1975

Lateral load distribution in skewed prestressed concrete i-beam bridges, July 1975

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LATERAL LOAD DISTRIBUTION IN SKEWED PRESTRESSED CONCRETE I-BEAM BRIDGES

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July 1975

Fritz Engineering Laboratory Report No. 400.16

ABSTRACT

This report contains a detailed compilation of the moment coefficients and load distribution factors in selected beam-slab highway bridge superstructures. The report presents the numerical results of the analytical studies conducted on 1) skewed beam-slab bridges with prestressed concrete I-beams, 2) skewed beam-slab bridges with prestressed concrete spread box-beams, and 3) right beam-slab bridges with prestressed concrete I-beams including the effects of curbs, parapets, and diaphragms.

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1. INTRODUCTION

The current design practice for the individual beams of highway bridges for live load is through the use of "Load Distribution Factors". For right bridges, these distribution factors are defined by the provisions in the Standard Specifications for Highway Bridges by the American Association of State Highway and Transportation Officials (Ref. 1).

The distribution factor is defined as the fraction of the wheel load applied to a longitudinal beam. For beam-slab bridges, e.g., prestressed concrete I-beam or prestressed concrete spread box-beam bridges (Fig.1), the distribution factor can be obtained from distribution factor equations as given by the specification provisions. The distribution factor equations for spread box-beam bridges are primarily functions of the number of beams, the number of lanes, and the spacing and width of the bridge (Ref.1). However, the lateral load distribution provisions for I-beam bridges are more simplistic and consider the spacing of the beams only (Ref. 1). Given the load distribution factors, the longitudinal beams of the bridge can be designed without going through a rigorous analysis of the complete bridge structure.

The present specifications however, do not provide the load distribution factors for highway bridges with skew. Moreover, the effects of curbs, parapets and diaphragms, which are parts of the bridge structure, are not taken into account.

1.1 Objective and Scope of the Investigation

The purpose of this report is to present a compilation of the moment coefficients and the load distribution factors for specific beam-slab bridges. This report contains the detailed numerical results of the analytical studies on the load distribution analysis of skewed beam-slab bridges in Ref. 2. Influence lines for moments and distribution factors are presented through a series of figures and tables.

The two types of bridge superstructures covered in the investigation are (1) the beam-slab bridge with prestressed concrete I-beams (Fig.2), and (2) the beam-slab bridge with prestressed concrete box-beams (Fig. 3).

For selected right bridges with prestressed concrete I-beams, the moment coefficients and distribution factors are given, including the effects of curbs, parapets and diaphragms.

1.2 The Definition of Skew

The skew bridges in the reported investigation are simply supported on parallel abutments. The beams are equally spaced and are in the direction of traffic. The angle of skew is defined as the angle between a line of support and the longitudinal axis of the beams (Fig. 4). When the angle is 90°, the structure is a right bridge (Fig. 4a).

1.3 Method of Analysis

The method of analysis is by the finite element technique. The bridge superstructure is discretized into an assemblage of finite elements. In the I-beam bridges, the structure is idealized into plate and stiffener elements (Fig. 2). For spread box-beam bridges, the structure is idealized by plate and web elements (Fig 3). The basic finite elements are shown in Fig. 5.

The theoretical developments and the analysis procedure are reported in Ref. 4.

2. DISTRIBUTION FACTORS IN SKEWED BEAM-SLAB BRIDGES WITH PRESTRESSED CONCRETE I-BEAMS

The prestressed concrete I-beam bridges in this section represent the 24 ft., 48 ft., and 72 ft. wide bridges. These bridges were selected systematically from the list of bridges in Ref. 7 which were taken to represent the range of the common bridge configurations encountered in practice.

The selected bridges are listed in Table 1. The number of beams for each bridge width are 4,5 and 6 for the 24 ft. wide bridge; 6,9 and 11 for the 48 ft. wide bridges; and 9,12,14 and 16 for the 72 ft. wide bridges. With the change in the number of beams, the resulting beam spacings also changed; and for the reported investigations the range of the spacing was varied from 4'-10" to 9'-6". For every bridge width there were predefined number of beams and three span lengths. These lengths are approximately 30 ft., 60 ft., and 120 ft. For each given length, the skew angles of the supports are 90^{o}, 60^{o}, 45^{o} and 30^{o}. In some cases, the 60^{o} skew bridges were not analyzed. The distribution factors for these bridges were interpolated linearly between the 90^{o} and the 45^{o} skew bridge distribution factors.

2.1 Application of Vehicular Loads

The specified loading on the bridge superstructure was the HS20-44, a 20 ton truck with a 16 ton semi-trailer (Fig. 6). The procedure was to apply the vehicular load at different positions

across the width of the bridge and analyze the structure for each load case. Theoretically, the longitudinal position of the truck should be such that the maximum moment is produced in the beams. However, this position could not be known before hand and could be determined only through a very tedious process of trial and error. The loading scheme adopted to overcome this difficulty was to place the load centroid of the vehicle at midspan. This scheme greatly simplifies the procedure of applying the loads but is found to underestimate the true maximum moment. For the cases investigated in Reference 4 the true maximum moment was underestimated by 2½%. The technique used to avoid the underestimation of the resulting distribution factor is described in Section 2.3. The concept behind this technique is to express the theoretical lane moment in terms of the moment produced by the load centroid at midspan instead of the maximum theoretical moment.

In the lateral direction, the truck centroid was placed directly over the beams or in between the beams, except for the bridges whose number of beams are equal or greater than 9. In these cases, 11 load positions, each equally distant from the next immediate load position, were specified across the bridge width.

2.2 Influence Lines for Moments

For each of the load positions on the bridge structure, moments are produced in the beams. These moments are computed at a section d/2 from midspan in the direction of the obtuse angle at the supports (Ref. 4), d being the distance between the drive wheels and

the load centroid. By dividing the beam moments by the theoretical one lane moment for the given span length (Appendix A of Ref. 1), the moments can be expressed in terms of moment coefficients. The influence line for moment in the beams can then be constructed by connecting a curve through the moment coefficients for the different load positions across the width of the bridge. The moment coefficients due to a vehicular load anywhere on the bridge can be determined by interpolation or with the use of the generated curve.

The plots of the influence lines for moments of selected beams in the list of bridges are shown in Figs. 7 through 36. Bridges with the same basic configurations, except for the angle of skew, are shown on the same figure. In this way, the effect of skew on the moment for different lane positions can be observed.

The longitudinal position of the vehicular load and the location of the section where the moment was computed, had been specified and evaluated in Reference 4. It should be noted that the longitudinal position of the truck was such that the load centroid was at midspan; and the beam moments were computed at the section d/2 from the midspan in the direction of the obtuse angle at the support, where d is the distance between the drive wheels and the load centroid.

2.3 Computation of the Load Distribution Factors

The computation of the load distribution factors from the coefficients of the influence lines for moments is detailed in

Reference 4. Basically, the procedure consisted of positioning the vehicular load on the structure such that the maximum moment response is obtained for the beams. This can be accomplished easily with the use of the influence line for moments of the individual beams. Clearly the sum of the moment coefficient coordinates at the position of the vehicular loads is the distribution factor. The position of the vehicular loads is varied until the largest sum of the moment coefficient coordinates is obtained; and hence the maximum load distribution factor is determined. The AASHTO lane width requirements however must be met (Ref. 1).

In the generation of the influence lines for moment, the longitudinal position of the vehicular load was such that the load centroid was at midspan (Section 2.1). This position was known not to consistently produce the maximum response in the beams but was a convenient way of applying the loads (Ref. 4). In order to obtain conservative values in the distribution factors, the influence moment coefficients were re-expressed in terms of the theoretical one lane moment due to the load centroid at midspan before the distribution factors were computed.

2.4 Load Distribution Factors vs. Skew Angle

The purpose of this section is to present the effect of skew on the load distribution factors in the skewed I-beam bridges investigated in the reported study. The distribution factors in the interior and the exterior beams in a set of bridges with a given number of beams are plotted against the skew angles. The numerical

values are connected by a smooth curve so that the rate of change in the distribution factor as a function of the skew angle may be visualized.

For the interior I-beams, the plots of the distribution factors can be seen in Figs. 37 through 78. In the figures, the maximum distribution factors due to a given number of design lanes are shown. The design distribution factors due to the critical combination of design lanes are shown separately in Figs. 79 through 88. The numerical values of the distribution factors are listed in Tables 2 through 7 for a given number of design provisions. The maximum design distribution factors are given in Table 8.

For the exterior I-beams, the distribution factors for a given number of design lanes are listed in tables 12 through 17 and the maximum design distribution factors are listed in Table 18.

2.5 Percent Reduction in the Load Distribution Factors

The percent reduction is the amount of reduction in the distribution factor when a right bridge becomes a skew bridge. This reduction was conveniently expressed in percentage and as a function of the angle of skew with the bridge design parameters such as the bridge width, spacing and span length (Ref. 4). Clearly, in this context the right bridge in a set of bridges is the base. Consequently the percent reduction is zero for all right bridges.

In the study, the bridge parameters that greatly influenced the percent reduction were the bridge width, spacing, span length and

skew (Ref. 4). The effect of the number of lanes was not signifigant and was purposely not included in the distribution factor equations. It should be noted that one of the considerations in the development of the distribution factor equations was the required simplicity in the form and ease of application.

2.5.1 Interior I-Beams

The equation developed for the percent reduction in the load distribution factor in skewed I-beam bridges is given by (Ref. 4):

$$PCTR = (45 \frac{S}{L} + 2\frac{W_c}{L}) \cot^2 \phi$$

where PCTR = reduction in percent in the distribution factor of a right bridge with the given S, W_c and L

S = Center to center beam spacing (ft)

W_c = Bridge width, curb to curb (ft)

L = Span length (ft)

ϕ = Angle of skew. (degrees)

The percent reduction was computed for all the bridges based on this equation and are listed in Tables 9 through 11. The distribution factors based on the analysis are also shown in the tables. The difference in the distribution factor between the equation and analysis can also be seen from the tables.

2.5.2 Exterior I-Beam

The percent reduction equation for the exterior beams is

$$PCTR_{EXT} = 50\left(\frac{S}{L} - 0.12\right)\cot\phi$$

where $PCTR_{EXT}$ = reduction (positive) or amplification (negative) in the distribution factor of a right bridge with the given S and L

S = Beam spacing (ft)

L = Span length (ft)

ϕ = Skew angle (degrees)

The percent reductions or amplifications were computed for all the bridges and are listed in Tables 19 through 21. The difference in the distribution factor between the equation and analysis can be seen from the tables.

3. DISTRIBUTION FACTORS IN SKEWED BEAM-SLAB BRIDGES WITH PRESTRESSED CONCRETE BOX-BEAMS

This section presents the numerical results of the pilot study conducted in Reference 4 for the skewed beam-slab bridges with prestressed concrete spread box-beams. The bridge widths considered in the study were 24 ft., 48 ft., and 72 ft. The number of beams, spacing and span lengths for each bridge width are listed in Table 22. The skew angles investigated were 90°, 60°, 45° and 30°. The number of design lanes for a given bridge width W_c was always taken to be $W_c/12$ (Ref. 1).

3.1 Application of the Design Vehicular Loads

The loading on the bridge superstructure is the HS 20-44 (Fig. 6) placed on all design lanes. In the transverse direction, the vehicular loads were positioned within the lanes, and as close as possible towards the center of the bridge width. In the longitudinal directions, the drive wheels were placed at midspan.

Due to the fact that only one loading case was investigated for a given bridge, influence lines for moments in spread box-beam bridges were not generated. The given loading, however, directly provided the distribution factors for the maximum number of design lanes.

3.2 Computation of the Load Distribution Factors

The beam moments in the bridges were computed at skew midspan. By dividing the computed moments by the theoretical one lane moment, the distribution factors in the beams could be directly determined. For this case however, the drive wheels were placed at midspan and the moments were computed at midspan. The theoretical lane moment at midspan was obtained by the same position of the load on a simple beam. It should be noted that this does not correspond to the maximum theoretical lane moment.

It can be seen that the given loading would produce the maximum moment response in the interior beam for the given number of design lanes. The absolute maximum moment response for a different number of design lanes however could not be determined. The distribution factors for the interior box-beams are given in Table 23.

The given loading obviously is not that which would produce the maximum response in the exterior beams. It is, however, of interest to see the effect of skew in the exterior beams under this loading condition. The list of distribution factors for exterior beams is shown in Table 24.

3.3 Load Distribution Factor vs. Skew Angle

The load distribution factors in the spread box-beam bridge are plotted against the skew angle in Figs. 89 through 94. The numerical values are connected by a smooth curve so that the rate of change in the distribution factor as the skew angle changes may be

visualized.

For all the bridges, the skew had the effect of greatly reducing the distribution factors. The amount of reduction was found to be signifigant even at 60^{o} skew for the shorter span length. In the figures, the three span lengths for the given bridge width and number of beams are superimposed in one figure.

3.4 Percent Reduction in the Load Distribution Factors

The percent reductions in the distribution factors for the spread box-beam bridges were determined as was done for the I-beam bridges in Section 2.5. In view of the very limited number of spread box-beam bridges and the single type of loading that were investigated, only a very tentative expression for the percent reduction was developed. The expression for the percent reduction for interior beams was found to be largely a function of the beam spacing, span length and the skew angle ϕ:

$$PCTR_{BOX} = \left(\frac{5000\ S}{L + 64}\right) \cdot \cot \phi$$

where $PCTR_{BOX}$ = percent reduction to be applied to the distribution factor of a right bridge of a given S and L

S = Center to center beam spacing (ft)

L = Span length (ft)

ϕ = Skew angle (degrees)

It should be noted, however, that the bridge width and other parameters may be as important. For the bridge investigated, however, the expression provides a very conservative prediction of the distribution factors in skew box-beam bridges.

No attempt has been made to provide an expression for the exterior box-beams. The loading scheme adopted for the box-beams did not constitute a critical loading pattern that would produce the maximum moment response for the exterior beam. The distribution factors based on the above loading however, are shown in Figures 95 through 100 for completeness.

4. LOAD DISTRIBUTION IN PRESTRESSED CONCRETE I-BEAMS BRIDGES WITH CURBS AND PARAPETS AND DIAPHRAGMS

4.1 General

The load distribution in prestressed concrete I-beam bridges with 90° skew (right bridges) has been extensively investigated (Ref. 7). Refined expressions for the distribution factors in these bridges have been developed. The expressions for the distribution factors, including the skew, have been investigated and reported in Reference 4 and Section 2 of this report. The actual highway bridge superstructure, however, has curbs and parapets, and diaphragms. While these factors are known to have certain effects on the load distribution, and ultimately on the load distribution factors, the extent of their overall significance is not known.

This section presents the influence moment and load distribution factors for prestressed concrete I-beam bridges (1) with curbs and parapets, (2) with diaphragm and multiple diaphragms, and (3) continuous over two intermediate supports. The tables and figures presented herein are those which have not been presented in Ref. 4.

4.2 Comparison of the Analytical with Field Test Results

The effects of curbs, parapets and diaphragms can be readily seen from the influence lines for moments and the plot of the resulting distribution factors (Figs. 101 through 116, and Refs. 2 and 3). These two illustrations are used exclusively in presenting the effects of the curbs and parapets and diaphragms. The analysis employed the test vehicle loading (Fig. 6).

The field tested bridges are the Lehighton Bridge (Ref.2) and Bartonsville Bridge (Ref. 3). The details of the analytical modeling can be found in Reference 4. The influence lines for moments for the different beams are shown in Figs. 101 through 103 for the Lehighton Bridge and Figs. 104 and 105 for the Bartonsville Bridge. The numerical values are listed in Table 28.

4.3 Effect of Partial and Fully Effective Diaphragms

The diaphragms were not fully continuous and therefore their sections were not considered as fully effective. The effect of having no diaphragms and then having fully effective diaphragms can be seen in the influence lines for moments in Figs. 106 through 109.

The moment coefficients that include the effect of the diaphragms are given in Tables 28 to 30. The resulting plot of the distribution factors is detailed in Ref. 4.

4.4 Effect of Curbs and Parapets, Diaphragms, and Curbs and Parapets and Diaphragms

Three prestressed concrete I-beam bridges with basically the same spacing and span length were investigated. The influence lines for moments are shown in Fig. 110 for the 5 beam bridge, and Figs. 111 and 112 for the 7 beam bridges. The influence lines for the 5 beam bridges are given in Ref. 4. The resulting distribution factors from the above influence line for moment using the AASHTO loading provisions are shown in Figs. 113 and 114. The numerical values are shown in Tables 31 and 32.

4.5 Effect of Diaphragms and Multiple Diaphragms

This part of the investigation was concerned with determining the most effective location of the diaphragms. Five cases were studied and compared: (1) no diaphragms, (2) one line of diaphragms at midspan, (3) two lines of diaphragms at third of the span, (4) three lines of diaphragms at quarter of the span and (5) four lines of diaphragms at a fifth of the span. The effect of the diaphragm can be seen in Figs. 115 and 116. The distribution factors can be seen in Figs. 117 and 118. The numerical values of the distribution factors are presented in Ref. 4.

4.6 Effect of Continuity

The figures illustrating the effect of continuity are given in Reference 4. The numerical values for the distribution factors in the reported study are given in Tables 33 and 34.

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6. TABLES

TABLE 1

LIST OF BRIDGES

NO	WIDTH	NB	SPACING	LENGTH	BEAM SIZE	S/L
1	24.00	6	57.60	120.00	AASHO-6	.0400
2	24.00	6	57.60	72.00	24/42	.0667
3	24.00	6	57.60	38.40	20/30	.1250
4	24.00	5	72.00	120.00	AASHO-6	.0500
5	24.00	5	72.00	60.00	20/39	.1000
6	24.00	5	72.00	42.00	20/30	.1429
7	24.00	4	96.00	120.00	AASHO-6	.0667
8	24.00	4	96.00	64.00	24/45	.1250
9	24.00	4	96.00	40.00	20/30	.2000
10	48.00	11	57.60	120.00	AASHO-6	.0400
11	48.00	11	57.60	84.00	24/48	.0571
12	48.00	11	57.60	48.00	20/30	.1000
13	48.00	9	72.00	105.00	28/63	.0571
14	48.00	9	72.00	60.00	20/39	.1000
15	48.00	9	72.00	42.00	20/30	.1429
16	48.00	6	115.20	96.00	AASHO-6	.1000
17	48.00	6	115.20	57.60	24/45	.1667
18	48.00	6	115.20	48.00	20/33	.2000
19	72.00	16	57.60	120.00	AASHO-6	.0400
20	72.00	16	57.60	57.60	20/36	.0833
21	72.00	16	57.60	38.40	AASHO-1	.1250
22	72.00	14	66.50	110.80	AASHO-6	.0500
23	72.00	14	66.50	66.50	24/42	.0833
24	72.00	14	66.50	38.80	AASHO-1	.1429
25	72.00	12	78.50	114.50	AASHO-6	.0571
26	72.00	12	78.50	65.50	24/42	.1000
27	72.00	12	78.50	39.30	20/30	.1667
28	72.00	9	108.00	108.00	AASHO-6	.0833
29	72.00	9	108.00	54.00	24/42	.1667
30	72.00	9	108.00	45.00	24/36	.2000

TABLE 2

INTERIOR BEAM DISTRIBUTION FACTORS

NO. OF LOADED LANES 1

BEAM NUMBER AND SKEW ANGLE (DEGREES)

BRIDGE NO.	BEAM	90	BEAM	60	BEAM	45	BEAM	30
1	5	.58	0	.59	5	.59	2	.56
2	2	.60	0	.59	5	.57	2	.50
3	3	.76	0	.73	5	.69	5	.60
4	2	.64	2	.64	2	.64	4	.60
5	2	.68	4	.66	4	.63	4	.54
6	3	.77	3	.73	3	.67	3	.55
7	3	.80	0	.78	3	.77	3	.71
8	3	.86	0	.82	3	.78	3	.66
9	3	.90	0	.83	3	.76	3	.59
10	10	.58	0	.57	2	.57	2	.55
11	2	.59	0	.58	2	.57	2	.52
12	6	.70	0	.68	6	.66	2	.58
13	2	.66	2	.66	2	.64	8	.59
14	2	.69	2	.67	2	.63	2	.53
15	5	.74	5	.65	5	.64	2	.48
16	2	.97	0	.94	5	.92	5	.84
17	2	1.06	0	1.02	2	.98	2	.84
18	5	1.04	0	.95	5	.85	4	.68
19	2	.58	0	.58	2	.58	2	.56
20	2	.61	0	.59	15	.56	2	.48
21	15	.62	0	.58	2	.53	2	.42
22	2	.64	2	.64	2	.63	2	.59
23	2	.66	2	.64	13	.61	2	.54
24	2	.66	2	.62	2	.56	2	.43
25	2	.63	0	.62	11	.61	11	.57
26	11	.66	0	.63	11	.60	11	.52
27	2	.74	0	.68	11	.61	7	.49
28	8	.81	0	.79	8	.77	8	.71
29	5	1.00	0	.93	5	.87	8	.69
30	5	1.04	0	.95	5	.87	8	.66

TABLE 3

INTERIOR BEAM DISTRIBUTION FACTORS

NO. OF LOADED LANES 2

BEAM NUMBER AND SKEW ANGLE (DEGREES)

BRIDGE NO.	BEAM	90	BEAM	60	BEAM	45	BEAM	30
1	4	.81	0	.79	4	.77	2	.71
2	4	.84	-0	.81	4	.77	4	.66
3	3	.96	0	.94	4	.93	4	.86
4	3	.96	3	.92	3	.88	4	.82
5	3	1.05	3	.99	3	.92	3	.78
6	3	1.17	3	1.07	3	.95	3	.76
7	2	1.23	0	1.20	3	1.18	3	1.08
8	3	1.30	0	1.24	3	1.17	2	.99
9	3	1.32	0	1.23	3	1.14	2	.88
10	8	.78	0	.76	2	.75	10	.70
11	8	.81	0	.78	8	.75	7	.67
12	6	1.03	0	.98	7	.93	7	.84
13	6	.95	7	.93	7	.89	8	.81
14	5	1.06	5	.99	6	.93	6	.79
15	5	1.16	5	1.00	6	.96	2	.78
16	3	1.60	0	1.55	4	1.49	4	1.32
17	3	1.72	0	1.63	4	1.55	5	1.31
18	4	1.68	0	1.55	4	1.41	4	1.13
19	15	.75	0	.75	15	.74	2	.70
20	8	.84	0	.80	8	.76	13	.65
21	8	.91	0	.85	10	.78	9	.64
22	12	.89	12	.87	12	.85	13	.78
23	4	.93	4	.90	9	.87	9	.75
24	7	1.00	12	.92	12	.86	6	.68
25	10	.97	0	.95	10	.93	10	.86
26	10	1.06	0	1.01	10	.97	10	.84
27	6	1.20	0	1.10	10	.99	10	.79
28	7	1.35	0	1.31	8	1.27	8	1.14
29	5	1.53	0	1.45	5	1.36	3	1.11
30	5	1.57	0	1.45	5	1.33	3	1.06

TABLE 4

INTERIOR BEAM DISTRIBUTION FACTORS

NO. OF LOADED LANES 3

BEAM NUMBER AND SKEW ANGLE (DEGREES)

BRIDGE NO.	BEAM	90	BEAM	60	BEAM	45	BEAM	30
10	8	.88	0	.85	8	.83	8	.76
11	8	.89	0	.86	6	.83	8	.73
12	6	1.03	0	.98	7	.94	7	.87
13	6	1.10	5	1.07	5	1.03	6	.92
14	5	1.15	5	1.12	5	1.06	6	.86
15	5	1.20	5	1.13	5	1.07	6	.83
16	4	1.81	0	1.75	4	1.69	4	1.51
17	4	1.83	0	1.75	4	1.67	4	1.42
18	3	1.84	0	1.70	4	1.55	4	1.24
19	9	.87	0	.85	10	.83	13	.76
20	8	.93	0	.88	8	.83	11	.71
21	8	.97	0	.90	8	.83	9	.68
22	11	1.02	4	1.00	4	.97	4	.90
23	11	1.04	11	1.01	10	.96	10	.84
24	7	1.08	7	1.00	5	.92	8	.73
25	10	1.13	0	1.10	10	1.08	10	1.00
26	6	1.18	0	1.14	9	1.10	9	.95
27	6	1.28	0	1.18	5	1.08	5	.85
28	7	1.60	0	1.55	7	1.51	7	1.36
29	5	1.73	0	1.65	5	1.57	5	1.25
30	5	1.76	0	1.66	5	1.56	6	1.12

TABLE 5

INTERIOR BEAM DISTRIBUTION FACTORS

NO. OF LOADED LANES 4

BEAM NUMBER AND SKEW ANGLE (DEGREES)

BRIDGE NO.	BEAM	90	BEAM	60	BEAM	45	BEAM	30
10	6	.94	0	.91	6	.87	7	.79
11	6	.94	0	.90	6	.87	6	.75
12	6	1.02	0	.98	6	.93	6	.83
13	5	1.17	5	1.13	5	1.09	5	.97
14	5	1.20	5	1.14	5	1.08	5	.89
15	5	1.24	5	1.13	5	1.04	5	.80
16	4	1.84	0	1.79	4	1.74	4	1.59
17	4	1.83	0	1.77	4	1.70	4	1.45
18	4	1.86	0	1.72	4	1.58	4	1.21
19	9	.93	0	.91	9	.89	9	.83
20	8	.95	0	.91	8	.87	9	.74
21	8	.97	0	.91	10	.86	9	.71
22	9	1.07	9	1.04	9	1.03	9	.96
23	9	1.07	9	1.04	9	1.01	9	.88
24	7	1.09	7	1.02	9	.96	8	.77
25	8	1.22	0	1.19	7	1.17	7	1.08
26	6	1.24	0	1.20	7	1.16	7	1.01
27	6	1.30	0	1.21	7	1.12	5	.89
28	5	1.69	0	1.65	5	1.61	5	1.44
29	5	1.74	0	1.67	5	1.60	6	1.32
30	5	1.77	0	1.68	5	1.59	6	1.22

TABLE 6

INTERIOR BEAM DISTRIBUTION FACTORS

NO. OF LOADED LANES 5

BEAM NUMBER AND SKEW ANGLE (DEGREES)

BRIDGE NO.	BEAM	90	BEAM	60	BEAM	45	BEAM	30
19	9	.94	0	.92	9	.90	9	.84
20	8	.95	0	.91	8	.87	9	.75
21	8	.96	0	.91	10	.86	9	.72
22	9	1.07	9	1.05	9	1.04	9	.98
23	9	1.06	9	1.03	9	1.01	9	.89
24	7	1.08	7	1.02	9	.96	8	.77
25	6	1.23	0	1.21	7	1.19	7	1.11
26	6	1.24	0	1.20	7	1.16	7	1.03
27	6	1.29	0	1.21	7	1.12	5	.89
28	5	1.72	0	1.68	5	1.65	5	1.49
29	5	1.74	0	1.68	5	1.61	6	1.33
30	5	1.76	0	1.68	5	1.60	6	1.23

TABLE 7

INTERIOR BEAM DISTRIBUTION FACTORS

NO. OF LOADED LANES 6

BEAM NUMBER AND SKEW ANGLE (DEGREES)

BRIDGE NO.	BEAM	90	BEAM	60	BEAM	45	BEAM	30
19	7	.91	0	.89	10	.88	10	.84
20	8	.90	0	.88	8	.85	10	.74
21	8	.89	0	.87	11	.84	9	.70
22	9	1.05	9	1.03	9	1.02	9	.97
23	9	1.05	10	1.02	10	.99	9	.88
24	7	1.01	5	.99	5	.95	8	.75
25	8	1.20	0	1.19	8	1.17	8	1.10
26	8	1.21	0	1.18	8	1.15	8	1.02
27	6	1.21	0	1.16	5	1.11	5	.87
28	5	1.69	0	1.66	5	1.64	5	1.51
29	5	1.71	0	1.65	5	1.59	5	1.32
30	5	1.73	0	1.64	5	1.55	5	1.20

TABLE 8

MAXIMUM DISTRIBUTION FACTORS

INTERIOR BEAMS

BRIDGE NO.	*NL	**NLL	NO. OF LOADED LANES AND SKEW ANGLE 90	NLL	60	NLL	45	NLL	30
1	2	2	.81	2	.79	2	.77	2	.71
2	2	2	.84	2	.81	2	.77	2	.66
3	2	2	.96	2	.94	2	.93	2	.86
4	2	2	.96	2	.92	2	.88	2	.82
5	2	2	1.05	2	.99	2	.92	2	.78
6	2	2	1.17	2	1.07	2	.95	2	.76
7	2	2	1.23	2	1.20	2	1.18	2	1.08
8	2	2	1.30	2	1.24	2	1.17	2	.99
9	2	2	1.32	2	1.23	2	1.14	2	.88
10	4	4	.94	4	.91	4	.87	4	.79
11	4	4	.94	4	.90	4	.87	4	.75
12	4	2	1.03	3	.98	3	.94	3	.87
13	4	4	1.17	4	1.13	4	1.09	4	.97
14	4	4	1.20	4	1.14	4	1.08	4	.89
15	4	4	1.24	3	1.13	3	1.07	3	.83
16	4	4	1.84	4	1.79	4	1.74	4	1.59
17	4	4	1.83	4	1.77	4	1.70	4	1.45
18	4	4	1.86	4	1.72	4	1.58	3	1.24
19	6	5	.94	5	.92	5	.90	5	.84
20	6	4	.95	4	.91	4	.87	5	.75
21	6	4	.97	4	.91	4	.86	5	.72
22	6	5	1.07	5	1.05	5	1.04	5	.98
23	6	4	1.07	4	1.04	4	1.01	5	.89
24	6	4	1.09	4	1.02	5	.96	5	.77
25	6	5	1.23	5	1.21	5	1.19	5	1.11
26	6	4	1.24	5	1.20	5	1.16	5	1.03
27	6	4	1.30	4	1.21	5	1.12	5	.89
28	6	5	1.72	5	1.68	5	1.65	6	1.51
29	6	4	1.74	5	1.68	5	1.61	5	1.33
30	6	4	1.77	5	1.68	5	1.60	5	1.23

* NL = NO. OF LANES

** NLL = NO. OF LOADED LANES

TABLE 9

DISTRIBUTION FACTORS

24 FT. WIDE BRIDGES

BRIDGE NO. 1

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.58	.58	.00	.00
60	1	.58	.59	-.00	.73
45	1	.58	.59	-.01	2.20
30	1	.55	.56	-.01	6.60
90	2	.81	.81	-.00	.00
60	2	.80	.79	.01	.73
45	2	.79	.77	.02	2.20
30	2	.76	.71	.05	6.60

BRIDGE NO. 2

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.60	.60	-.00	.00
60	1	.60	.59	.01	1.22
45	1	.58	.57	.01	3.67
30	1	.54	.50	.04	11.00
90	2	.84	.84	-.00	.00
60	2	.83	.81	.02	1.22
45	2	.81	.77	.04	3.67
30	2	.75	.66	.09	11.00

BRIDGE NO. 3

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.76	.76	.00	.00
60	1	.74	.73	.02	2.29
45	1	.71	.69	.02	6.88
30	1	.60	.60	.01	20.63
90	2	.96	.96	.00	.00
60	2	.93	.94	-.01	2.29
45	2	.89	.93	-.04	6.88
30	2	.76	.86	-.10	20.63

TABLE 9 (CONT.)

BRIDGE NO. 4

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.64	.64	-.00	.00
60	1	.64	.64	-.01	.88
45	1	.62	.64	-.02	2.65
30	1	.59	.60	-.01	7.95
90	2	.96	.96	-.00	.00
60	2	.95	.92	.03	.88
45	2	.93	.88	.05	2.65
30	2	.88	.82	.06	7.95

BRIDGE NO. 5

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.68	.68	-.00	.00
60	1	.67	.66	.00	1.77
45	1	.64	.63	.01	5.30
30	1	.57	.54	.03	15.90
90	2	1.05	1.05	-.00	.00
60	2	1.03	.99	.04	1.77
45	2	1.00	.92	.08	5.30
30	2	.88	.78	.10	15.90

BRIDGE NO. 6

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.77	.77	-.00	.00
60	1	.75	.73	.02	2.53
45	1	.71	.67	.05	7.57
30	1	.60	.55	.05	22.72
90	2	1.17	1.17	-.00	.00
60	2	1.14	1.07	.07	2.53
45	2	1.08	.95	.14	7.57
30	2	.91	.76	.15	22.72

TABLE 9 (CONT.)

BRIDGE NO. 7

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	0/0 REDUCTION
90	1	.80	.80	-.00	.00
60	1	.79	.78	.00	1.13
45	1	.77	.77	.00	3.40
30	1	.72	.71	.00	10.20
90	2	1.23	1.23	-.00	.00
60	2	1.22	1.20	.01	1.13
45	2	1.19	1.18	.01	3.40
30	2	1.10	1.08	.02	10.20

BRIDGE NO. 8

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	0/0 REDUCTION
90	1	.86	.86	-.00	.00
60	1	.85	.82	.02	2.13
45	1	.81	.78	.03	6.38
30	1	.70	.66	.04	19.13
90	2	1.30	1.30	.00	.00
60	2	1.27	1.24	.03	2.13
45	2	1.22	1.17	.04	6.38
30	2	1.05	.99	.06	19.13

BRIDGE NO. 9

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	0/0 REDUCTION
90	1	.90	.90	-.00	.00
60	1	.87	.83	.04	3.40
45	1	.81	.76	.05	10.20
30	1	.63	.59	.04	30.60
90	2	1.32	1.32	-.00	.00
60	2	1.28	1.23	.05	3.40
45	2	1.19	1.14	.05	10.20
30	2	.92	.88	.04	30.60

DISTRIBUTION FACTORS

TABLE 10

48 FT. WIDE BRIDGES

BRIDGE NO. 10

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.58	.58	-.00	.00
60	1	.57	.57	-.00	.87
45	1	.56	.57	-.01	2.60
30	1	.53	.55	-.02	7.80
90	2	.78	.78	-.00	.00
60	2	.77	.76	.01	.87
45	2	.76	.75	.01	2.60
30	2	.72	.70	.01	7.80
90	3	.88	.88	.00	.00
60	3	.87	.85	.02	.87
45	3	.86	.83	.03	2.60
30	3	.81	.76	.05	7.80
90	4	.94	.94	.00	.00
60	4	.93	.91	.02	.87
45	4	.91	.87	.04	2.60
30	4	.86	.79	.07	7.80

BRIDGE NO. 11

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.59	.59	-.00	.00
60	1	.58	.58	.00	1.24
45	1	.56	.57	-.00	3.71
30	1	.52	.52	.00	11.14
90	2	.81	.81	-.00	.00
60	2	.80	.78	.02	1.24
45	2	.78	.75	.03	3.71
30	2	.72	.67	.06	11.14
90	3	.89	.89	.00	.00
60	3	.88	.86	.02	1.24
45	3	.86	.83	.03	3.71
30	3	.79	.73	.06	11.14
90	4	.94	.94	-.00	.00
60	4	.93	.90	.03	1.24
45	4	.91	.87	.04	3.71
30	4	.84	.75	.08	11.14

TABLE 10 (CONT.)

BRIDGE NO. 12

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.70	.70	-.00	.00
60	1	.69	.68	.01	2.17
45	1	.66	.66	-.00	6.50
30	1	.56	.58	-.02	19.50
90	2	1.03	1.03	-.00	.00
60	2	1.01	.98	.03	2.17
45	2	.96	.93	.04	6.50
30	2	.83	.84	-.01	19.50
90	3	1.03	1.03	-.00	.00
60	3	1.01	.98	.03	2.17
45	3	.96	.94	.03	6.50
30	3	.83	.87	-.04	19.50
90	4	1.03	1.03	-.00	.00
60	4	1.01	.98	.03	2.17
45	4	.96	.94	.03	6.50
30	4	.83	.87	-.04	19.50

BRIDGE NO. 13

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.66	.66	-.00	.00
60	1	.66	.66	.00	1.16
45	1	.64	.64	.01	3.49
30	1	.59	.59	.01	10.46
90	2	.95	.95	-.00	.00
60	2	.94	.93	.01	1.16
45	2	.92	.89	.02	3.49
30	2	.85	.81	.04	10.46
90	3	1.10	1.10	.00	.00
60	3	1.08	1.07	.01	1.16
45	3	1.06	1.03	.03	3.49
30	3	.98	.92	.06	10.46
90	4	1.16	1.16	.00	.00
60	4	1.15	1.13	.03	1.16
45	4	1.12	1.09	.04	3.49
30	4	1.04	.97	.07	10.46

TABLE 10 (CONT.)

BRIDGE NO. 14

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.69	.69	-.00	.00
60	1	.68	.67	.01	2.03
45	1	.65	.63	.02	6.10
30	1	.57	.53	.03	18.30
90	2	1.06	1.06	.00	.00
60	2	1.04	.99	.05	2.03
45	2	1.00	.93	.07	6.10
30	2	.87	.79	.08	18.30
90	3	1.15	1.15	-.00	.00
60	3	1.12	1.12	.00	2.03
45	3	1.08	1.06	.02	6.10
30	3	.94	.86	.08	18.30
90	4	1.20	1.20	-.00	.00
60	4	1.18	1.14	.04	2.03
45	4	1.13	1.08	.05	6.10
30	4	.98	.89	.10	18.30

BRIDGE NO. 15

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.74	.74	-.00	.00
60	1	.72	.65	.07	2.91
45	1	.68	.64	.03	8.72
30	1	.55	.48	.07	26.15
90	2	1.16	1.16	-.00	.00
60	2	1.13	1.00	.13	2.91
45	2	1.06	.96	.10	8.72
30	2	.86	.78	.07	26.15
90	3	1.20	1.20	-.00	.00
60	3	1.17	1.13	.04	2.91
45	3	1.10	1.07	.03	8.72
30	3	.89	.83	.06	26.15
90	4	1.24	1.24	-.00	.00
60	4	1.21	1.13	.08	2.91
45	4	1.13	1.07	.06	8.72
30	4	.92	.83	.09	26.15

TABLE 10 (CONT.)

BRIDGE NO. 16

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.97	.97	-.00	.00
60	1	.95	.94	.01	1.83
45	1	.91	.92	-.00	5.50
30	1	.81	.84	-.04	16.50
90	2	1.60	1.60	.00	.00
60	2	1.57	1.55	.02	1.83
45	2	1.51	1.49	.02	5.50
30	2	1.34	1.32	.01	16.50
90	3	1.81	1.81	-.00	.00
60	3	1.78	1.75	.03	1.83
45	3	1.71	1.69	.02	5.50
30	3	1.51	1.51	-.00	16.50
90	4	1.84	1.84	-.00	.00
60	4	1.81	1.79	.02	1.83
45	4	1.74	1.74	-.00	5.50
30	4	1.54	1.59	-.05	16.50

BRIDGE NO. 17

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	1.06	1.06	-.00	.00
60	1	1.03	1.02	.01	3.06
45	1	.97	.98	-.01	9.17
30	1	.77	.84	-.07	27.50
90	2	1.72	1.72	-.00	.00
60	2	1.67	1.63	.03	3.06
45	2	1.56	1.55	.01	9.17
30	2	1.25	1.31	-.06	27.50
90	3	1.83	1.83	-.00	.00
60	3	1.78	1.75	.03	3.06
45	3	1.66	1.67	-.00	9.17
30	3	1.33	1.42	-.10	27.50
90	4	1.83	1.84	-.00	.00
60	4	1.78	1.77	.01	3.06
45	4	1.67	1.70	-.03	9.17
30	4	1.33	1.45	-.12	27.50

TABLE 10 (CONT.)

BRIDGE NO. 18

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	1.04	1.04	-.00	.00
60	1	1.00	.95	.05	3.67
45	1	.92	.85	.07	11.00
30	1	.70	.68	.01	33.00
90	2	1.68	1.68	-.00	.00
60	2	1.62	1.55	.07	3.67
45	2	1.49	1.41	.08	11.00
30	2	1.12	1.13	-.00	33.00
90	3	1.84	1.84	-.00	.00
60	3	1.78	1.70	.08	3.67
45	3	1.64	1.55	.09	11.00
30	3	1.23	1.24	-.01	33.00
90	4	1.86	1.86	-.00	.00
60	4	1.79	1.72	.07	3.67
45	4	1.66	1.58	.08	11.00
30	4	1.25	1.24	.00	33.00

DISTRIBUTION FACTORS

TABLE 11

72 FT. WIDE BRIDGES

BRIDGE NO. 19

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.58	.58	-.00	.00
60	1	.57	.58	-.01	1.00
45	1	.56	.58	-.02	3.00
30	1	.53	.56	-.03	9.00
90	2	.75	.75	-.00	.00
60	2	.75	.75	-.00	1.00
45	2	.73	.74	-.01	3.00
30	2	.69	.70	-.02	9.00
90	3	.87	.87	-.00	.00
60	3	.86	.85	.01	1.00
45	3	.84	.83	.01	3.00
30	3	.79	.76	.02	9.00
90	4	.93	.93	.00	.00
60	4	.92	.91	.01	1.00
45	4	.90	.89	.01	3.00
30	4	.84	.83	.02	9.00
90	5	.94	.94	-.00	.00
60	5	.93	.92	.01	1.00
45	5	.91	.90	.01	3.00
30	5	.85	.84	.01	9.00
90	6	.94	.94	-.00	.00
60	6	.93	.92	.01	1.00
45	6	.91	.90	.01	3.00
30	6	.85	.84	.01	9.00

TABLE 11 (CONT.)

BRIDGE NO. 20

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.61	.61	-.00	.00
60	1	.60	.59	.01	2.08
45	1	.57	.56	.01	6.25
30	1	.50	.48	.02	18.75
90	2	.84	.84	-.00	.00
60	2	.82	.80	.02	2.08
45	2	.79	.76	.02	6.25
30	2	.68	.65	.04	18.75
90	3	.93	.93	-.00	.00
60	3	.91	.88	.03	2.08
45	3	.87	.83	.04	6.25
30	3	.75	.71	.05	18.75
90	4	.95	.95	-.00	.00
60	4	.93	.91	.02	2.08
45	4	.89	.87	.03	6.25
30	4	.77	.74	.03	18.75
90	5	.95	.95	-.00	.00
60	5	.93	.91	.02	2.08
45	5	.89	.87	.03	6.25
30	5	.77	.75	.03	18.75
90	6	.95	.95	-.00	.00
60	6	.93	.91	.02	2.08
45	6	.89	.87	.03	6.25
30	6	.77	.75	.03	18.75

TABLE 11 (CONT.)

BRIDGE NO. 21

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.62	.62	-.00	.00
60	1	.60	.58	.03	3.13
45	1	.56	.53	.03	9.38
30	1	.45	.42	.03	28.13
90	2	.91	.91	-.00	.00
60	2	.88	.85	.04	3.13
45	2	.83	.78	.04	9.38
30	2	.66	.64	.02	28.13
90	3	.97	.97	-.00	.00
60	3	.94	.90	.04	3.13
45	3	.88	.83	.05	9.38
30	3	.70	.68	.01	28.13
90	4	.97	.97	-.00	.00
60	4	.94	.91	.03	3.13
45	4	.88	.86	.02	9.38
30	4	.70	.71	-.02	28.13
90	5	.97	.97	-.00	.00
60	5	.94	.91	.03	3.13
45	5	.88	.86	.02	9.38
30	5	.70	.72	-.02	28.13
90	6	.97	.97	-.00	.00
60	6	.94	.91	.03	3.13
45	6	.88	.86	.02	9.38
30	6	.70	.72	-.02	28.13

TABLE 11 (CONT.)

BRIDGE NO. 22

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.64	.64	-.00	.00
60	1	.64	.64	.00	1.18
45	1	.62	.63	-.01	3.55
30	1	.58	.59	-.02	10.65
90	2	.89	.89	-.00	.00
60	2	.88	.87	.01	1.18
45	2	.85	.85	.01	3.55
30	2	.79	.78	.01	10.65
90	3	1.02	1.02	-.00	.00
60	3	1.01	1.00	.01	1.18
45	3	.98	.97	.01	3.55
30	3	.91	.90	.01	10.65
90	4	1.07	1.07	-.00	.00
60	4	1.06	1.04	.02	1.18
45	4	1.03	1.02	.01	3.55
30	4	.96	.96	-.00	10.65
90	5	1.08	1.08	.00	.00
60	5	1.06	1.05	.01	1.18
45	5	1.04	1.03	.00	3.55
30	5	.96	.98	-.01	10.65
90	6	1.08	1.08	.00	.00
60	6	1.06	1.05	.01	1.18
45	6	1.04	1.03	.00	3.55
30	6	.96	.98	-.01	10.65

TABLE 11 (CONT.)

BRIDGE NO. 23

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.66	.66	-.00	.00
60	1	.65	.64	.00	1.97
45	1	.62	.61	.01	5.92
30	1	.54	.54	.01	17.75
90	2	.93	.93	-.00	.00
60	2	.91	.90	.01	1.97
45	2	.87	.87	.01	5.92
30	2	.76	.75	.02	17.75
90	3	1.04	1.04	.00	.00
60	3	1.02	1.01	.01	1.97
45	3	.98	.96	.01	5.92
30	3	.85	.84	.01	17.75
90	4	1.07	1.07	.00	.00
60	4	1.05	1.04	.01	1.97
45	4	1.01	1.01	-.00	5.92
30	4	.88	.88	-.00	17.75
90	5	1.07	1.07	.00	.00
60	5	1.05	1.04	.01	1.97
45	5	1.01	1.01	-.00	5.92
30	5	.88	.89	-.01	17.75
90	6	1.07	1.07	.00	.00
60	6	1.05	1.04	.01	1.97
45	6	1.01	1.01	-.00	5.92
30	6	.88	.89	-.01	17.75

TABLE 11 (CONT.)

BRIDGE NO. 24

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.66	.66	-.00	.00
60	1	.64	.62	.02	3.38
45	1	.59	.56	.03	10.14
30	1	.46	.43	.03	30.41
90	2	1.00	1.01	-.00	.00
60	2	.97	.92	.05	3.38
45	2	.90	.86	.05	10.14
30	2	.70	.68	.02	30.41
90	3	1.08	1.08	-.00	.00
60	3	1.04	1.00	.04	3.38
45	3	.97	.92	.05	10.14
30	3	.75	.73	.02	30.41
90	4	1.09	1.09	-.00	.00
60	4	1.06	1.02	.03	3.38
45	4	.98	.96	.03	10.14
30	4	.76	.77	-.01	30.41
90	5	1.09	1.09	-.00	.00
60	5	1.06	1.02	.03	3.38
45	5	.98	.96	.03	10.14
30	5	.76	.77	-.01	30.41
90	6	1.09	1.09	-.00	.00
60	6	1.06	1.02	.03	3.38
45	6	.98	.96	.03	10.14
30	6	.76	.77	-.01	30.41

TABLE 11 (CONT.)

BRIDGE NO. 25

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.63	.63	-.00	.00
60	1	.63	.62	.00	1.28
45	1	.61	.61	-.00	3.83
30	1	.56	.57	-.01	11.49
90	2	.97	.97	-.00	.00
60	2	.96	.95	.01	1.28
45	2	.94	.93	.00	3.83
30	2	.86	.86	-.00	11.49
90	3	1.13	1.13	-.00	.00
60	3	1.11	1.10	.01	1.28
45	3	1.08	1.08	.00	3.83
30	3	1.00	1.00	.00	11.49
90	4	1.22	1.22	-.00	.00
60	4	1.20	1.19	.01	1.28
45	4	1.17	1.17	.00	3.83
30	4	1.08	1.08	-.00	11.49
90	5	1.23	1.23	.00	.00
60	5	1.21	1.21	.01	1.28
45	5	1.18	1.19	-.00	3.83
30	5	1.09	1.11	-.02	11.49
90	6	1.23	1.23	.00	.00
60	6	1.21	1.21	.01	1.28
45	6	1.18	1.19	-.00	3.83
30	6	1.09	1.11	-.02	11.49

TABLE 11 (CONT.)

BRIDGE NO. 26

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.66	.66	.00	.00
60	1	.64	.63	.01	2.23
45	1	.61	.60	.01	6.69
30	1	.53	.52	.00	20.08
90	2	1.05	1.05	.00	.00
60	2	1.03	1.01	.02	2.23
45	2	.98	.97	.01	6.69
30	2	.84	.84	.00	20.08
90	3	1.18	1.18	.00	.00
60	3	1.15	1.14	.01	2.23
45	3	1.10	1.10	.00	6.69
30	3	.94	.95	-.01	20.08
90	4	1.24	1.24	-.00	.00
60	4	1.21	1.20	.02	2.23
45	4	1.16	1.16	.00	6.69
30	4	.99	1.01	-.02	20.08
90	5	1.24	1.24	-.00	.00
60	5	1.21	1.20	.01	2.23
45	5	1.16	1.16	-.00	6.69
30	5	.99	1.02	-.03	20.08
90	6	1.24	1.24	-.00	.00
60	6	1.21	1.20	.01	2.23
45	6	1.16	1.16	-.00	6.69
30	6	.99	1.02	-.03	20.08

TABLE 11 (CONT.)

BRIDGE NO. 27

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.74	.74	-.00	.00
60	1	.72	.68	.04	3.72
45	1	.66	.61	.05	11.16
30	1	.49	.49	.01	33.47
90	2	1.20	1.20	-.00	.00
60	2	1.16	1.10	.06	3.72
45	2	1.07	.99	.07	11.16
30	2	.80	.79	.01	33.47
90	3	1.28	1.28	-.00	.00
60	3	1.23	1.18	.05	3.72
45	3	1.13	1.08	.05	11.16
30	3	.85	.85	.00	33.47
90	4	1.30	1.30	-.00	.00
60	4	1.25	1.21	.04	3.72
45	4	1.15	1.12	.03	11.16
30	4	.86	.89	-.02	33.47
90	5	1.30	1.30	-.00	.00
60	5	1.25	1.21	.04	3.72
45	5	1.15	1.12	.03	11.16
30	5	.86	.89	-.03	33.47
90	6	1.30	1.30	-.00	.00
60	6	1.25	1.21	.04	3.72
45	6	1.15	1.12	.03	11.16
30	6	.86	.89	-.03	33.47

TABLE 11 (CONT.)

BRIDGE NO. 28

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	D/D REDUCTION
90	1	.81	.81	-.00	.00
60	1	.80	.79	.01	1.69
45	1	.77	.77	-.00	5.08
30	1	.69	.71	-.02	15.25
90	2	1.35	1.35	-.00	.00
60	2	1.33	1.31	.02	1.69
45	2	1.28	1.27	.01	5.08
30	2	1.14	1.14	.00	15.25
90	3	1.60	1.60	-.00	.00
60	3	1.57	1.55	.02	1.69
45	3	1.52	1.51	.01	5.08
30	3	1.36	1.36	.00	15.25
90	4	1.69	1.69	.00	.00
60	4	1.66	1.65	.01	1.69
45	4	1.60	1.61	-.01	5.08
30	4	1.43	1.44	-.02	15.25
90	5	1.72	1.72	-.00	.00
60	5	1.69	1.68	.01	1.69
45	5	1.63	1.65	-.02	5.08
30	5	1.46	1.49	-.04	15.25
90	6	1.72	1.72	-.00	.00
60	6	1.69	1.68	.01	1.69
45	6	1.63	1.65	-.02	5.08
30	6	1.46	1.51	-.05	15.25

TABLE 11 (CONT.)

BRIDGE NO. 29

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	D/D REDUCTION
90	1	1.00	1.00	-.00	.00
60	1	.97	.93	.03	3.39
45	1	.90	.87	.03	10.17
30	1	.70	.69	.01	30.50
90	2	1.53	1.53	-.00	.00
60	2	1.48	1.45	.03	3.39
45	2	1.38	1.36	.01	10.17
30	2	1.06	1.11	-.05	30.50
90	3	1.73	1.73	-.00	.00
60	3	1.67	1.65	.02	3.39
45	3	1.55	1.57	-.02	10.17
30	3	1.20	1.25	-.05	30.50
90	4	1.74	1.74	-.00	.00
60	4	1.68	1.67	.01	3.39
45	4	1.56	1.60	-.04	10.17
30	4	1.21	1.32	-.11	30.50
90	5	1.74	1.74	-.00	.00
60	5	1.68	1.67	.01	3.39
45	5	1.56	1.61	-.05	10.17
30	5	1.21	1.33	-.12	30.50
90	6	1.74	1.74	-.00	.00
60	6	1.68	1.67	.01	3.39
45	6	1.56	1.61	-.05	10.17
30	6	1.21	1.33	-.12	30.50

TABLE 11 (CONT.)

BRIDGE NO. 30

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	1.04	1.04	-.00	.00
60	1	1.00	.95	.04	4.07
45	1	.91	.87	.05	12.20
30	1	.66	.66	.00	36.60
90	2	1.57	1.57	-.00	.00
60	2	1.51	1.45	.06	4.07
45	2	1.38	1.33	.05	12.20
30	2	1.00	1.06	-.06	36.60
90	3	1.76	1.76	-.00	.00
60	3	1.68	1.66	.03	4.07
45	3	1.54	1.56	-.02	12.20
30	3	1.11	1.12	-.00	36.60
90	4	1.76	1.77	-.00	.00
60	4	1.69	1.68	.02	4.07
45	4	1.55	1.59	-.04	12.20
30	4	1.12	1.22	-.10	36.60
90	5	1.76	1.77	-.00	.00
60	5	1.69	1.68	.02	4.07
45	5	1.55	1.60	-.05	12.20
30	5	1.12	1.23	-.11	36.60
90	6	1.76	1.77	-.00	.00
60	6	1.69	1.68	.02	4.07
45	6	1.55	1.60	-.05	12.20
30	6	1.12	1.23	-.11	36.60

TABLE 12

NO. OF LOADED LANES 1

EXTERIOR BEAM DISTRIBUTION FACTORS

BEAM NUMBER AND SKEW ANGLE (DEGREES)

BRIDGE NO.	BEAM	90	BEAM	60	BEAM	45	BEAM	30
1	EDGE	.64	EDGE	.65	EDGE	.66	EDGE	.64
2	EDGE	.63	EDGE	.63	EDGE	.62	EDGE	.58
3	EDGE	.56	EDGE	.57	EDGE	.57	EDGE	.58
4	EDGE	.73	EDGE	.74	EDGE	.75	EDGE	.72
5	EDGE	.72	EDGE	.73	EDGE	.73	EDGE	.64
6	EDGE	.73	EDGE	.71	EDGE	.68	EDGE	.56
7	EDGE	.90	EDGE	.91	EDGE	.91	EDGE	.87
8	EDGE	.89	EDGE	.87	EDGE	.85	EDGE	.76
9	EDGE	.85	EDGE	.82	EDGE	.80	EDGE	.66
10	EDGE	.65	EDGE	.65	EDGE	.66	EDGE	.63
11	EDGE	.64	EDGE	.63	EDGE	.63	EDGE	.58
12	EDGE	.62	EDGE	.61	EDGE	.61	EDGE	.58
13	EDGE	.75	EDGE	.74	EDGE	.75	EDGE	.71
14	EDGE	.74	EDGE	.71	EDGE	.71	EDGE	.62
15	EDGE	.71	EDGE	.71	EDGE	.68	EDGE	.58
16	EDGE	1.00	EDGE	1.00	EDGE	1.00	EDGE	.94
17	EDGE	.98	EDGE	.95	EDGE	.93	EDGE	.83
18	EDGE	1.00	EDGE	.94	EDGE	.89	EDGE	.68
19	EDGE	.65	EDGE	.65	EDGE	.65	EDGE	.63
20	EDGE	.64	EDGE	.62	EDGE	.61	EDGE	.54
21	EDGE	.61	EDGE	.60	EDGE	.60	EDGE	.51
22	EDGE	.72	EDGE	.71	EDGE	.72	EDGE	.69
23	EDGE	.71	EDGE	.69	EDGE	.68	EDGE	.61
24	EDGE	.68	EDGE	.66	EDGE	.65	EDGE	.54
25	EDGE	.79	EDGE	.80	EDGE	.80	EDGE	.78
26	EDGE	.79	EDGE	.79	EDGE	.79	EDGE	.72
27	EDGE	.74	EDGE	.73	EDGE	.73	EDGE	.59
28	EDGE	.96	EDGE	.96	EDGE	.96	EDGE	.91
29	EDGE	.93	EDGE	.91	EDGE	.88	EDGE	.76
30	EDGE	.91	EDGE	.88	EDGE	.84	EDGE	.72

TABLE 13

NO. OF LOADED LANES 2

EXTERIOR BEAM DISTRIBUTION FACTORS

BEAM NUMBER AND SKEW ANGLE (DEGREES)

BRIDGE NO.	BEAM	90	BEAM	60	BEAM	45	BEAM	30
1	EDGE	.69	EDGE	.70	EDGE	.70	EDGE	.72
2	EDGE	.67	EDGE	.67	EDGE	.67	EDGE	.64
3	EDGE	.56	EDGE	.56	EDGE	.56	EDGE	.58
4	EDGE	.80	EDGE	.81	EDGE	.82	EDGE	.83
5	EDGE	.75	EDGE	.77	EDGE	.78	EDGE	.73
6	EDGE	.73	EDGE	.73	EDGE	.72	EDGE	.62
7	EDGE	1.01	EDGE	1.02	EDGE	1.02	EDGE	1.01
8	EDGE	.95	EDGE	.95	EDGE	.94	EDGE	.88
9	EDGE	.87	EDGE	.87	EDGE	.86	EDGE	.74
10	EDGE	.71	EDGE	.72	EDGE	.73	EDGE	.73
11	EDGE	.68	EDGE	.68	EDGE	.68	EDGE	.65
12	EDGE	.59	EDGE	.59	EDGE	.59	EDGE	.59
13	EDGE	.83	EDGE	.83	EDGE	.84	EDGE	.82
14	EDGE	.78	EDGE	.76	EDGE	.76	EDGE	.69
15	EDGE	.72	EDGE	.74	EDGE	.71	EDGE	.62
16	EDGE	1.10	EDGE	1.10	EDGE	1.11	EDGE	1.08
17	EDGE	1.02	EDGE	1.01	EDGE	1.00	EDGE	.91
18	EDGE	1.08	EDGE	1.03	EDGE	.99	EDGE	.84
19	EDGE	.70	EDGE	.71	EDGE	.72	EDGE	.70
20	EDGE	.65	EDGE	.64	EDGE	.63	EDGE	.58
21	EDGE	.59	EDGE	.60	EDGE	.60	EDGE	.53
22	EDGE	.78	EDGE	.78	EDGE	.79	EDGE	.78
23	EDGE	.74	EDGE	.72	EDGE	.73	EDGE	.67
24	EDGE	.67	EDGE	.66	EDGE	.67	EDGE	.58
25	EDGE	.88	EDGE	.89	EDGE	.91	EDGE	.91
26	EDGE	.83	EDGE	.85	EDGE	.86	EDGE	.80
27	EDGE	.74	EDGE	.75	EDGE	.75	EDGE	.63
28	EDGE	1.09	EDGE	1.10	EDGE	1.11	EDGE	1.08
29	EDGE	.97	EDGE	.96	EDGE	.95	EDGE	.85
30	EDGE	.95	EDGE	.93	EDGE	.91	EDGE	.80

TABLE 14

NO. OF LOADED LANES 3

EXTERIOR BEAM DISTRIBUTION FACTORS

BEAM NUMBER AND SKEW ANGLE (DEGREES)

BRIDGE NO.	BEAM	90	BEAM	60	BEAM	45	BEAM	30
10	EDGE	.68	EDGE	.70	EDGE	.71	EDGE	.73
11	EDGE	.67	EDGE	.68	EDGE	.68	EDGE	.65
12	EDGE	.59	EDGE	.59	EDGE	.59	EDGE	.59
13	EDGE	.80	EDGE	.80	EDGE	.82	EDGE	.83
14	EDGE	.76	EDGE	.75	EDGE	.76	EDGE	.69
15	EDGE	.71	EDGE	.73	EDGE	.71	EDGE	.62
16	EDGE	1.05	EDGE	1.07	EDGE	1.08	EDGE	1.09
17	EDGE	1.00	EDGE	1.00	EDGE	1.00	EDGE	.92
18	EDGE	1.06	EDGE	1.02	EDGE	.99	EDGE	.85
19	EDGE	.67	EDGE	.69	EDGE	.70	EDGE	.72
20	EDGE	.64	EDGE	.63	EDGE	.62	EDGE	.57
21	EDGE	.59	EDGE	.59	EDGE	.60	EDGE	.53
22	EDGE	.74	EDGE	.75	EDGE	.77	EDGE	.78
23	EDGE	.72	EDGE	.71	EDGE	.71	EDGE	.67
24	EDGE	.66	EDGE	.66	EDGE	.67	EDGE	.58
25	EDGE	.84	EDGE	.86	EDGE	.89	EDGE	.91
26	EDGE	.81	EDGE	.83	EDGE	.85	EDGE	.80
27	EDGE	.73	EDGE	.74	EDGE	.74	EDGE	.63
28	EDGE	1.05	EDGE	1.07	EDGE	1.09	EDGE	1.09
29	EDGE	.95	EDGE	.95	EDGE	.94	EDGE	.85
30	EDGE	.93	EDGE	.91	EDGE	.90	EDGE	.80

TABLE 15

NO. OF LOADED LANES 4

EXTERIOR BEAM DISTRIBUTION FACTORS

BEAM NUMBER AND SKEW ANGLE (DEGREES)

BRIDGE NO.	BEAM	90	BEAM	60	BEAM	45	BEAM	30
10	EDGE	.68	EDGE	.69	EDGE	.70	EDGE	.73
11	EDGE	.68	EDGE	.68	EDGE	.68	EDGE	.65
12	EDGE	.59	EDGE	.59	EDGE	.59	EDGE	.59
13	EDGE	.80	EDGE	.80	EDGE	.82	EDGE	.83
14	EDGE	.77	EDGE	.75	EDGE	.76	EDGE	.70
15	EDGE	.72	EDGE	.73	EDGE	.71	EDGE	.62
16	EDGE	1.05	EDGE	1.07	EDGE	1.08	EDGE	1.09
17	EDGE	1.01	EDGE	1.00	EDGE	1.00	EDGE	.92
18	EDGE	1.06	EDGE	1.03	EDGE	.99	EDGE	.85
19	EDGE	.66	EDGE	.68	EDGE	.69	EDGE	.71
20	EDGE	.64	EDGE	.63	EDGE	.63	EDGE	.57
21	EDGE	.59	EDGE	.60	EDGE	.60	EDGE	.53
22	EDGE	.73	EDGE	.74	EDGE	.76	EDGE	.78
23	EDGE	.72	EDGE	.71	EDGE	.72	EDGE	.67
24	EDGE	.66	EDGE	.66	EDGE	.67	EDGE	.58
25	EDGE	.82	EDGE	.85	EDGE	.88	EDGE	.91
26	EDGE	.81	EDGE	.83	EDGE	.85	EDGE	.80
27	EDGE	.74	EDGE	.74	EDGE	.75	EDGE	.63
28	EDGE	1.03	EDGE	1.05	EDGE	1.07	EDGE	1.09
29	EDGE	.95	EDGE	.95	EDGE	.94	EDGE	.86
30	EDGE	.93	EDGE	.91	EDGE	.90	EDGE	.80

TABLE 16

NO. OF LOADED LANES 5

EXTERIOR BEAM DISTRIBUTION FACTORS

BEAM NUMBER AND SKEW ANGLE (DEGREES)

BRIDGE NO.	BEAM	90	BEAM	60	BEAM	45	BEAM	30
19	EDGE	.66	EDGE	.68	EDGE	.69	EDGE	.71
20	EDGE	.65	EDGE	.64	EDGE	.63	EDGE	.57
21	EDGE	.60	EDGE	.60	EDGE	.60	EDGE	.53
22	EDGE	.73	EDGE	.74	EDGE	.76	EDGE	.78
23	EDGE	.72	EDGE	.71	EDGE	.72	EDGE	.67
24	EDGE	.67	EDGE	.66	EDGE	.67	EDGE	.58
25	EDGE	.82	EDGE	.85	EDGE	.87	EDGE	.91
26	EDGE	.81	EDGE	.83	EDGE	.85	EDGE	.80
27	EDGE	.74	EDGE	.74	EDGE	.75	EDGE	.63
28	EDGE	1.03	EDGE	1.05	EDGE	1.07	EDGE	1.09
29	EDGE	.96	EDGE	.95	EDGE	.94	EDGE	.86
30	EDGE	.93	EDGE	.91	EDGE	.90	EDGE	.80

TABLE 17

NO. OF LOADED LANES 6

EXTERIOR BEAM DISTRIBUTION FACTORS

BEAM NUMBER AND SKEW ANGLE (DEGREES)

BRIDGE NO.	BEAM	90	BEAM	60	BEAM	45	BEAM	30
19	EDGE	.67	EDGE	.68	EDGE	.69	EDGE	.71
20	EDGE	.65	EDGE	.64	EDGE	.63	EDGE	.57
21	EDGE	.60	EDGE	.60	EDGE	.60	EDGE	.53
22	EDGE	.74	EDGE	.74	EDGE	.76	EDGE	.78
23	EDGE	.73	EDGE	.71	EDGE	.72	EDGE	.67
24	EDGE	.67	EDGE	.66	EDGE	.67	EDGE	.58
25	EDGE	.83	EDGE	.85	EDGE	.88	EDGE	.91
26	EDGE	.82	EDGE	.83	EDGE	.85	EDGE	.80
27	EDGE	.74	EDGE	.74	EDGE	.75	EDGE	.63
28	EDGE	1.03	EDGE	1.05	EDGE	1.07	EDGE	1.09
29	EDGE	.96	EDGE	.95	EDGE	.94	EDGE	.86
30	EDGE	.93	EDGE	.92	EDGE	.90	EDGE	.80

TABLE 18

MAXIMUM DISTRIBUTION FACTORS

EXTERIOR BEAM

BRIDGE NO.	NO. OF LOADED LANES AND SKEW ANGLE *NL	**NLL	NO. OF LOADED LANES AND SKEW ANGLE 90	NLL	60	NLL	45	NLL	30
1	2	2	.69	2	.70	2	.70	2	.72
2	2	2	.67	2	.67	2	.67	2	.64
3	2	2	.56	1	.57	1	.57	2	.58
4	2	2	.80	2	.81	2	.82	2	.83
5	2	2	.75	2	.77	2	.78	2	.73
6	2	2	.73	2	.73	2	.72	2	.62
7	2	2	1.01	2	1.02	2	1.02	2	1.01
8	2	2	.95	2	.95	2	.94	2	.88
9	2	2	.87	2	.87	2	.86	2	.74
10	4	2	.71	2	.72	2	.73	3	.73
11	4	4	.68	2	.68	2	.68	4	.65
12	4	1	.62	1	.61	1	.61	2	.59
13	4	2	.83	2	.83	2	.84	4	.83
14	4	2	.78	2	.76	2	.76	4	.70
15	4	2	.72	2	.74	4	.71	4	.62
16	4	2	1.10	2	1.10	2	1.11	4	1.09
17	4	2	1.02	2	1.01	2	1.00	4	.92
18	4	2	1.08	2	1.03	4	.99	4	.85
19	6	2	.70	2	.71	2	.72	3	.72
20	6	6	.65	2	.64	2	.63	2	.58
21	6	1	.61	1	.60	2	.60	2	.53
22	6	2	.78	2	.78	2	.79	2	.78
23	6	2	.74	2	.72	2	.73	2	.67
24	6	1	.68	2	.66	2	.67	6	.58
25	6	2	.88	2	.89	2	.91	3	.91
26	6	2	.83	2	.85	2	.86	6	.80
27	6	1	.74	2	.75	2	.75	2	.63
28	6	2	1.09	2	1.10	2	1.11	3	1.09
29	6	2	.97	2	.96	2	.95	6	.86
30	6	2	.95	2	.93	2	.91	6	.80

TABLE 19

DISTRIBUTION FACTORS

24 FT. WIDE BRIDGES

BRIDGE NO. 1

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.64	.64	-.00	-.00
60	1	.66	.65	.01	-2.31
45	1	.67	.66	.01	-4.00
30	1	.69	.64	.05	-6.93
90	2	.69	.69	-.00	-.00
60	2	.71	.70	.01	-2.31
45	2	.72	.70	.02	-4.00
30	2	.74	.72	.02	-6.93

BRIDGE NO. 2

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.63	.63	.00	-.00
60	1	.64	.63	.02	-1.54
45	1	.65	.62	.03	-2.67
30	1	.66	.58	.09	-4.62
90	2	.67	.67	-.00	-.00
60	2	.68	.67	.01	-1.54
45	2	.69	.67	.02	-2.67
30	2	.70	.64	.06	-4.62

BRIDGE NO. 3

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.56	.56	-.00	.00
60	1	.56	.57	-.01	.14
45	1	.56	.57	-.02	.25
30	1	.56	.58	-.02	.43
90	2	.56	.56	-.00	.00
60	2	.56	.57	-.01	.14
45	2	.56	.57	-.02	.25
30	2	.56	.58	-.02	.43

TABLE 19 (CONT.)

BRIDGE NO. 4

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.73	.73	-.00	-.00
60	1	.74	.74	-.00	-2.02
45	1	.75	.75	.01	-3.50
30	1	.77	.72	.05	-6.06
90	2	.80	.80	-.00	-.00
60	2	.81	.81	.01	-2.02
45	2	.83	.82	.01	-3.50
30	2	.85	.83	.02	-6.06

BRIDGE NO. 5

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.72	.72	-.00	-.00
60	1	.72	.73	-.01	-.58
45	1	.73	.73	.00	-1.00
30	1	.73	.64	.09	-1.73
90	2	.75	.75	.00	-.00
60	2	.76	.77	-.01	-.58
45	2	.76	.78	-.02	-1.00
30	2	.76	.73	.04	-1.73

BRIDGE NO. 6

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.73	.73	-.00	.00
60	1	.72	.71	.01	.66
45	1	.72	.68	.04	1.15
30	1	.71	.56	.15	1.98
90	2	.73	.73	-.00	.00
60	2	.72	.73	-.00	.66
45	2	.72	.72	.00	1.15
30	2	.71	.62	.09	1.98

TABLE 19 (CONT.)

BRIDGE NO. 7

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.90	.90	-.00	-.00
60	1	.92	.91	.01	-1.54
45	1	.93	.91	.02	-2.67
30	1	.95	.87	.08	-4.62
90	2	1.01	1.01	-.00	-.00
60	2	1.03	1.02	.01	-1.54
45	2	1.04	1.02	.02	-2.67
30	2	1.06	1.01	.04	-4.62

BRIDGE NO. 8

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.89	.89	-.00	.00
60	1	.89	.87	.02	.14
45	1	.89	.85	.04	.25
30	1	.89	.76	.13	.43
90	2	.95	.95	-.00	.00
60	2	.95	.95	.00	.14
45	2	.95	.94	.00	.25
30	2	.95	.88	.06	.43

BRIDGE NO. 9

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.85	.85	-.00	.00
60	1	.83	.82	.01	2.31
45	1	.82	.80	.02	4.00
30	1	.79	.66	.13	6.93
90	2	.87	.87	-.00	.00
60	2	.85	.87	-.02	2.31
45	2	.83	.86	-.03	4.00
30	2	.81	.74	.07	6.93

DISTRIBUTION FACTORS

TABLE 20

48 FT. WIDE BRIDGES

BRIDGE NO. 10

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.65	.65	-.00	-.00
60	1	.66	.65	.01	-2.31
45	1	.68	.66	.02	-4.00
30	1	.69	.63	.06	-6.93
90	2	.71	.71	-.00	-.00
60	2	.73	.72	.01	-2.31
45	2	.74	.73	.01	-4.00
30	2	.76	.73	.03	-6.93
90	3	.71	.71	-.00	-.00
60	3	.73	.72	.01	-2.31
45	3	.74	.73	.01	-4.00
30	3	.76	.73	.03	-6.93
90	4	.71	.71	-.00	-.00
60	4	.73	.72	.01	-2.31
45	4	.74	.73	.01	-4.00
30	4	.76	.73	.03	-6.93

BRIDGE NO. 11

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.64	.64	-.00	-.00
60	1	.65	.63	.02	-1.81
45	1	.66	.63	.03	-3.14
30	1	.67	.58	.09	-5.44
90	2	.68	.68	.00	-.00
60	2	.69	.68	.01	-1.81
45	2	.70	.68	.02	-3.14
30	2	.72	.65	.07	-5.44
90	3	.68	.68	.00	-.00
60	3	.69	.68	.01	-1.81
45	3	.70	.68	.02	-3.14
30	3	.72	.65	.07	-5.44
90	4	.68	.68	-.00	-.00
60	4	.70	.68	.01	-1.81
45	4	.71	.68	.02	-3.14
30	4	.72	.65	.07	-5.44

TABLE 20 (CONT.)

BRIDGE NO. 12

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.62	.62	-.00	-.00
60	1	.62	.61	.01	-.58
45	1	.63	.61	.02	-1.00
30	1	.63	.58	.05	-1.73
90	2	.62	.62	-.00	-.00
60	2	.62	.61	.01	-.58
45	2	.63	.61	.02	-1.00
30	2	.63	.59	.04	-1.73
90	3	.62	.62	-.00	-.00
60	3	.62	.61	.01	-.58
45	3	.63	.61	.02	-1.00
30	3	.63	.59	.04	-1.73
90	4	.62	.62	-.00	-.00
60	4	.62	.61	.01	-.58
45	4	.63	.61	.02	-1.00
30	4	.63	.59	.04	-1.73

BRIDGE NO. 13

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.75	.75	.00	-.00
60	1	.76	.74	.02	-1.81
45	1	.77	.75	.02	-3.14
30	1	.79	.71	.08	-5.44
90	2	.83	.83	-.00	-.00
60	2	.84	.83	.01	-1.81
45	2	.85	.84	.01	-3.14
30	2	.87	.82	.05	-5.44
90	3	.83	.83	-.00	-.00
60	3	.84	.83	.01	-1.81
45	3	.85	.84	.01	-3.14
30	3	.87	.83	.04	-5.44
90	4	.83	.83	-.00	-.00
60	4	.84	.83	.01	-1.81
45	4	.85	.84	.01	-3.14
30	4	.87	.83	.04	-5.44

TABLE 20 (CONT.)

BRIDGE NO. 14

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.74	.74	.00	-.00
60	1	.75	.71	.03	-.58
45	1	.75	.71	.04	-1.00
30	1	.75	.62	.13	-1.73
90	2	.78	.78	-.00	-.00
60	2	.78	.76	.02	-.58
45	2	.78	.76	.02	-1.00
30	2	.79	.69	.10	-1.73
90	3	.78	.78	-.00	-.00
60	3	.78	.76	.02	-.58
45	3	.78	.76	.02	-1.00
30	3	.79	.69	.09	-1.73
90	4	.78	.78	-.00	-.00
60	4	.78	.76	.02	-.58
45	4	.78	.76	.02	-1.00
30	4	.79	.70	.09	-1.73

BRIDGE NO. 15

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.71	.71	-.00	.00
60	1	.71	.71	-.00	.66
45	1	.71	.68	.02	1.15
30	1	.70	.58	.12	1.98
90	2	.72	.72	-.00	.00
60	2	.71	.74	-.03	.66
45	2	.71	.71	.00	1.15
30	2	.70	.62	.08	1.98
90	3	.72	.72	-.00	.00
60	3	.71	.74	-.03	.66
45	3	.71	.71	.00	1.15
30	3	.70	.62	.08	1.98
90	4	.72	.72	-.00	.00
60	4	.71	.74	-.03	.66
45	4	.71	.71	-.00	1.15
30	4	.70	.62	.08	1.98

TABLE 20 (CONT.)

BRIDGE NO. 16

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	1.00	1.00	-.00	-.00
60	1	1.01	1.00	.01	-.58
45	1	1.01	1.00	.02	-1.00
30	1	1.02	.94	.08	-1.73
90	2	1.09	1.09	-.00	-.00
60	2	1.10	1.10	-.00	-.58
45	2	1.11	1.11	-.00	-1.00
30	2	1.11	1.08	.03	-1.73
90	3	1.09	1.09	-.00	-.00
60	3	1.10	1.10	-.00	-.58
45	3	1.11	1.11	-.00	-1.00
30	3	1.11	1.09	.02	-1.73
90	4	1.09	1.09	-.00	-.00
60	4	1.10	1.10	-.00	-.58
45	4	1.11	1.11	-.00	-1.00
30	4	1.11	1.09	.02	-1.73

BRIDGE NO. 17

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.98	.98	-.00	.00
60	1	.96	.95	.01	1.35
45	1	.95	.93	.02	2.34
30	1	.94	.83	.11	4.04
90	2	1.02	1.02	-.00	.00
60	2	1.01	1.01	-.00	1.35
45	2	1.00	1.00	-.00	2.34
30	2	.98	.91	.07	4.04
90	3	1.02	1.02	-.00	.00
60	3	1.01	1.01	-.00	1.35
45	3	1.00	1.00	-.00	2.34
30	3	.98	.92	.06	4.04
90	4	1.02	1.02	-.00	.00
60	4	1.01	1.01	-.00	1.35
45	4	1.00	1.00	-.00	2.34
30	4	.98	.92	.06	4.04

TABLE 20 (CONT.)

BRIDGE NO. 18

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	1.00	1.00	-.00	.00
60	1	.98	.94	.03	2.31
45	1	.96	.89	.07	4.00
30	1	.93	.68	.25	6.93
90	2	1.08	1.08	-.00	.00
60	2	1.05	1.03	.02	2.31
45	2	1.03	.99	.04	4.00
30	2	1.00	.84	.16	6.93
90	3	1.08	1.08	-.00	.00
60	3	1.05	1.03	.02	2.31
45	3	1.03	.99	.04	4.00
30	3	1.00	.85	.15	6.93
90	4	1.08	1.08	-.00	.00
60	4	1.05	1.03	.02	2.31
45	4	1.03	.99	.04	4.00
30	4	1.00	.85	.15	6.93

DISTRIBUTION FACTORS

TABLE 21

72 FT. WIDE BRIDGES

BRIDGE NO. 19

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.65	.65	-.00	-.00
60	1	.67	.65	.01	-2.31
45	1	.68	.65	.02	-4.00
30	1	.70	.63	.07	-6.93
90	2	.70	.70	.00	-.00
60	2	.72	.71	.01	-2.31
45	2	.73	.72	.01	-4.00
30	2	.75	.70	.05	-6.93
90	3	.70	.70	.00	-.00
60	3	.72	.71	.01	-2.31
45	3	.73	.72	.01	-4.00
30	3	.75	.72	.04	-6.93
90	4	.70	.70	.00	-.00
60	4	.72	.71	.01	-2.31
45	4	.73	.72	.01	-4.00
30	4	.75	.72	.04	-6.93
90	5	.70	.70	.00	-.00
60	5	.72	.71	.01	-2.31
45	5	.73	.72	.01	-4.00
30	5	.75	.72	.04	-6.93
90	6	.70	.70	.00	-.00
60	6	.72	.71	.01	-2.31
45	6	.73	.72	.01	-4.00
30	6	.75	.72	.04	-6.93

TABLE 21 (CONT.)

BRIDGE NO. 20

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.64	.64	-.00	-.00
60	1	.64	.62	.02	-1.06
45	1	.65	.61	.04	-1.83
30	1	.66	.54	.12	-3.18
90	2	.65	.65	.00	-.00
60	2	.66	.64	.01	-1.06
45	2	.66	.63	.03	-1.83
30	2	.67	.58	.09	-3.18
90	3	.65	.65	.00	-.00
60	3	.66	.64	.01	-1.06
45	3	.66	.63	.03	-1.83
30	3	.67	.58	.09	-3.18
90	4	.65	.65	.00	-.00
60	4	.66	.64	.01	-1.06
45	4	.66	.63	.03	-1.83
30	4	.67	.58	.09	-3.18
90	5	.65	.65	.00	-.00
60	5	.66	.64	.01	-1.06
45	5	.66	.63	.03	-1.83
30	5	.67	.58	.09	-3.18
90	6	.65	.65	.00	-.00
60	6	.66	.64	.02	-1.06
45	6	.66	.63	.03	-1.83
30	6	.67	.58	.10	-3.18

TABLE 21 (CONT.)

BRIDGE NO. 21

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.61	.61	-.00	.00
60	1	.61	.60	.01	.14
45	1	.61	.60	.01	.25
30	1	.61	.51	.10	.43
90	2	.61	.61	-.00	.00
60	2	.61	.60	.01	.14
45	2	.61	.60	.01	.25
30	2	.61	.53	.08	.43
90	3	.61	.61	-.00	.00
60	3	.61	.60	.01	.14
45	3	.61	.60	.01	.25
30	3	.61	.53	.08	.43
90	4	.61	.61	-.00	.00
60	4	.61	.60	.01	.14
45	4	.61	.60	.01	.25
30	4	.61	.53	.08	.43
90	5	.61	.61	-.00	.00
60	5	.61	.60	.01	.14
45	5	.61	.60	.01	.25
30	5	.61	.53	.08	.43
90	6	.61	.61	-.00	.00
60	6	.61	.60	.01	.14
45	6	.61	.60	.01	.25
30	6	.61	.53	.08	.43

TABLE 21 (CONT.)

BRIDGE NO. 22

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.72	.72	-.00	-.00
60	1	.73	.71	.02	-2.02
45	1	.75	.72	.02	-3.50
30	1	.76	.69	.07	-6.06
90	2	.78	.78	-.00	-.00
60	2	.79	.78	.01	-2.02
45	2	.80	.79	.01	-3.50
30	2	.82	.78	.04	-6.06
90	3	.78	.78	-.00	-.00
60	3	.79	.78	.01	-2.02
45	3	.80	.79	.01	-3.50
30	3	.82	.78	.04	-6.06
90	4	.78	.78	-.00	-.00
60	4	.79	.78	.01	-2.02
45	4	.80	.79	.01	-3.50
30	4	.82	.78	.04	-6.06
90	5	.78	.78	-.00	-.00
60	5	.79	.78	.01	-2.02
45	5	.80	.79	.01	-3.50
30	5	.82	.78	.04	-6.06
90	6	.78	.78	-.00	-.00
60	6	.79	.78	.01	-2.02
45	6	.80	.79	.01	-3.50
30	6	.82	.78	.04	-6.06

TABLE 21 (CONT.)

BRIDGE NO. 23

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.71	.71	-.00	-.00
60	1	.72	.69	.03	-1.06
45	1	.72	.68	.04	-1.83
30	1	.73	.61	.12	-3.18
90	2	.74	.74	-.00	-.00
60	2	.74	.72	.02	-1.06
45	2	.75	.73	.02	-1.83
30	2	.76	.67	.09	-3.18
90	3	.74	.74	-.00	-.00
60	3	.74	.72	.02	-1.06
45	3	.75	.73	.02	-1.83
30	3	.76	.67	.09	-3.18
90	4	.74	.74	-.00	-.00
60	4	.74	.72	.02	-1.06
45	4	.75	.73	.02	-1.83
30	4	.76	.67	.09	-3.18
90	5	.74	.74	-.00	-.00
60	5	.74	.72	.02	-1.06
45	5	.75	.73	.02	-1.83
30	5	.76	.67	.09	-3.18
90	6	.74	.74	-.00	-.00
60	6	.74	.72	.02	-1.06
45	6	.75	.73	.02	-1.83
30	6	.76	.67	.09	-3.18

TABLE 21 (CONT.)

BRIDGE NO. 24

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	D/D REDUCTION
90	1	.68	.68	-.00	.00
60	1	.67	.66	.01	.66
45	1	.67	.65	.02	1.14
30	1	.66	.54	.12	1.97
90	2	.68	.68	-.00	.00
60	2	.67	.66	.01	.66
45	2	.67	.67	-.00	1.14
30	2	.66	.58	.08	1.97
90	3	.68	.68	-.00	.00
60	3	.67	.66	.01	.66
45	3	.67	.67	-.00	1.14
30	3	.66	.58	.08	1.97
90	4	.68	.68	-.00	.00
60	4	.67	.66	.01	.66
45	4	.67	.67	-.00	1.14
30	4	.66	.58	.08	1.97
90	5	.68	.68	-.00	.00
60	5	.67	.66	.01	.66
45	5	.67	.67	-.00	1.14
30	5	.66	.58	.08	1.97
90	6	.68	.68	-.00	.00
60	6	.67	.66	.01	.66
45	6	.67	.67	-.00	1.14
30	6	.66	.58	.08	1.97

TABLE 21 (CONT.)

BRIDGE NO. 25

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.79	.79	-.00	-.00
60	1	.80	.80	.01	-1.82
45	1	.81	.80	.01	-3.14
30	1	.83	.78	.05	-5.44
90	2	.88	.88	.00	-.00
60	2	.89	.89	-.00	-1.82
45	2	.91	.91	-.00	-3.14
30	2	.93	.91	.02	-5.44
90	3	.88	.88	.00	-.00
60	3	.89	.89	-.00	-1.82
45	3	.91	.91	-.00	-3.14
30	3	.93	.91	.02	-5.44
90	4	.88	.88	.00	-.00
60	4	.89	.89	-.00	-1.82
45	4	.91	.91	-.00	-3.14
30	4	.93	.91	.02	-5.44
90	5	.88	.88	.00	-.00
60	5	.89	.89	-.00	-1.82
45	5	.91	.91	-.00	-3.14
30	5	.93	.91	.02	-5.44
90	6	.88	.88	.00	-.00
60	6	.89	.89	-.00	-1.82
45	6	.91	.91	-.00	-3.14
30	6	.93	.91	.02	-5.44

TABLE 21 (CONT.)

BRIDGE NO. 26

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.79	.79	-.00	-.00
60	1	.79	.79	.00	-.58
45	1	.80	.79	.00	-1.01
30	1	.80	.72	.08	-1.74
90	2	.83	.83	-.00	-.00
60	2	.83	.85	-.01	-.58
45	2	.84	.86	-.02	-1.01
30	2	.84	.80	.04	-1.74
90	3	.83	.83	-.00	-.00
60	3	.83	.85	-.01	-.58
45	3	.84	.86	-.02	-1.01
30	3	.84	.80	.04	-1.74
90	4	.83	.83	-.00	-.00
60	4	.83	.85	-.01	-.58
45	4	.84	.86	-.02	-1.01
30	4	.84	.80	.04	-1.74
90	5	.83	.83	-.00	-.00
60	5	.83	.85	-.01	-.58
45	5	.84	.86	-.02	-1.01
30	5	.84	.80	.04	-1.74
90	6	.83	.83	-.00	-.00
60	6	.83	.85	-.01	-.58
45	6	.84	.86	-.02	-1.01
30	6	.84	.80	.04	-1.74

TABLE 21 (CONT.)

BRIDGE NO. 27

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.74	.74	-.00	.00
60	1	.73	.73	-.00	1.34
45	1	.72	.73	-.00	2.33
30	1	.71	.59	.12	4.03
90	2	.74	.74	-.00	.00
60	2	.73	.75	-.01	1.34
45	2	.72	.75	-.03	2.33
30	2	.71	.63	.08	4.03
90	3	.74	.74	-.00	.00
60	3	.73	.75	-.01	1.34
45	3	.72	.75	-.03	2.33
30	3	.71	.63	.08	4.03
90	4	.74	.74	-.00	.00
60	4	.73	.75	-.01	1.34
45	4	.72	.75	-.03	2.33
30	4	.71	.63	.08	4.03
90	5	.74	.74	-.00	.00
60	5	.73	.75	-.01	1.34
45	5	.72	.75	-.03	2.33
30	5	.71	.63	.08	4.03
90	6	.74	.74	-.00	.00
60	6	.73	.75	-.01	1.34
45	6	.72	.75	-.03	2.33
30	6	.71	.63	.08	4.03

TABLE 21 (CONT.)

BRIDGE NO. 28

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.96	.96	-.00	-.00
60	1	.97	.96	.01	-1.06
45	1	.98	.96	.02	-1.83
30	1	.99	.91	.09	-3.18
90	2	1.09	1.09	-.00	-.00
60	2	1.10	1.10	.00	-1.06
45	2	1.11	1.11	.01	-1.83
30	2	1.13	1.08	.05	-3.18
90	3	1.09	1.09	-.00	-.00
60	3	1.10	1.10	.00	-1.06
45	3	1.11	1.11	.01	-1.83
30	3	1.13	1.09	.04	-3.18
90	4	1.09	1.09	-.00	-.00
60	4	1.10	1.10	.00	-1.06
45	4	1.11	1.11	.01	-1.83
30	4	1.13	1.09	.04	-3.18
90	5	1.09	1.09	-.00	-.00
60	5	1.10	1.10	.00	-1.06
45	5	1.11	1.11	.01	-1.83
30	5	1.13	1.09	.04	-3.18
90	6	1.09	1.09	-.00	-.00
60	6	1.10	1.10	.00	-1.06
45	6	1.11	1.11	.01	-1.83
30	6	1.13	1.09	.04	-3.18

TABLE 21 (CONT.)

BRIDGE NO. 29

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.93	.93	-.00	.00
60	1	.92	.91	.01	1.35
45	1	.91	.88	.03	2.34
30	1	.90	.76	.13	4.04
90	2	.97	.97	-.00	.00
60	2	.96	.96	-.00	1.35
45	2	.95	.95	-.00	2.34
30	2	.93	.85	.08	4.04
90	3	.97	.97	-.00	.00
60	3	.96	.96	-.00	1.35
45	3	.95	.95	-.00	2.34
30	3	.93	.85	.08	4.04
90	4	.97	.97	-.00	.00
60	4	.96	.96	-.00	1.35
45	4	.95	.95	-.00	2.34
30	4	.93	.86	.08	4.04
90	5	.97	.97	-.00	.00
60	5	.96	.96	-.00	1.35
45	5	.95	.95	-.00	2.34
30	5	.93	.86	.08	4.04
90	6	.97	.97	-.00	.00
60	6	.96	.96	-.00	1.35
45	6	.95	.95	-.00	2.34
30	6	.93	.86	.08	4.04

TABLE 21 (CONT.)

BRIDGE NO. 30

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.91	.91	-.00	.00
60	1	.89	.88	.02	2.31
45	1	.88	.84	.04	4.00
30	1	.85	.72	.13	6.93
90	2	.95	.95	-.00	.00
60	2	.92	.93	-.00	2.31
45	2	.91	.91	.00	4.00
30	2	.88	.80	.08	6.93
90	3	.95	.95	-.00	.00
60	3	.92	.93	-.00	2.31
45	3	.91	.91	.00	4.00
30	3	.88	.80	.08	6.93
90	4	.95	.95	-.00	.00
60	4	.92	.93	-.00	2.31
45	4	.91	.91	.00	4.00
30	4	.88	.80	.08	6.93
90	5	.95	.95	-.00	.00
60	5	.92	.93	-.00	2.31
45	5	.91	.91	.00	4.00
30	5	.88	.80	.08	6.93
90	6	.95	.95	-.00	.00
60	6	.92	.93	-.00	2.31
45	6	.91	.91	.00	4.00
30	6	.88	.80	.08	6.93

TABLE 22

LIST OF BRIDGES

NO	WIDTH	NB	SPACING	LENGTH	BEAM SIZE	S/L
1	24.00	3	122.50	40.83	3-48/48	.2500
2	24.00	3	122.50	71.46	3-48/48	.1430
3	24.00	3	122.50	122.50	3-48/48	.0830
4	24.00	4	81.67	34.03	4-48/48	.2000
5	24.00	4	81.67	47.64	4-48/48	.1430
6	24.00	4	81.67	102.08	4-48/48	.0670
7	48.00	5	133.25	44.42	5-48/48	.2500
8	48.00	5	133.25	88.83	5-48/48	.1250
9	48.00	5	133.25	111.04	5-48/48	.1000
10	48.00	7	88.83	37.01	7-48/48	.2000
11	48.00	7	88.83	59.22	7-48/48	.1250
12	48.00	7	88.83	111.03	7-48/48	.0670
13	72.00	8	117.29	39.10	8-48/48	.2500
14	72.00	8	117.29	78.19	8-48/48	.1250
15	72.00	8	117.29	97.74	8-48/48	.1000
16	72.00	9	102.62	42.75	9-48/48	.2000
17	72.00	9	102.62	68.42	9-48/48	.1250
18	72.00	9	102.62	128.25	9-48/48	.0670

TABLE 23

MAXIMUM DISTRIBUTION FACTORS

INTERIOR BEAMS

BRIDGE NO.	*NL	**NLL	NO. OF LOADED LANES AND SKEW ANGLE 90	NLL	60	NLL	45	NLL	30
1	2	2	1.73	2	1.45	2	1.09	2	.53
2	2	2	1.61	2	1.38	2	1.04	2	.47
3	2	2	1.56	2	1.27	2	1.01	2	.66
4	2	2	1.15	2	.95	2	.70	2	.38
5	2	2	1.06	2	.91	2	.65	2	.30
6	2	2	1.01	2	.87	2	.68	2	.40
7	4	4	2.16	4	1.77	4	1.20	4	.47
8	4	4	1.93	4	1.56	4	1.03	4	.32
9	4	4	1.89	4	1.49	4	1.00	4	.41
10	4	4	1.47	4	1.09	4	.74	4	.30
11	4	4	1.33	4	1.01	4	.62	4	.26
12	4	4	1.22	4	.86	4	.54	4	.24
13	6	6	1.87	6	1.55	6	1.03	6	.46
14	6	6	1.80	6	1.37	6	.82	6	.32
15	6	6	1.76	6	1.27	6	.75	6	.27
16	6	6	1.63	6	1.25	6	.77	6	.33
17	6	6	1.55	6	1.13	6	.66	6	.26
18	6	6	1.49	6	.85	6	.50	6	.24

* NL = NO. OF LANES
** NLL = NO. OF LOADED LANES

TABLE 24

MAXIMUM DISTRIBUTION FACTORS

EXTERIOR BEAM

BRIDGE NO.	NO. OF LOADED LANES AND SKEW ANGLE *NL	**NLL	90	NLL	60	NLL	45	NLL	30
1	2	2	1.17	2	1.01	2	.69	2	.24
2	2	2	1.29	2	1.12	2	.73	2	.23
3	2	2	1.27	2	1.03	2	.65	2	.20
4	2	2	.90	2	.68	2	.42	2	.12
5	2	2	.96	2	.77	2	.47	2	.13
6	2	2	.99	2	.79	2	.46	2	.08
7	4	4	1.17	4	1.00	4	.67	4	.26
8	4	4	1.40	4	1.09	4	.59	4	.17
9	4	4	1.43	4	1.06	4	.53	4	.11
10	4	4	.89	4	.70	4	.46	4	.16
11	4	4	.99	4	.75	4	.44	4	.19
12	4	4	1.10	4	.75	4	.44	4	.20
13	6	6	1.01	6	.88	6	.58	6	.24
14	6	6	1.20	6	.92	6	.58	6	.29
15	6	6	1.26	6	.90	6	.55	6	.28
16	6	6	.93	6	.76	6	.49	6	.21
17	6	6	1.04	6	.75	6	.46	6	.24
18	6	6	1.14	6	.56	6	.32	6	.18

TABLE 25

DISTRIBUTION FACTORS

24 FT. WIDE BRIDGES

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
BRIDGE NO. 1					
90	2	1.73	1.73	.00	.00
60	2	1.25	1.45	-.20	27.54
45	2	.90	1.09	-.19	47.70
30	2	.30	.53	-.23	82.57
BRIDGE NO. 2					
90	2	1.61	1.61	.00	.00
60	2	1.27	1.38	-.11	21.31
45	2	1.02	1.04	-.02	36.91
30	2	.58	.47	.11	63.90
BRIDGE NO. 3					
90	2	1.56	1.56	-.00	.00
60	2	1.32	1.27	.05	15.48
45	2	1.14	1.01	.13	26.81
30	2	.84	.66	.18	46.41
BRIDGE NO. 4					
90	2	1.15	1.15	-.00	.00
60	2	.81	.95	-.14	29.45
45	2	.56	.70	-.14	51.00
30	2	.13	.38	-.25	88.30
BRIDGE NO. 5					
90	2	1.06	1.06	-.00	.00
60	2	.79	.91	-.12	25.86
45	2	.59	.65	-.06	44.79
30	2	.24	.30	-.06	77.54
BRIDGE NO. 6					
90	2	1.01	1.01	-.00	.00
60	2	.83	.87	-.04	17.38
45	2	.71	.68	.03	30.10
30	2	.48	.40	.08	52.12

TABLE 26

DISTRIBUTION FACTORS

48 FT. WIDE BRIDGES

BRIDGE NO. 7

90	4	2.16	2.16	-.00	.00
60	4	1.58	1.77	-.19	26.63
45	4	1.16	1.20	-.04	46.12
30	4	.44	.47	-.03	79.84

BRIDGE NO. 8

90	4	1.93	1.93	-.00	.00
60	4	1.57	1.56	.01	18.89
45	4	1.30	1.03	.27	32.72
30	4	.84	.32	.52	56.64

BRIDGE NO. 9

90	4	1.89	1.89	-.00	.00
60	4	1.58	1.49	.09	16.50
45	4	1.35	1.00	.35	28.57
30	4	.96	.41	.55	49.46

BRIDGE NO. 10

90	4	1.47	1.47	.00	.00
60	4	1.05	1.09	-.04	28.58
45	4	.74	.74	.00	49.50
30	4	.21	.30	-.09	85.70

BRIDGE NO. 11

90	4	1.33	1.33	-.00	.00
60	4	1.02	1.01	.01	23.43
45	4	.79	.62	.17	40.58
30	4	.40	.26	.14	70.25

BRIDGE NO. 12

90	4	1.22	1.22	.00	.00
60	4	1.02	.86	.16	16.50
45	4	.87	.54	.33	28.57
30	4	.62	.24	.38	49.46

TABLE 27

DISTRIBUTION FACTORS

72 FT. WIDE BRIDGES

BRIDGE NO. 13

90	6	1.87	1.87	-.00	.00
60	6	1.35	1.55	-.20	28.00
45	6	.96	1.03	-.07	48.50
30	6	.30	.46	-.16	83.96

BRIDGE NO. 14

90	6	1.80	1.80	-.00	.00
60	6	1.43	1.37	.06	20.30
45	6	1.17	.82	.35	35.16
30	6	.70	.32	.38	60.88

BRIDGE NO. 15

90	6	1.76	1.76	-.00	.00
60	6	1.45	1.27	.18	17.85
45	6	1.22	.75	.47	30.91
30	6	.82	.27	.55	53.52

BRIDGE NO. 16

90	6	1.63	1.63	-.00	.00
60	6	1.19	1.25	-.06	27.04
45	6	.87	.77	.10	46.84
30	6	.31	.33	-.02	81.09

BRIDGE NO. 17

90	6	1.55	1.55	-.00	.00
60	6	1.21	1.13	.08	21.80
45	6	.96	.66	.30	37.76
30	6	.54	.26	.28	65.37

BRIDGE NO. 18

90	6	1.49	1.49	.00	.00
60	6	1.27	.85	.42	15.02
45	6	1.10	.50	.60	26.01
30	6	.82	.24	.58	45.04

Table 28

MOMENT COEFFICIENTS (%)

LEHIGHTON BRIDGE WITHOUT DIAPHRAGMS

LOAD CASE

	BEAM	1	2	3	4	5	6	7	8	9
Analytic	A	47.6	30.8	17.5	8.8	3.3	0.5	-1.1	-1.4	-1.4
	B	33.9	34.8	31.2	23.9	16.1	9.9	5.2	2.1	0.9
	C	15.2	23.4	30.0	32.2	29.8	23.0	15.5	9.5	6.6
	D	4.1	9.4	15.5	22.8	29.2	31.3	29.1	22.8	18.5
	E	-0.4	1.9	4.9	9.5	15.3	22.9	30.2	33.8	34.2
	F	-0.5	-0.3	0.9	2.8	6.4	12.4	21.2	33.2	41.3
Field Test	A	42.0	29.4	17.0	9.0	4.8	3.0	0.5	0.0	0.0
	B	34.7	34.5	31.0	21.7	15.0	10.9	6.0	3.2	1.0
	C	15.8	22.0	28.0	28.9	26.5	20.9	15.4	9.3	6.4
	D	6.8	11.3	16.8	25.0	29.1	31.3	28.1	21.6	18.0
	E	1.6	3.0	6.5	10.8	14.3	21.4	28.2	31.9	32.0
	F	-1.8	-0.4	1.3	4.5	8.3	13.5	21.6	36.0	42.4

Table 29

MOMENT COEFFICIENTS (%)

LEHIGHTON BRIDGE WITH DIAPHRAGMS

LOAD CASE

	BEAM	1	2	3	4	5	6	7	8	9
Analytic	A	46.5	33.8	22.5	13.7	6.8	2.5	-0.8	-2.5	-3.2
	B	31.5	29.8	26.6	22.3	17.7	12.8	7.9	4.1	2.2
	C	17.6	21.7	24.5	25.5	24.3	20.9	17.0	12.4	9.6
	D	6.6	11.9	16.7	20.8	24.0	25.2	24.4	21.7	19.7
	E	0.5	4.0	8.0	13.0	17.8	22.2	26.6	29.6	30.5
	F	-2.8	-1.2	1.7	4.8	9.4	16.4	24.9	34.7	41.3
Field Test	A	43.0	31.5	18.8	11.0	6.5	3.0	0.5	0.0	0.0
	B	32.5	31.9	29.0	22.4	16.8	12.3	7.2	3.8	3.6
	C	15.8	20.4	25.6	26.4	24.9	21.3	15.4	11.0	7.5
	D	6.8	11.3	16.8	23.0	28.5	29.4	28.1	22.2	18.0
	E	2.1	4.0	7.7	11.5	13.2	19.0	23.1	26.6	26.8
	F	-1.3	0.4	2.0	6.3	10.0	15.2	24.0	26.7	43.6

Table 30

MOMENT COEFFICIENTS (%)

LEHIGHTON BRIDGE WITH DIAPHRAGMS

		LOAD CASE								
BEAM		1	2	3	4	5	6	7	8	9
Effective in Shear	A	47.6	30.8	17.5	8.8	3.3	0.5	-1.1	-1.5	-1.4
	B	33.9	34.8	31.2	23.9	16.1	9.9	5.2	2.1	0.9
	C	15.3	23.4	30.0	32.2	29.8	23.0	15.5	9.5	6.6
	D	4.1	9.4	15.5	22.8	29.2	31.3	29.1	22.8	18.5
	E	-0.4	1.9	4.9	9.5	15.3	22.9	30.2	33.8	34.2
	F	-0.5	-0.3	0.9	2.8	6.4	12.4	21.2	33.2	41.3
Fully Effective	A	45.0	34.9	25.4	17.0	9.7	4.5	0.9	-2.7	-4.2
	B	30.7	27.7	24.5	21.0	17.9	13.7	9.0	5.1	3.0
	C	19.2	20.7	21.8	22.5	21.2	19.0	16.8	13.6	11.1
	D	8.4	13.1	16.6	19.0	21.1	22.5	21.7	20.9	20.1
	E	1.3	5.3	9.4	14.1	18.3	21.2	24.5	27.6	28.8
	F	-4.6	-1.6	2.2	6.4	11.9	19.2	27.1	35.6	41.2

Table 31

LOAD DISTRIBUTION FACTORS IN A 4 - BEAM BRIDGE

24 FEET WIDE WITH AND WITHOUT CURBS, PARAPETS, AND DIAPHRAGMS

S = 8' - 0" L = 64' - 0"

No. of Loaded Lanes	Beam	LIVE LOAD DISTRIBUTION FACTORS			
		(1)[a]	(2)[b]	(3)[c]	(4)[d]
1	A	.89	.91	.93	.94
	B	.86	.87	.76	.75
	C	.86	.87	.76	.75
	D	.89	.91	.93	.94
2	A	.95	.98	1.03	1.05
	B	1.30	1.30	1.22	1.20
	C	1.30	1.30	1.22	1.20
	D	.95	.98	1.03	1.05

(a) beams and slab only

(b) beams and slab with curb and parapet

(c) beams and slab with diaphragm

(d) beams and slab with curb, parapets and diaphragms

Table 32

LOAD DISTRIBUTION FACTORS IN A 7 - BEAM BRIDGE

48 FEET WIDE WITH AND WITHOUT CURBS, PARAPETS AND DIAPHRAGMS

S = 8' - 0" L = 64' - 0"

No. of Loaded Lanes	Beam	LIVE LOAD DISTRIBUTION FACTORS			
		(1)[a]	(2)[b]	(3)[c]	(4)[d]
1	A	.91	.91	.93	.93
	B	.87	.86	.74	.73
	C	.85	.84	.70	.70
	D	.84	.84	.69	.69
2	A	.96	.98	1.04	1.06
	B	1.31	1.29	1.20	1.19
	C	1.37	1.36	1.22	1.21
	D	1.36	1.36	1.21	1.21
3	A	.94	.96	1.00	1.01
	B	1.34	1.33	1.28	1.27
	C	1.51	1.50	1.45	1.44
	D	1.52	1.51	1.46	1.45
4	A	.94	.96	.98	1.00
	B	1.33	1.31	1.26	1.25
	C	1.51	1.50	1.47	1.45
	D	1.57	1.57	1.54	1.54

(a) beams and slab only

(b) beams and slab with curbs and parapet

(c) beams and slab with diaphragms

(d) beams and slab with curbs, parapets and diaphragms

Table 33

MOMENT COEFFICIENTS AT SUPPORTS (%)

CONTINUOUS BRIDGE

75' - 100' - 75' 6 Beams s = 7' - 2"

	LOAD CASE								
BEAM	1	2	3	4	5	6	7	8	9
A	46.65	27.91	14.08	5.60	1.18	-.32	-.26	.32	1.62
B	32.64	36.23	32.54	24.96	16.75	9.62	5.12	2.31	.79
C	14.77	24.16	31.95	35.37	32.07	24.78	16.57	9.08	3.73
D	3.73	9.08	16.57	24.78	32.07	35.37	31.95	24.16	14.77
E	.79	2.31	5.12	9.62	16.75	24.96	32.54	36.23	32.64
F	1.62	.32	-.26	-.32	1.18	5.60	14.08	27.91	46.65

Table 34

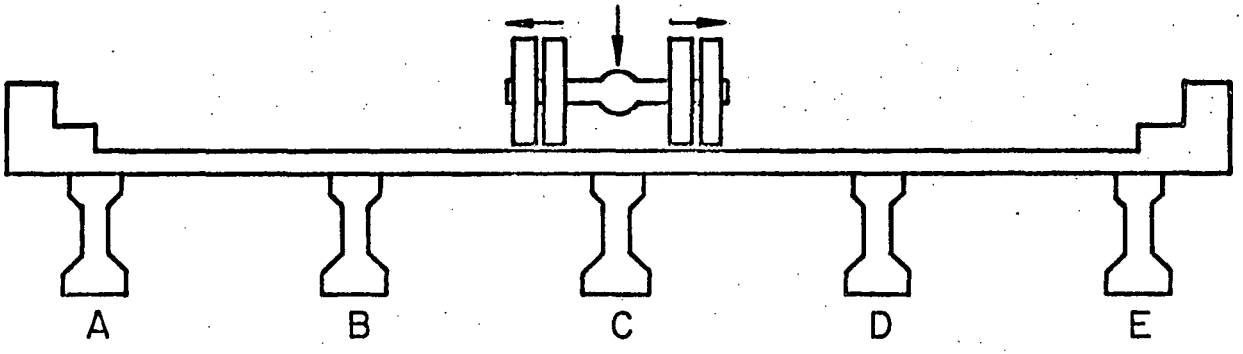
MOMENT COEFFICIENTS AT MIDSPAN (%)

CONTINUOUS BRIDGE

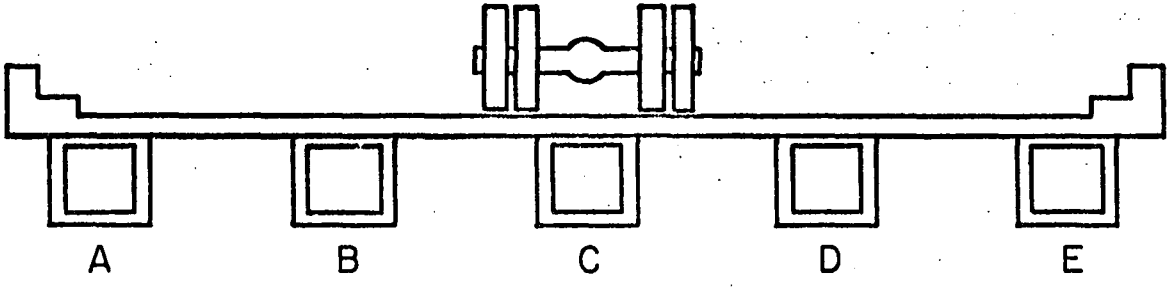
75' - 100' - 75' 6 Beams s = 7' - 2"

	LOAD CASE								
BEAM	1	2	3	4	5	6	7	8	9
A	45.44	28.87	16.38	8.49	3.84	1.27	.16	-.07	.19
B	33.79	35.39	31.27	23.36	15.59	10.05	6.08	3.12	.87
C	14.82	23.00	30.51	33.56	30.58	23.27	15.60	9.70	4.89
D	4.89	9.70	15.60	23.27	30.58	33.56	30.51	23.00	14.82
E	.87	3.12	6.08	10.05	15.59	23.36	31.27	35.39	33.79
F	.19	-.07	.16	1.27	3.84	8.49	16.38	28.87	45.44

7. FIGURES



(a) I-Beam Bridge



(b) Spread-Box Beam Bridge

Fig. 1 Beam-Slab Bridge Cross-Sections

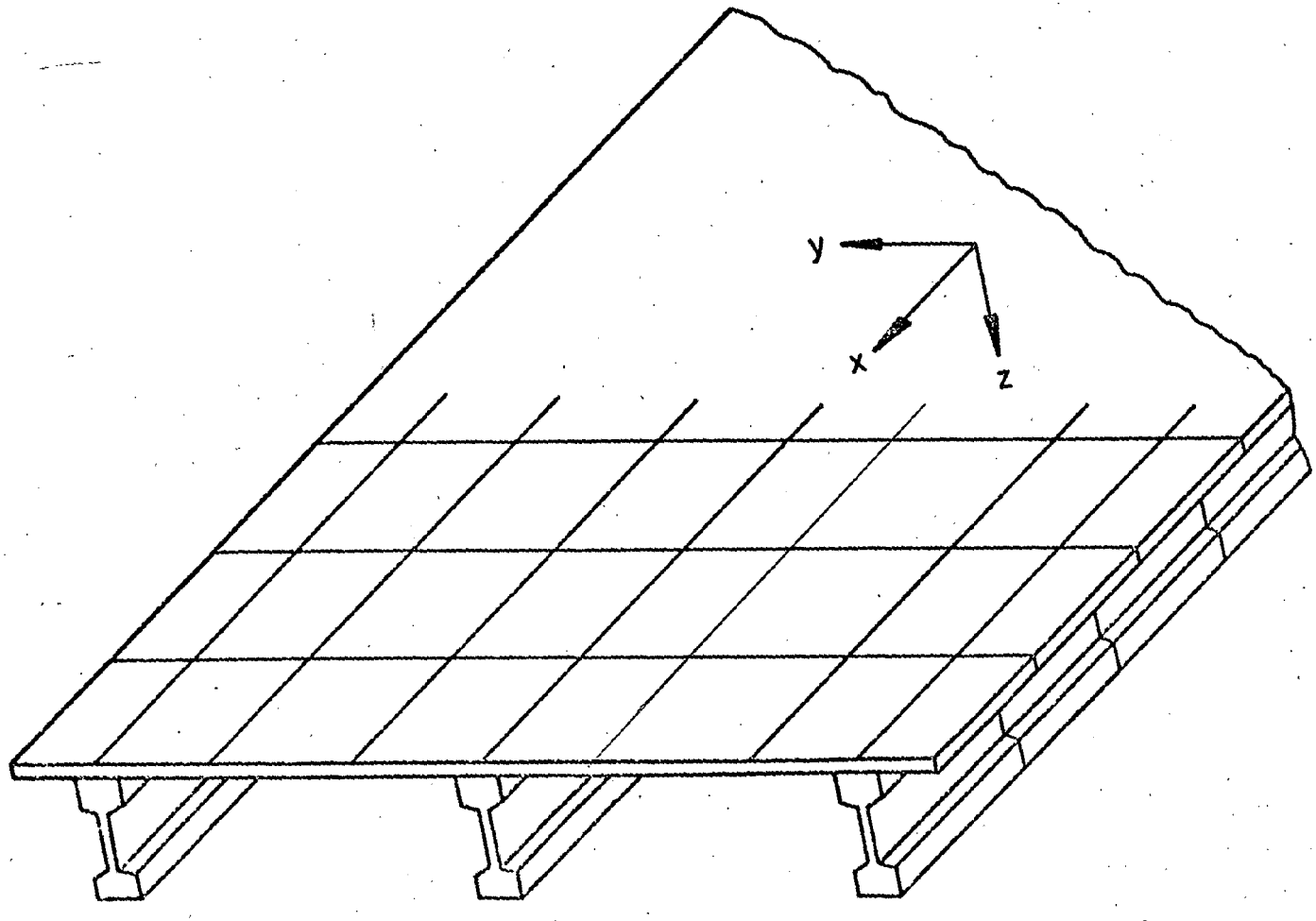


Fig. 2 Finite Element Discretization of Beam-Slab Bridge with Prestressed Concrete I-Beams

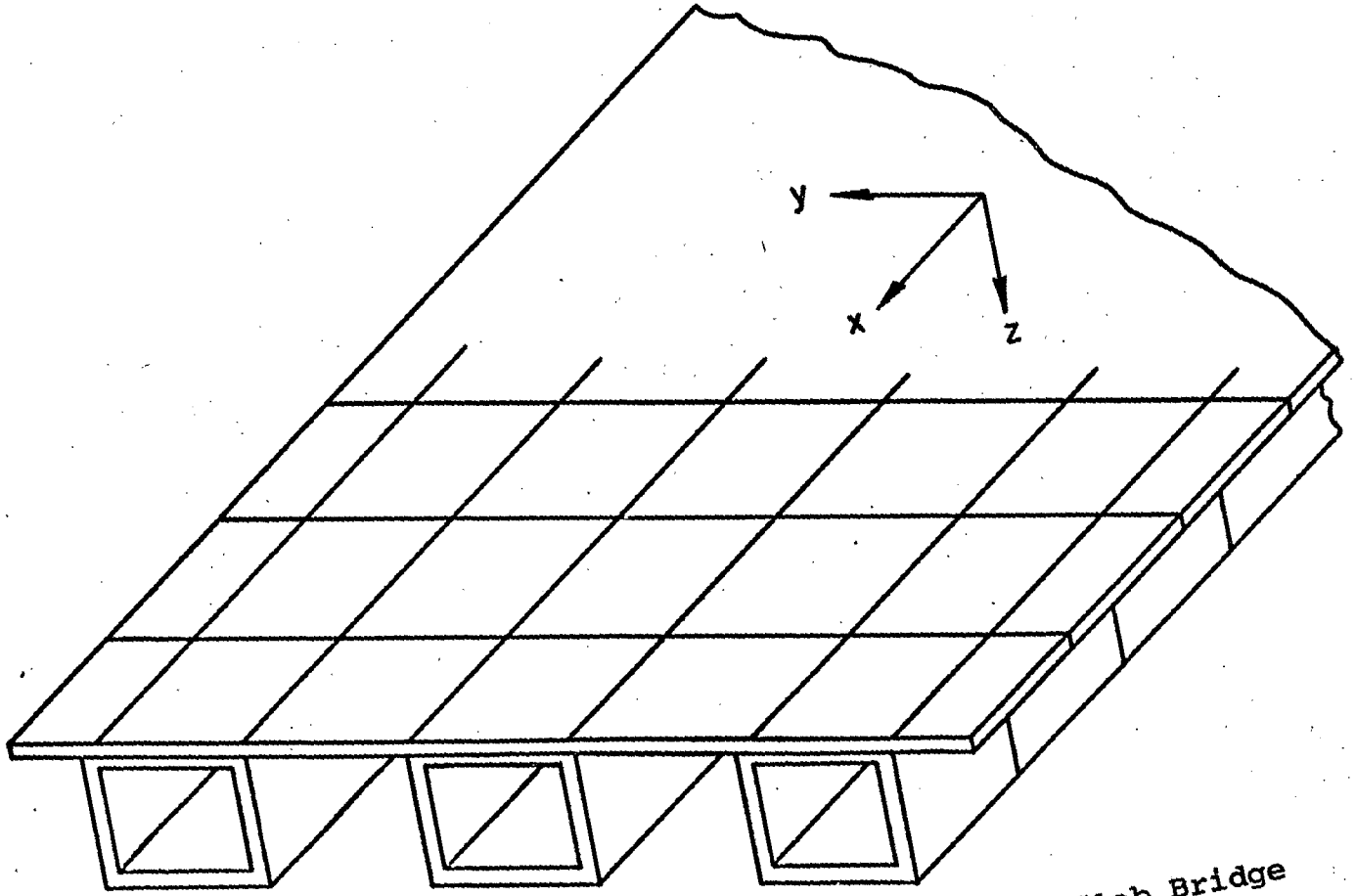
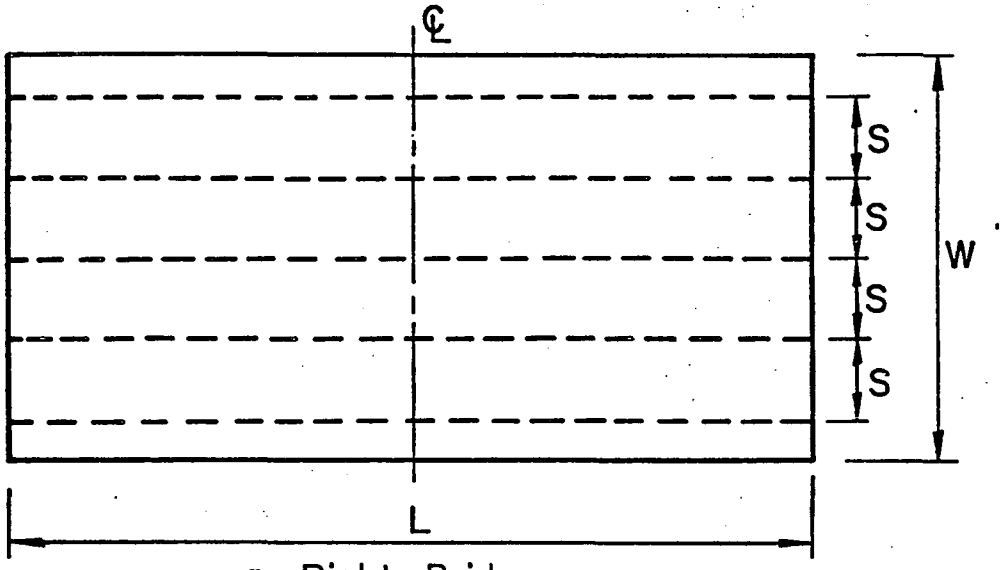
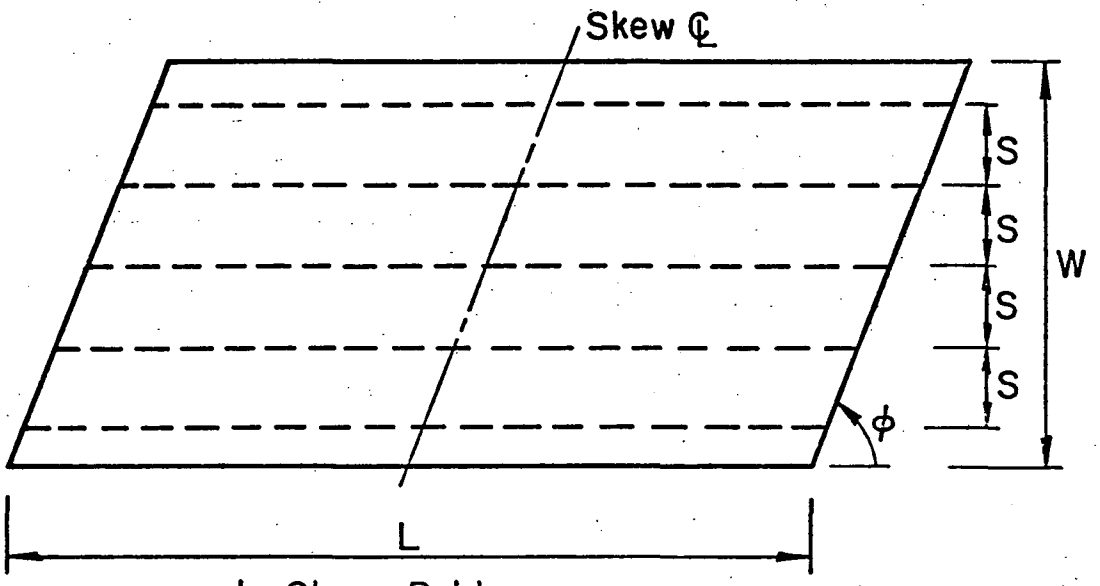


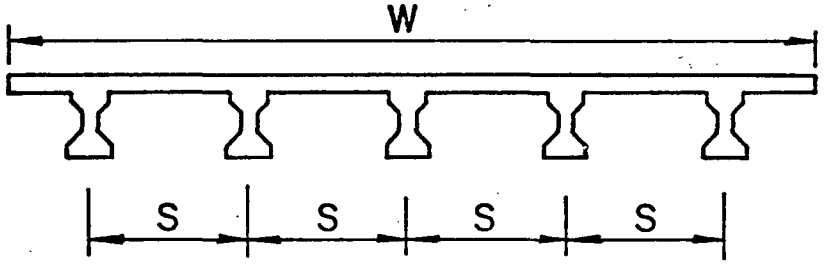
Fig. 3 Finite Element Discretization of Beam-Slab Bridge with Prestressed Concrete Spread Box-Beams



a Right Bridge

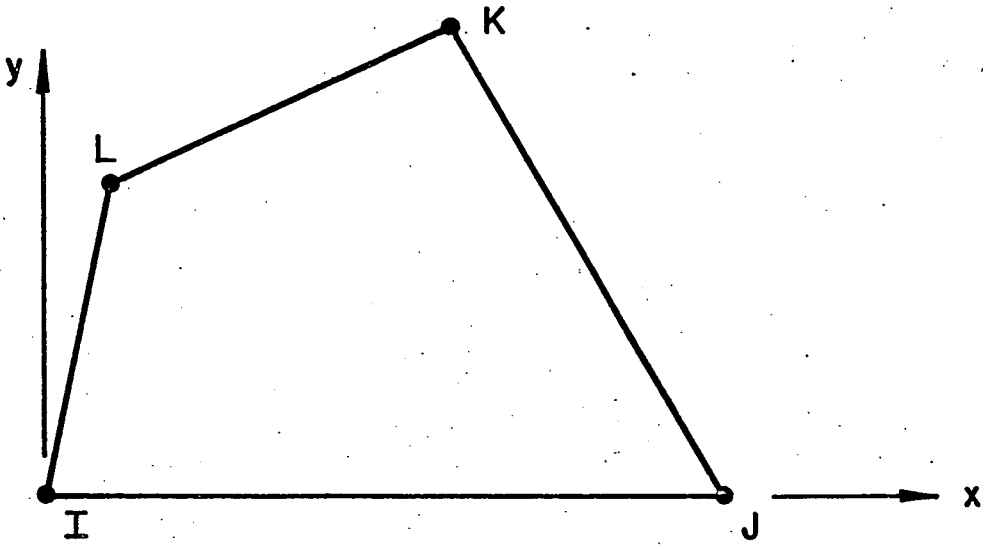


b Skew Bridge

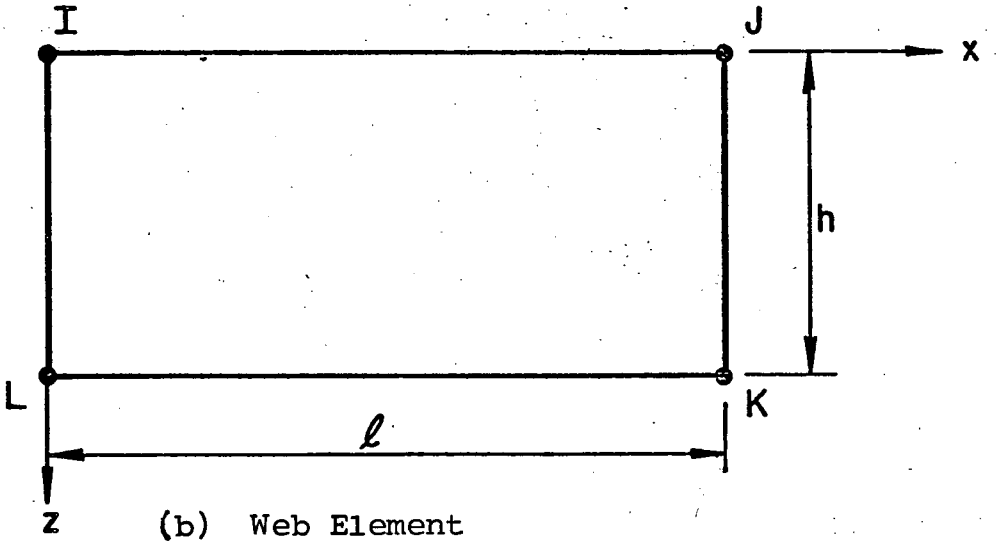


c Section

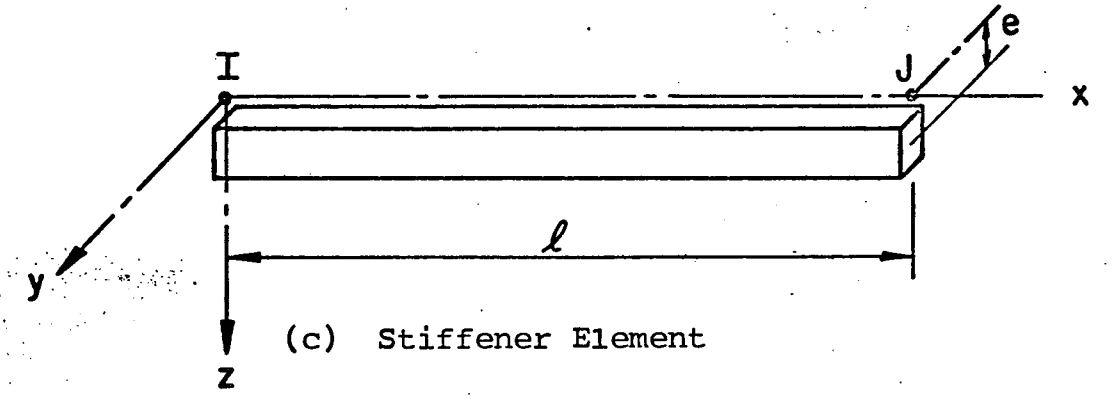
Fig. 4 Plan and Section of A Right and A Skew Bridge



(a) Quadrilateral Element

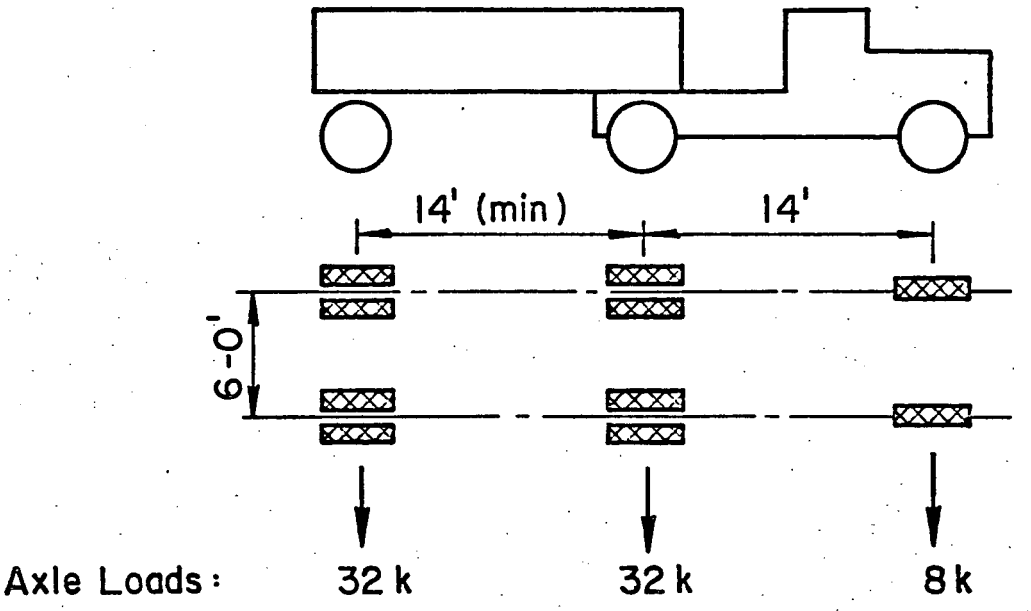


(b) Web Element

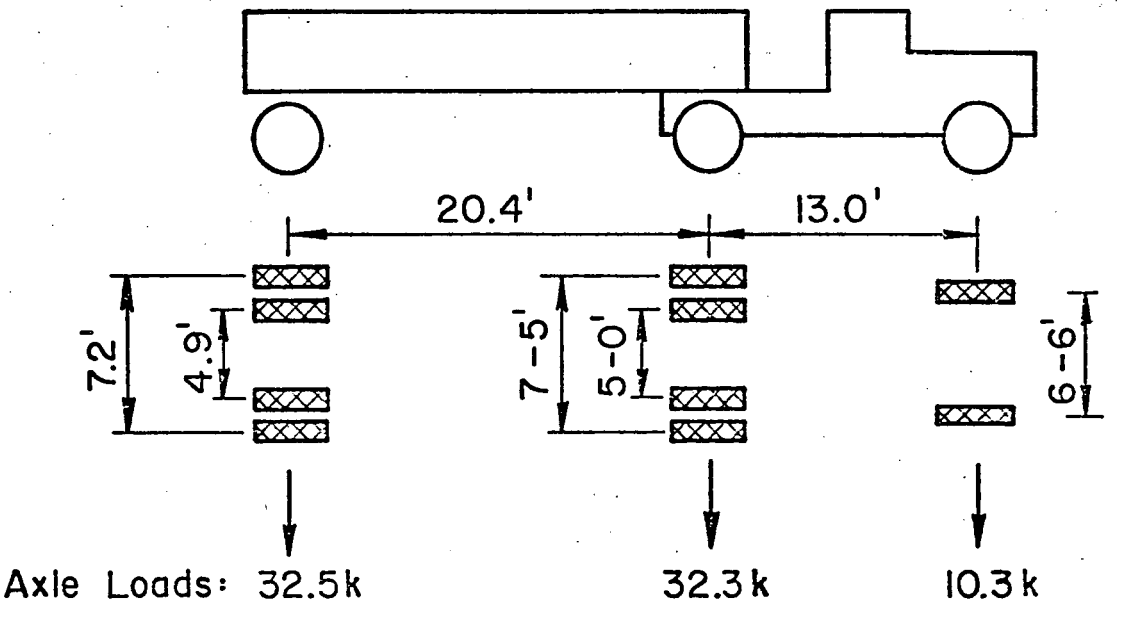


(c) Stiffener Element

Fig. 5 Basic Finite Elements Used in the Modeling of Bridges



HS 20-44 Design Load Vehicle



Test Vehicle

Fig. 6 Vehicular Loadings

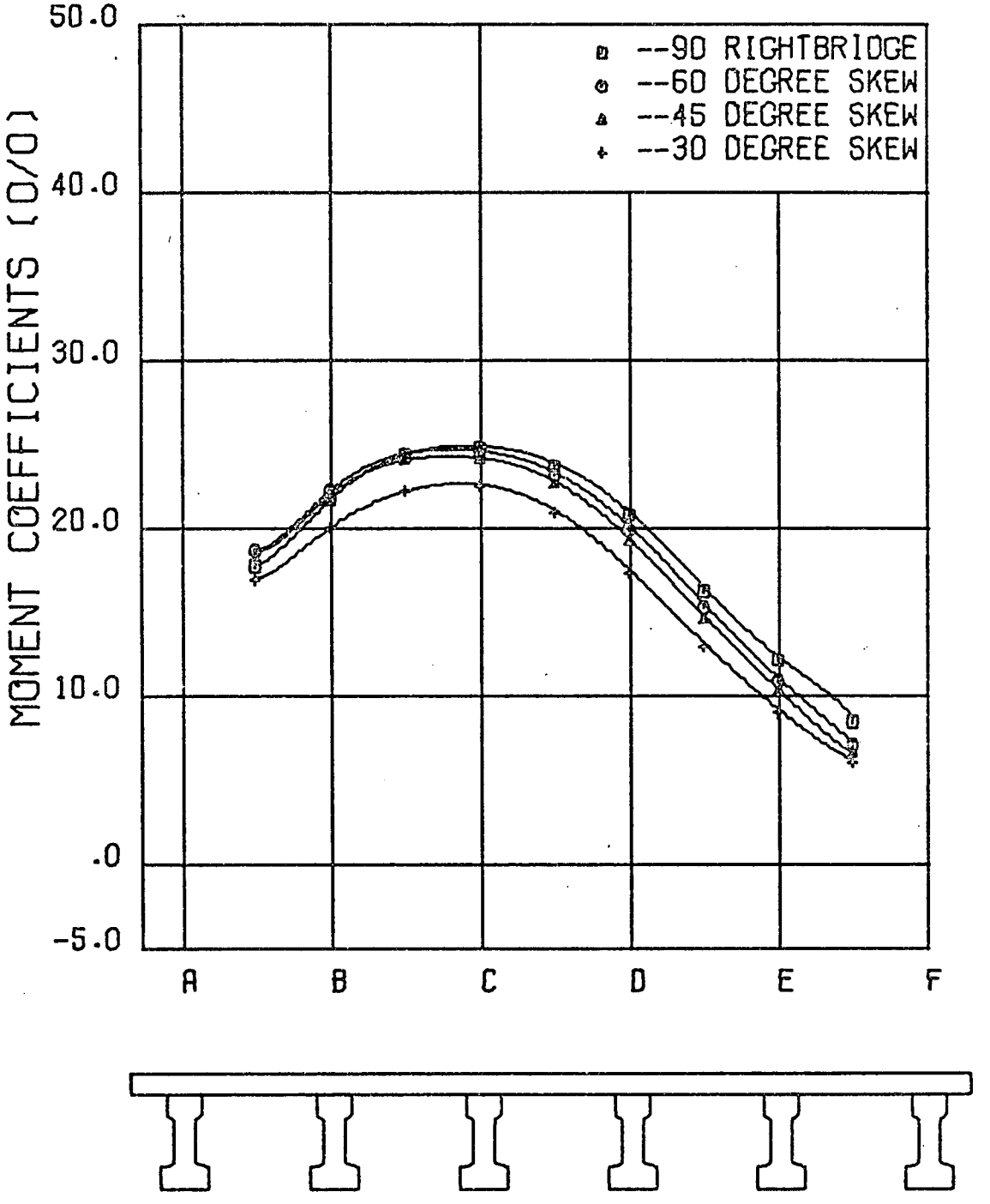


Fig. 7 Influence Lines for Moment - Beam C
(Bridge No. 1)

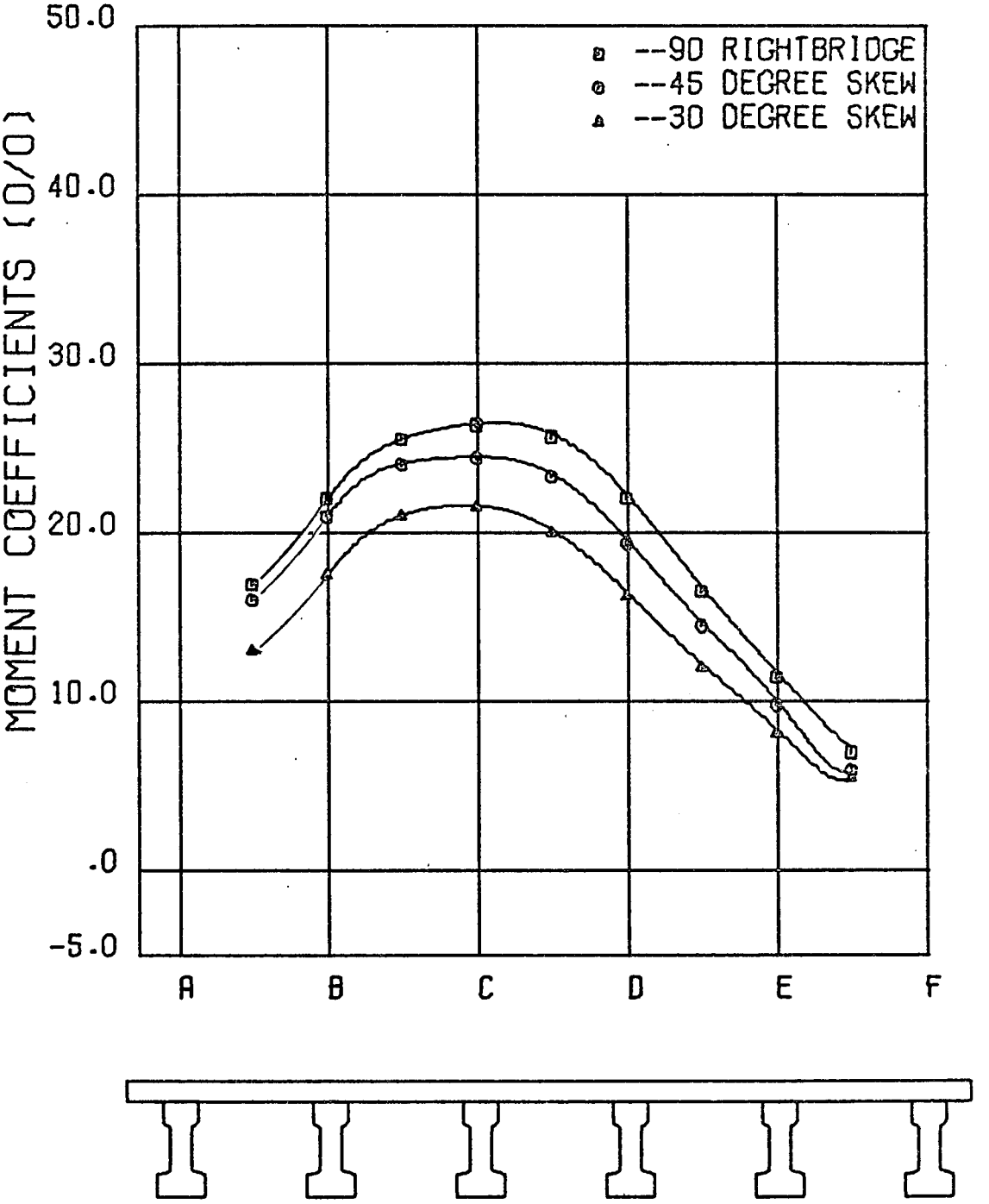


Fig. 8 Influence Lines for Moment - Beam C
(Bridge No. 2)

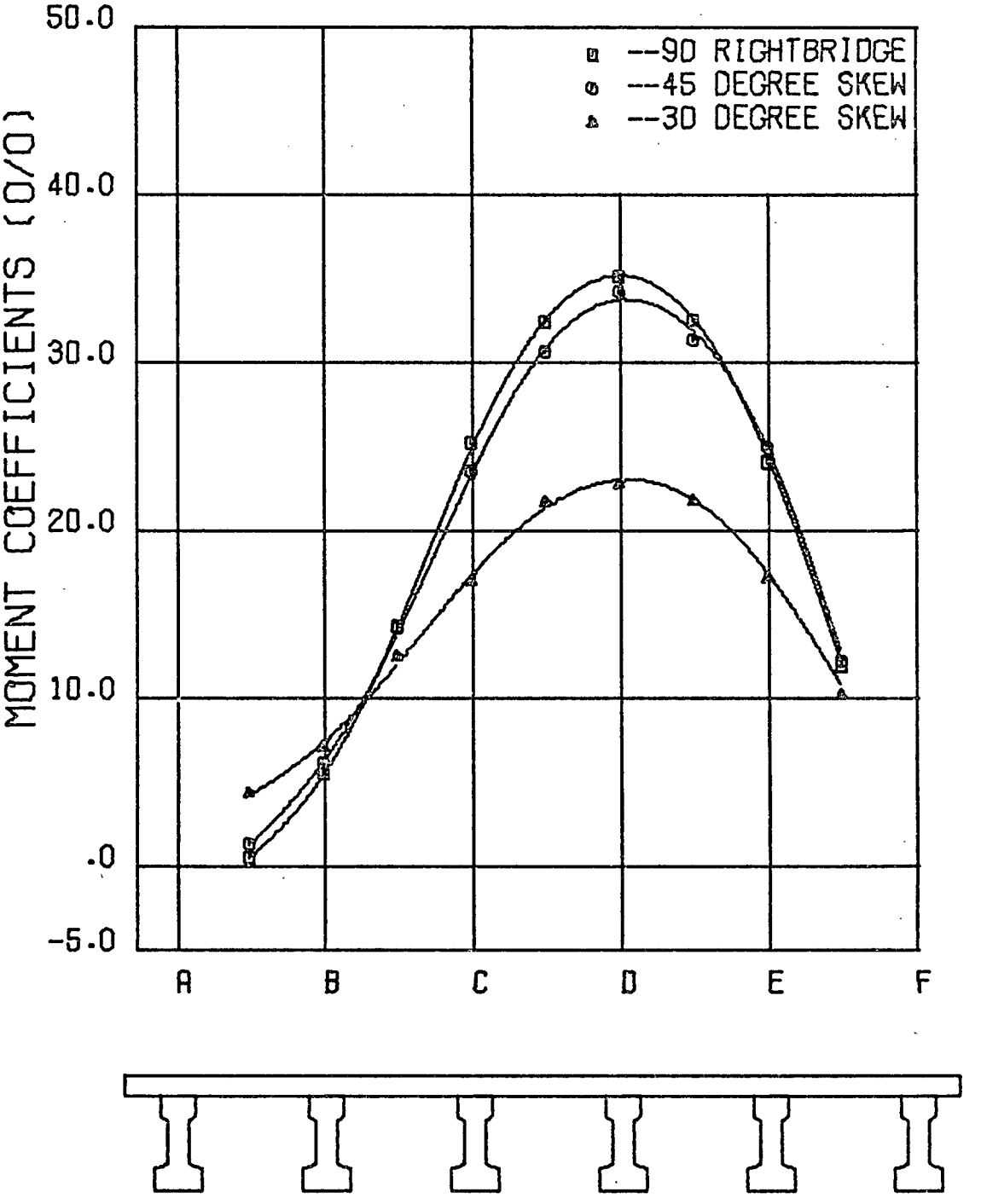


Fig. 9 Influence Lines for Moment - Beam D
(Bridge No. 3)

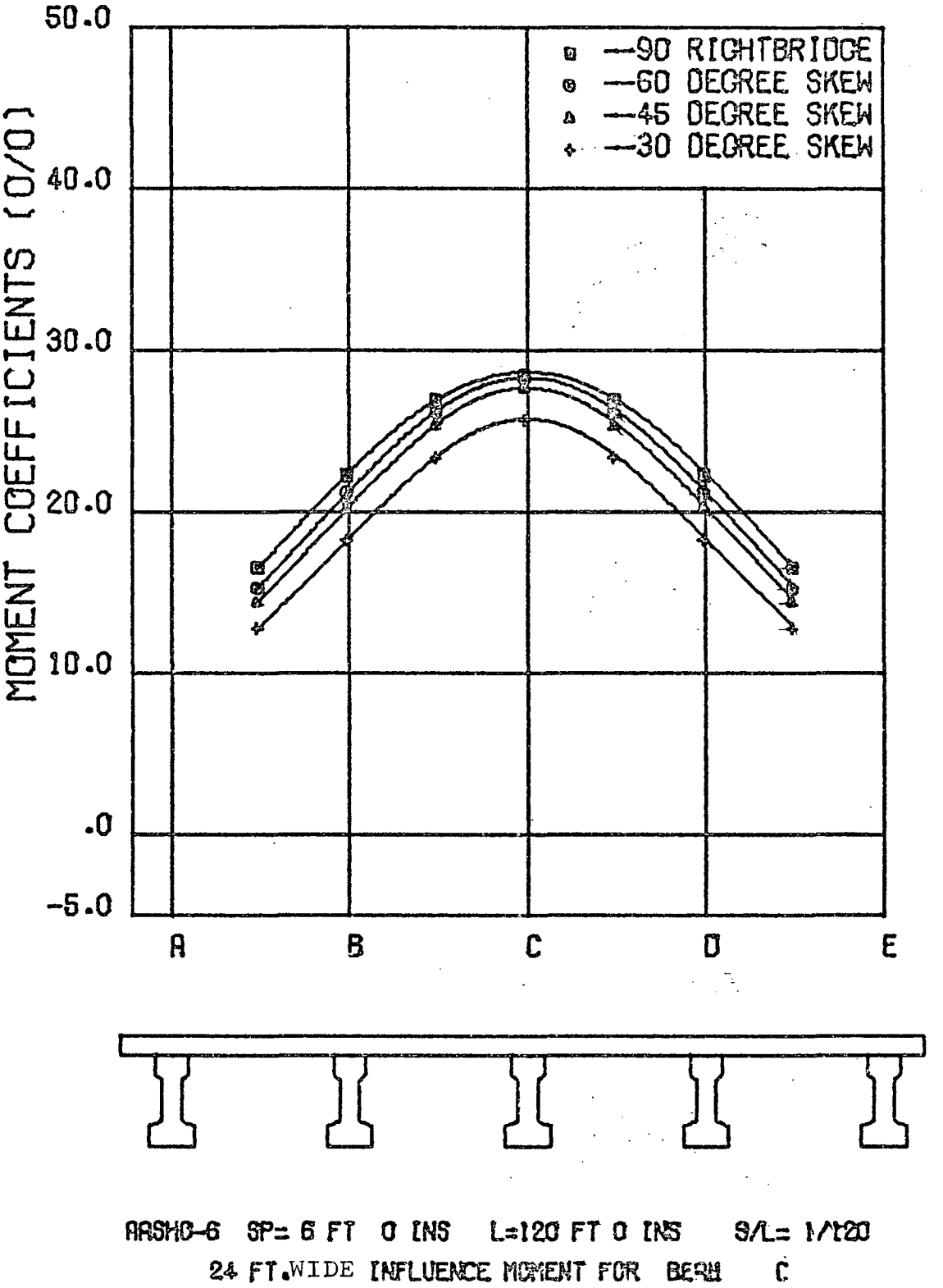


Fig. 10 Influence Lines for Moment - Beam C
(Bridge No. 4)

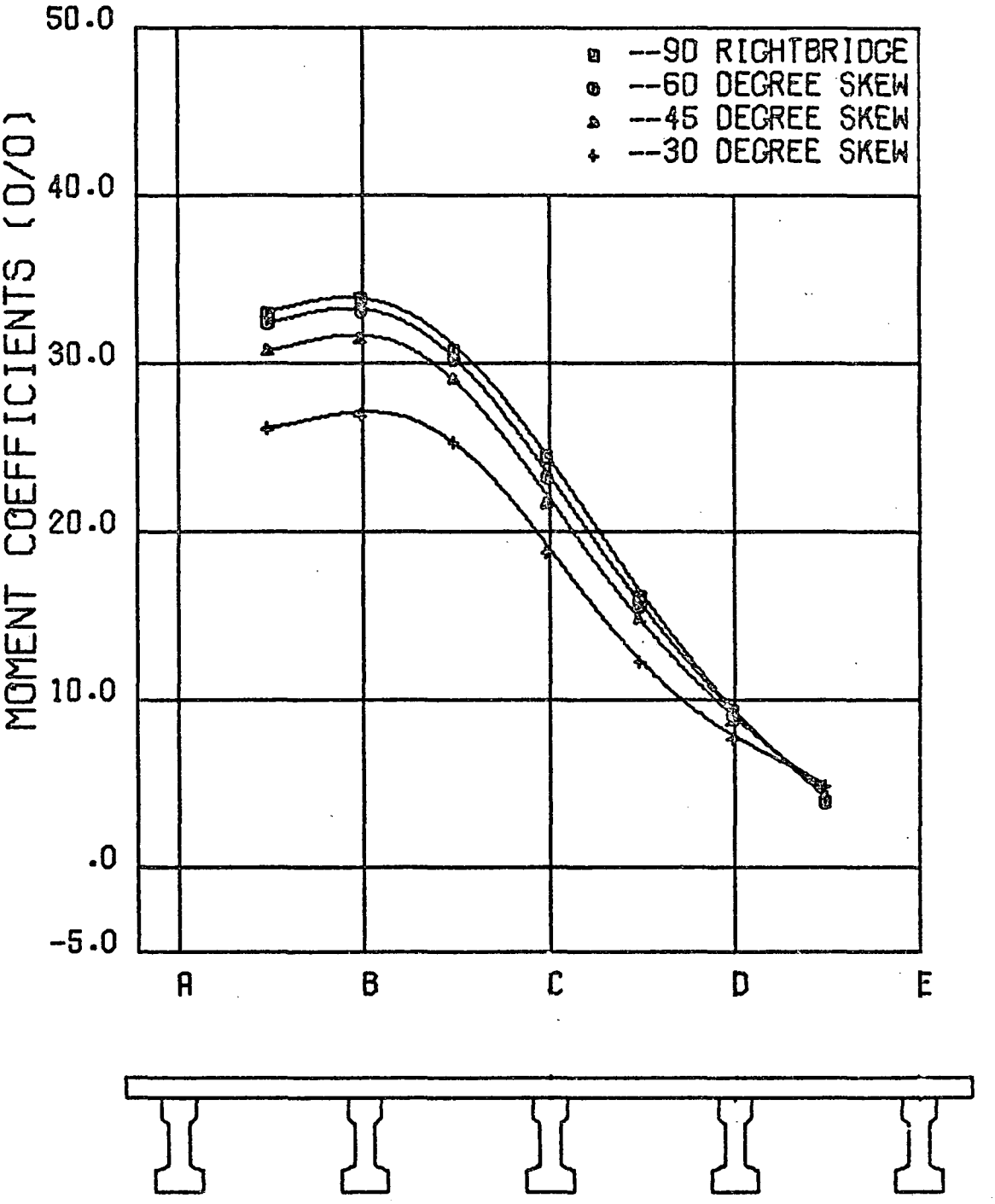


Fig. 11 Influence Lines for Moment - Beam B
(Bridge No. 5)

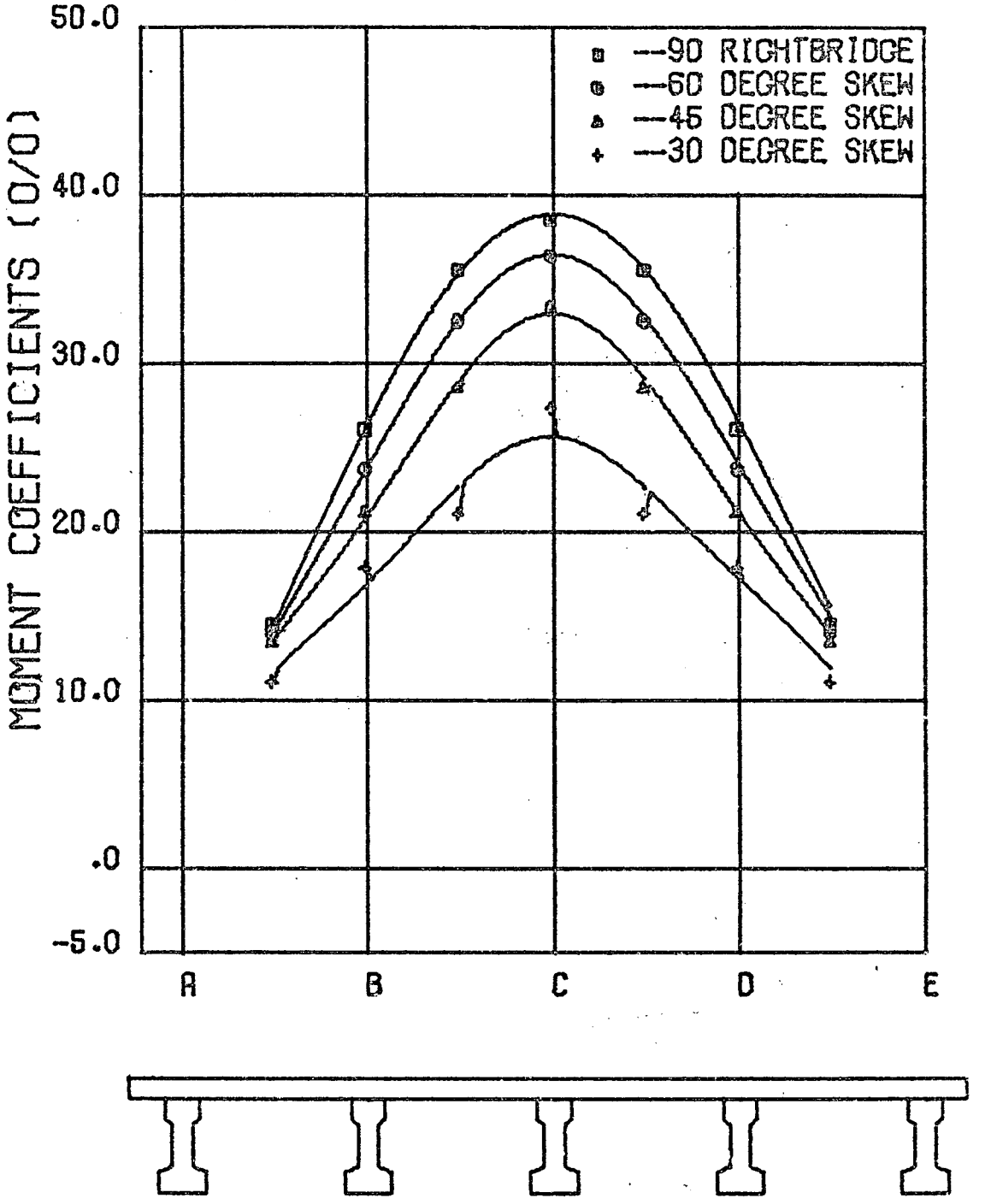


Fig. 12 Influence Lines for Moment - Beam C
(Bridge No. 6)

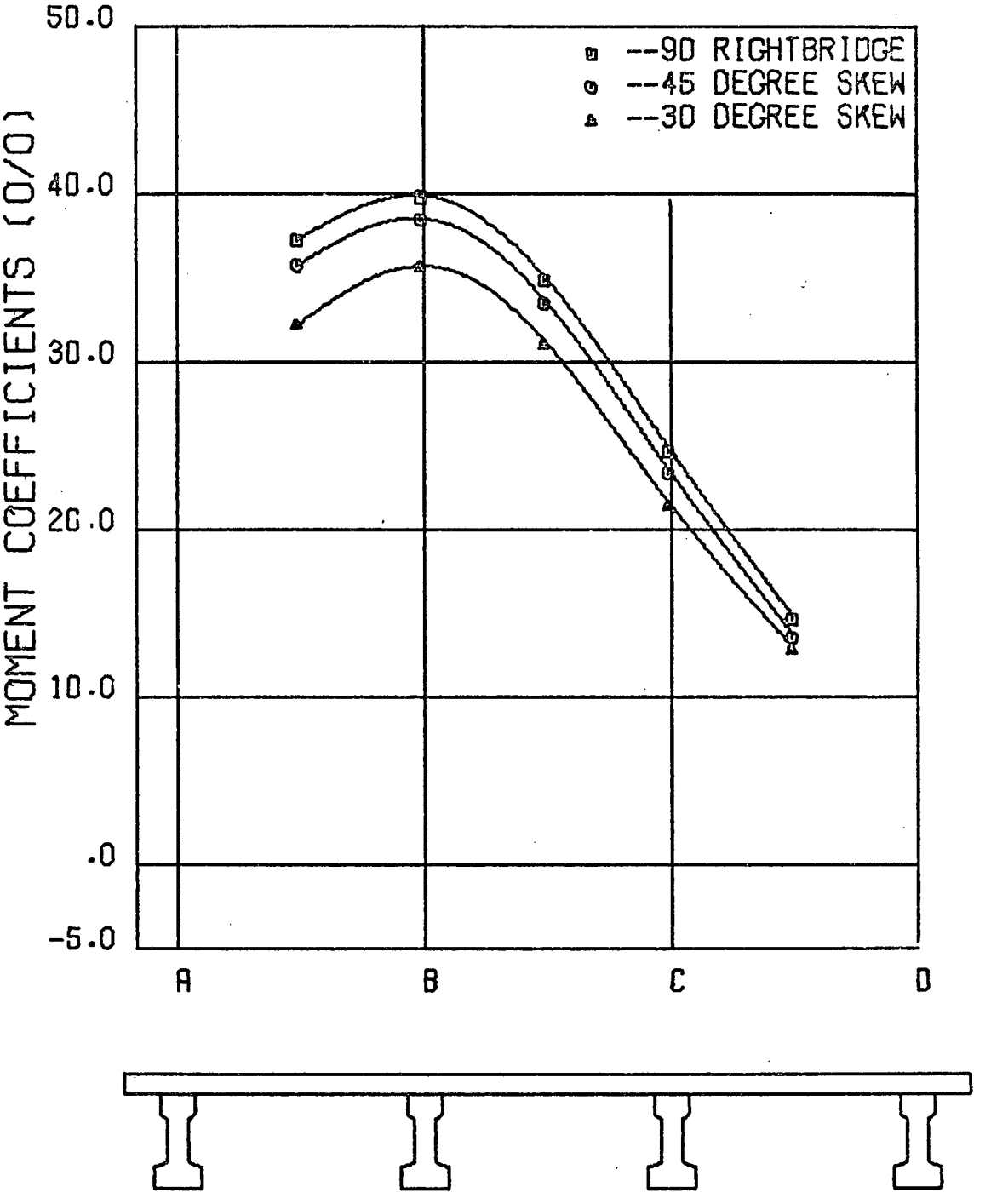


Fig. 13 Influence Lines for Moment - Beam B
(Bridge No. 7)

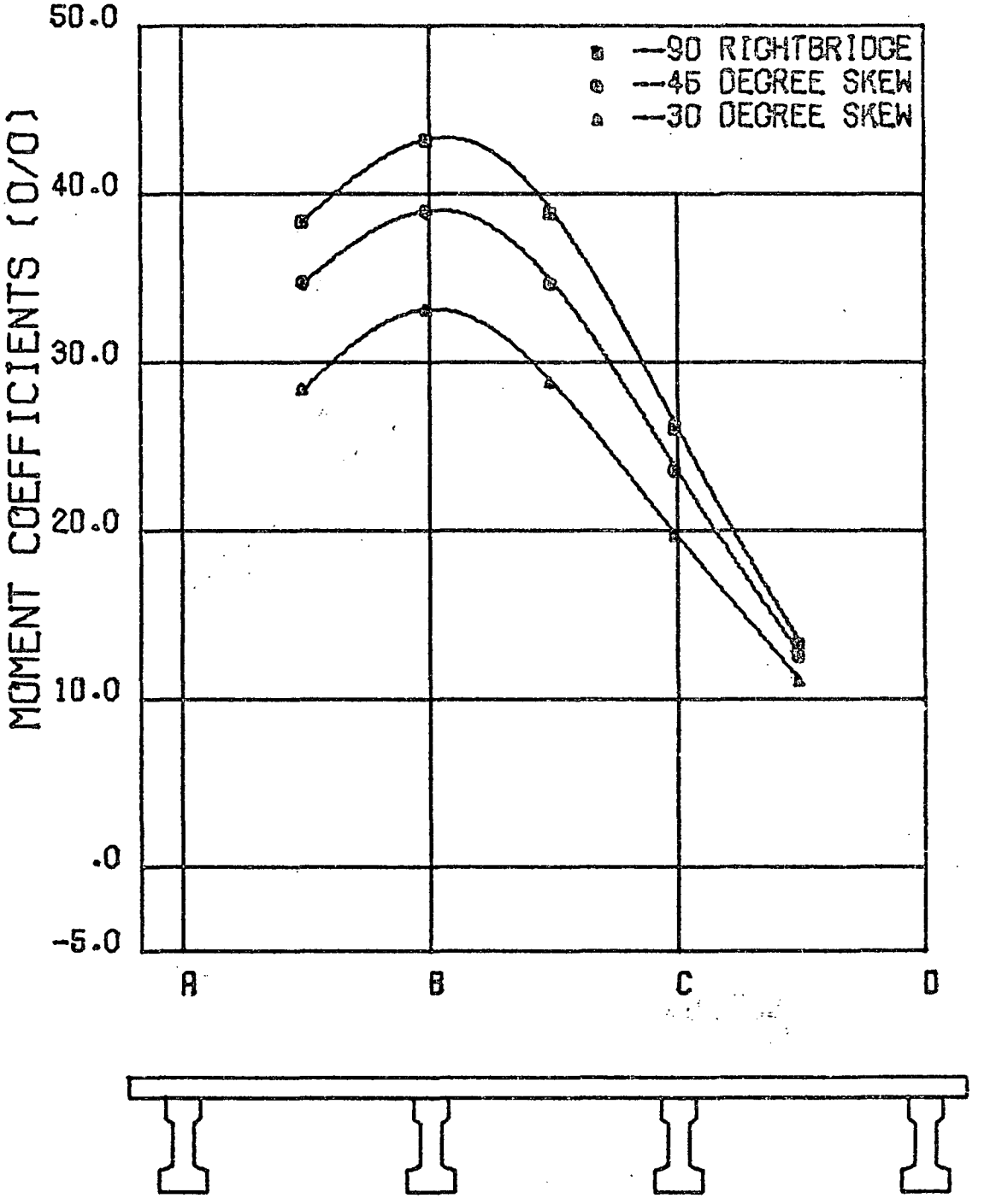


Fig. 14 Influence Lines for Moment - Beam B
(Bridge No. 8)

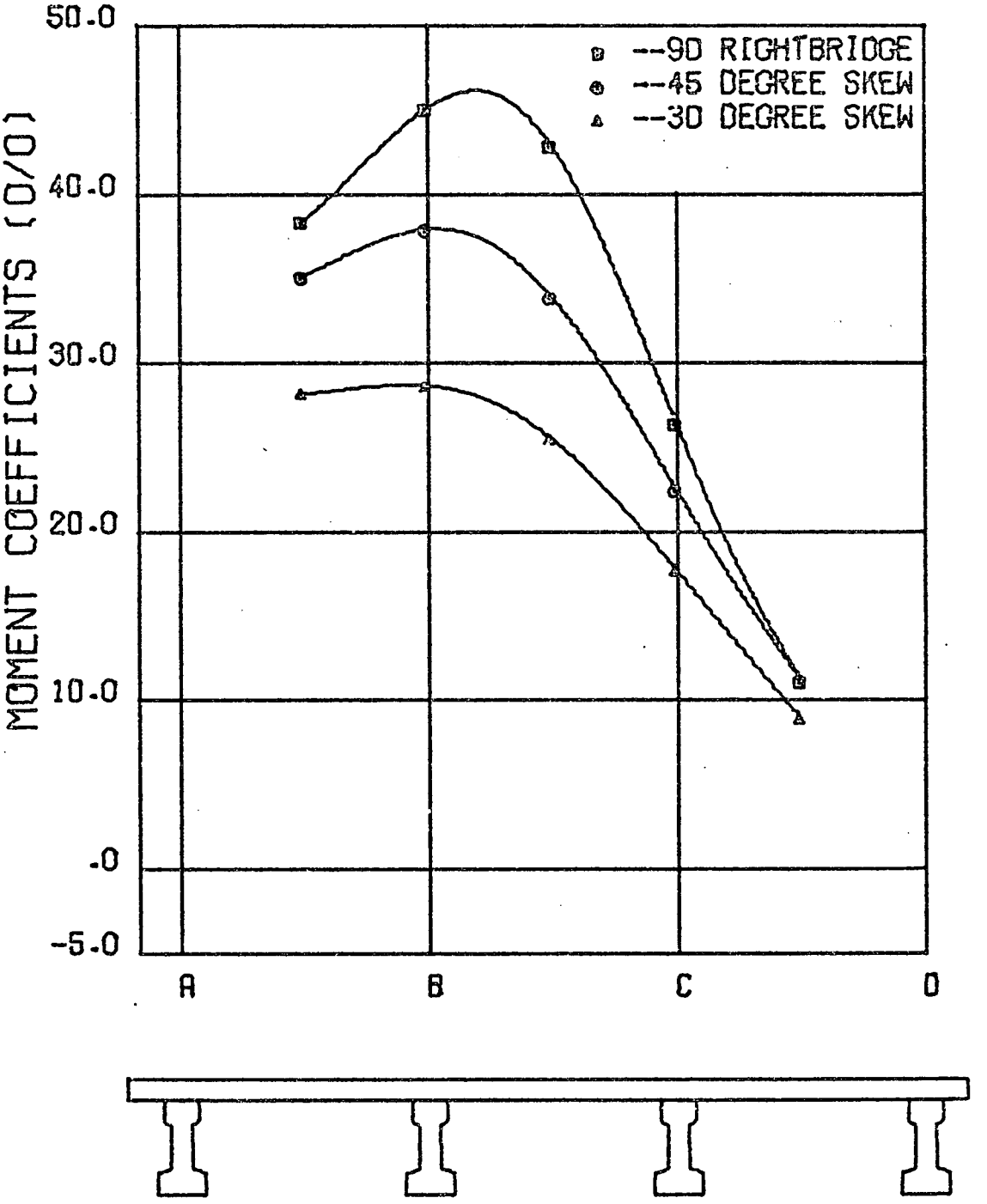
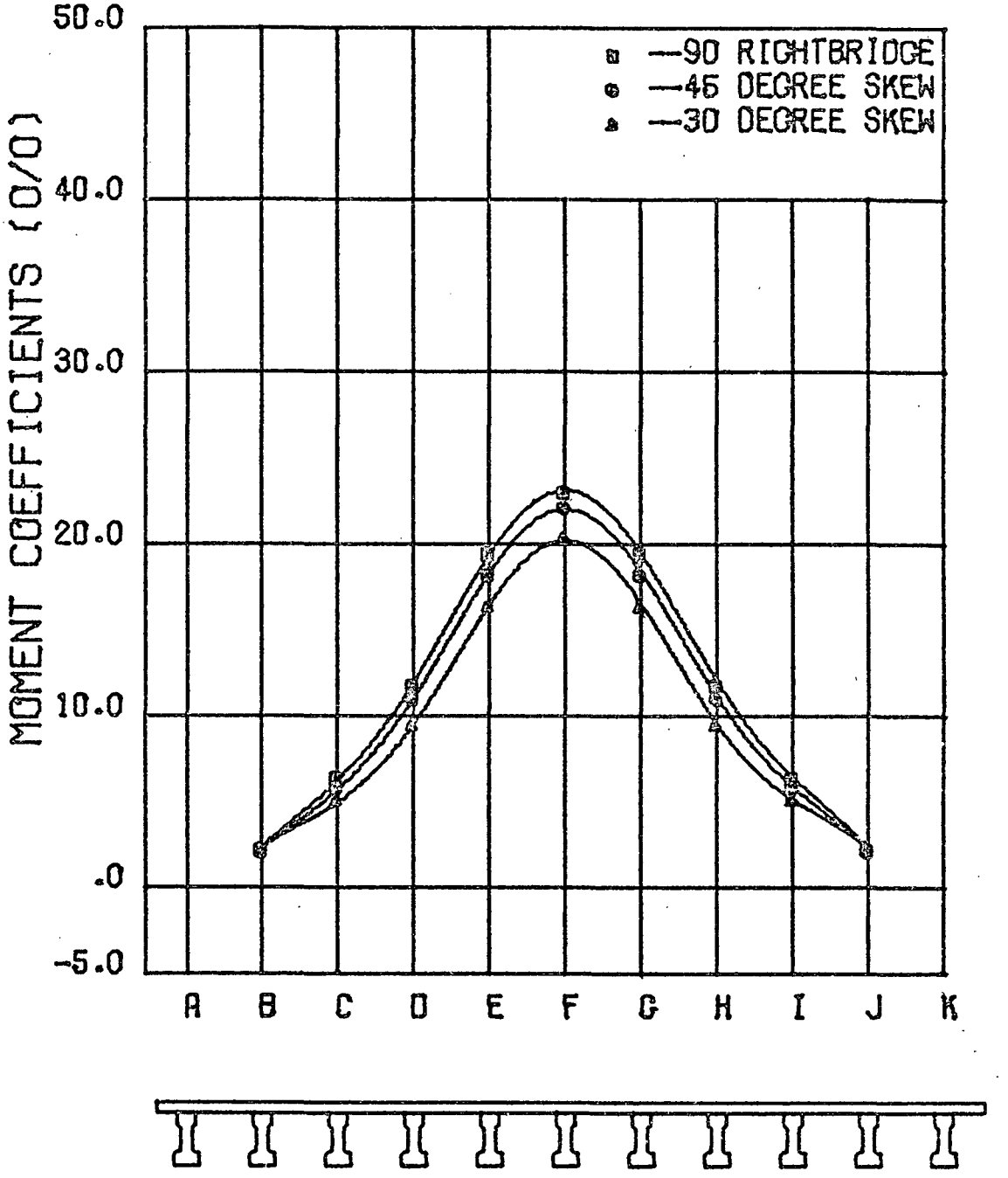


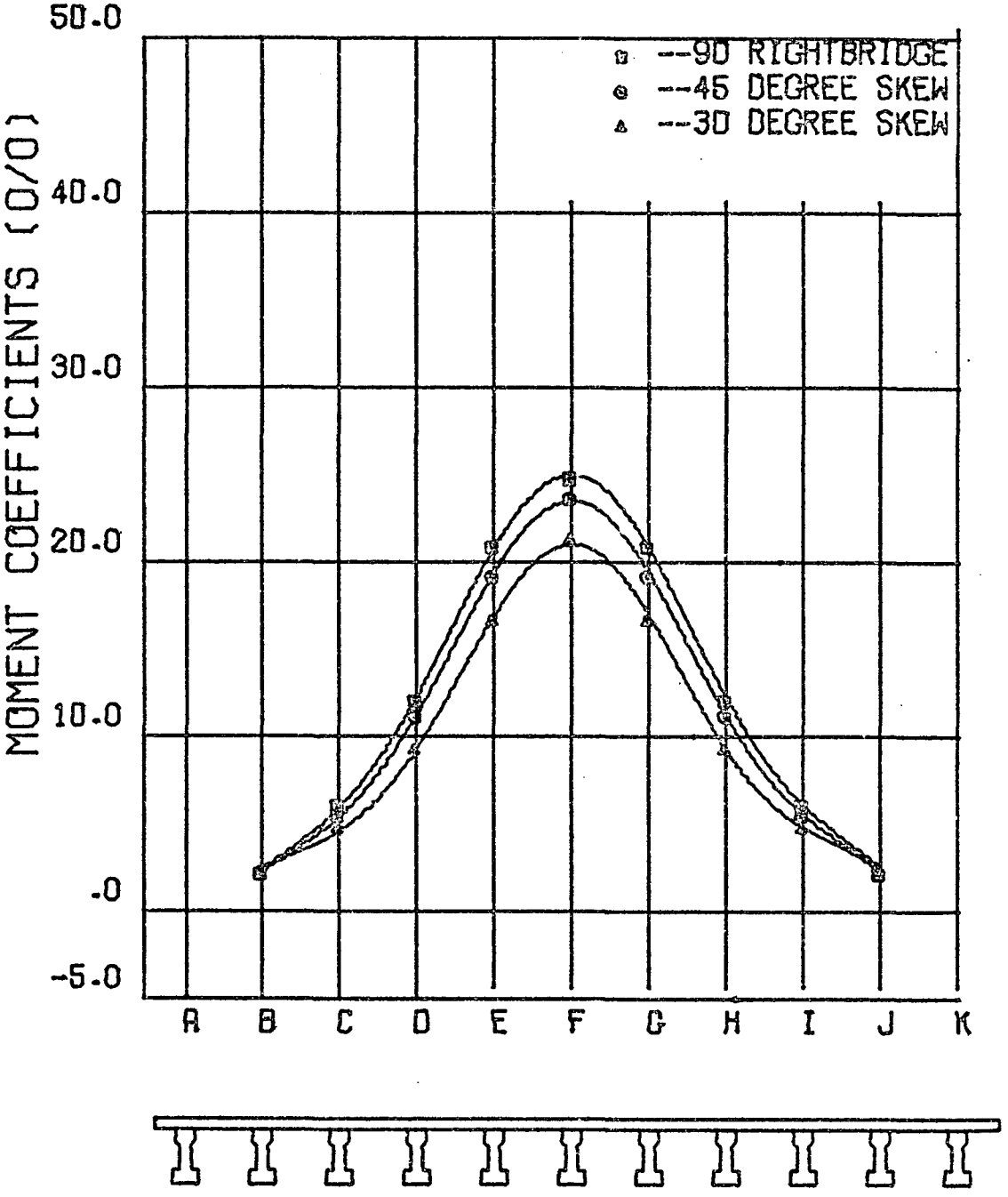
Fig. 15 Influence Lines for Moment - Beam B
(Bridge No. 9)



AASHO-6 SP= 4 FT 10 INS L=120 FT 0 INS S/L= 1/25

48 FT. WIDE INFLUENCE MOMENT FOR BEAM F

Fig. 16 Influence Lines for Moment - Beam F
(Bridge No. 10)



24/48 SP= 4 FT 10 INS L= 84 FT 0 INS S/L= 1/17.5
48 FT. WIDE INFLUENCE MOMENT FOR BEAM F

Fig. 17 Influence Lines for Moment - Beam F
(Bridge No. 11)

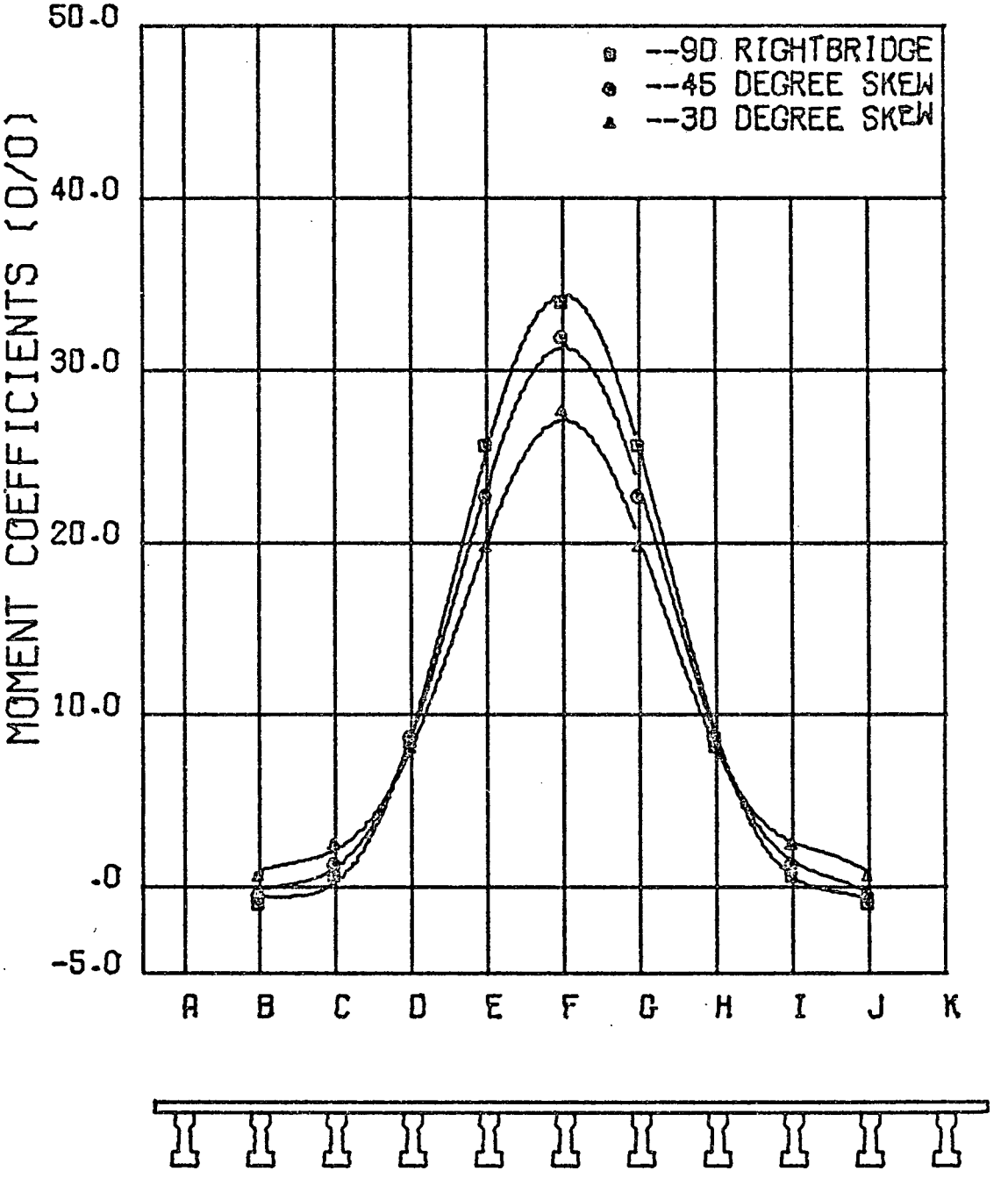


Fig. 18 Influence Lines for Moment - Beam F
(Bridge No. 12)

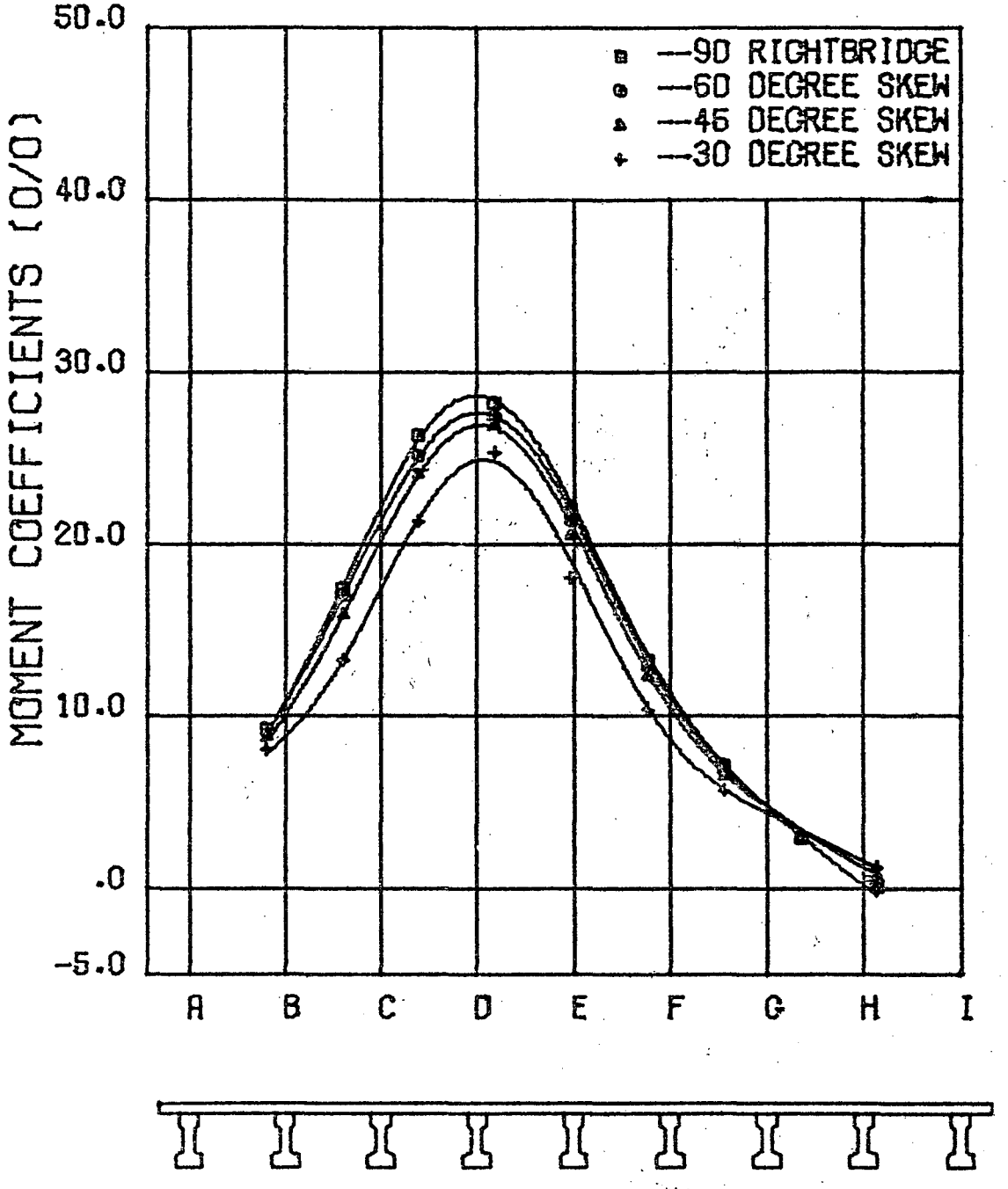


Fig. 19 Influence Lines for Moment - Beam D
(Bridge No. 13)

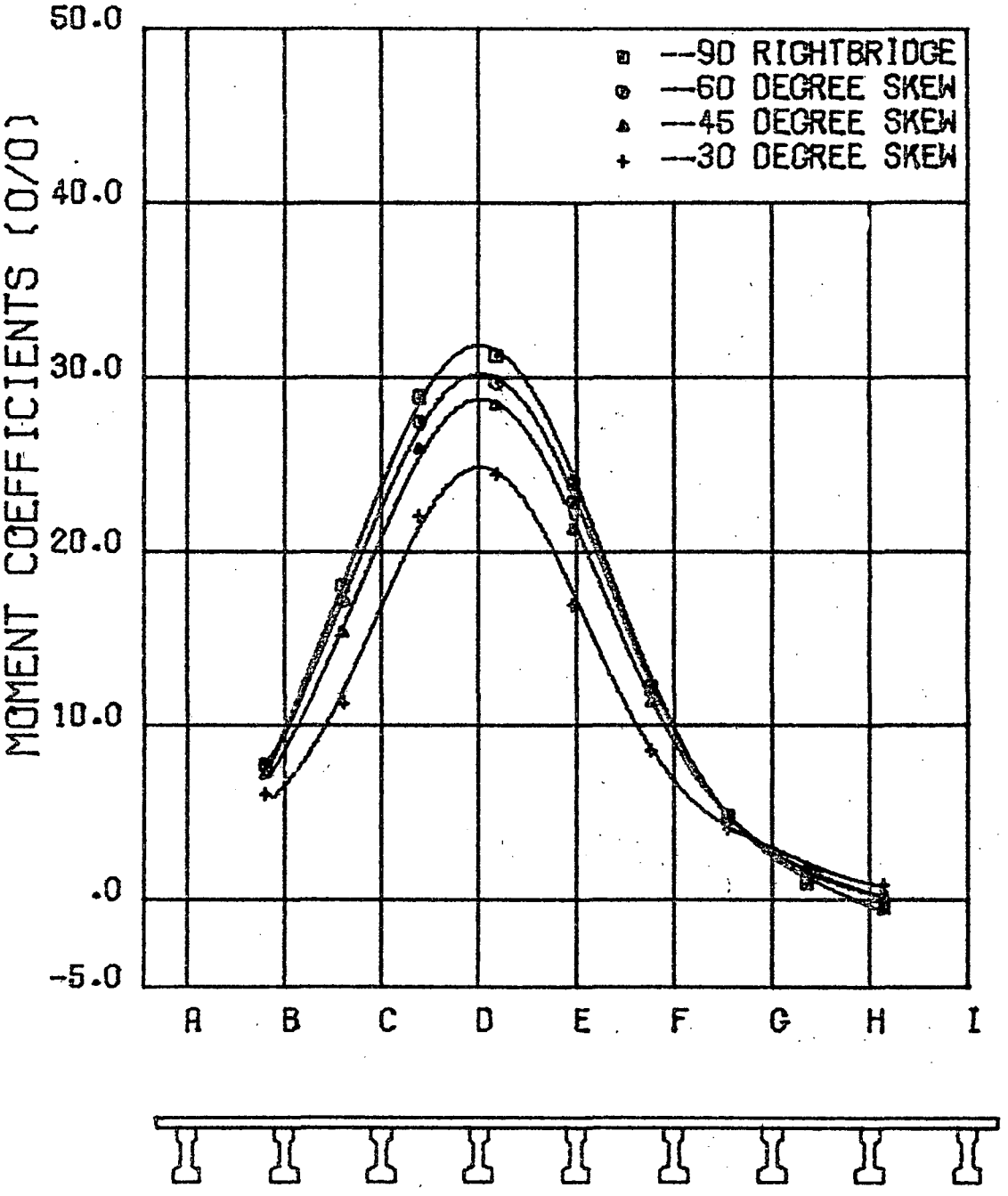


Fig. 20 Influence Lines for Moment - Beam D
(Bridge No. 14)

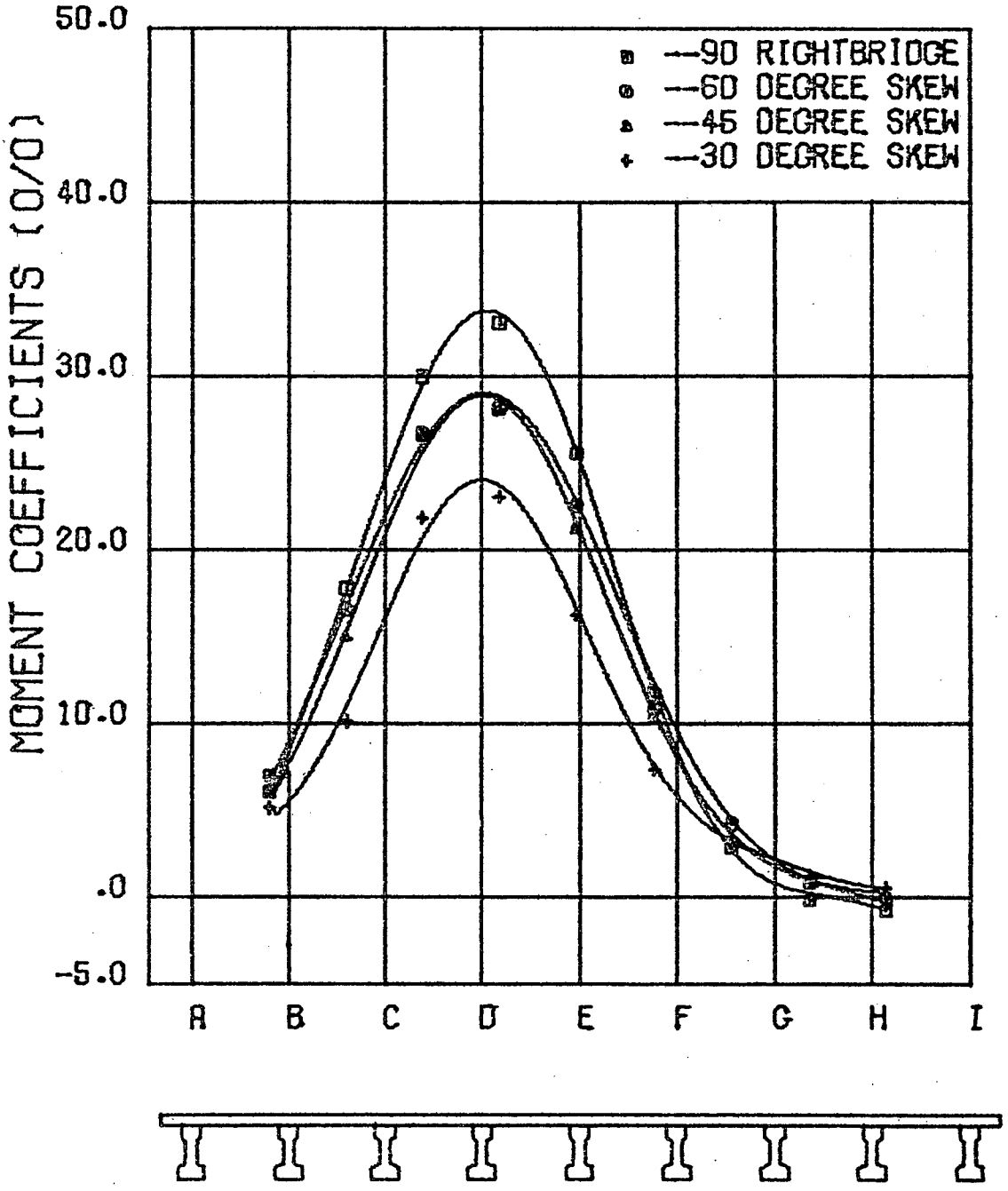


Fig. 21 Influence Lines for Moment - Beam D
(Bridge No. 15)

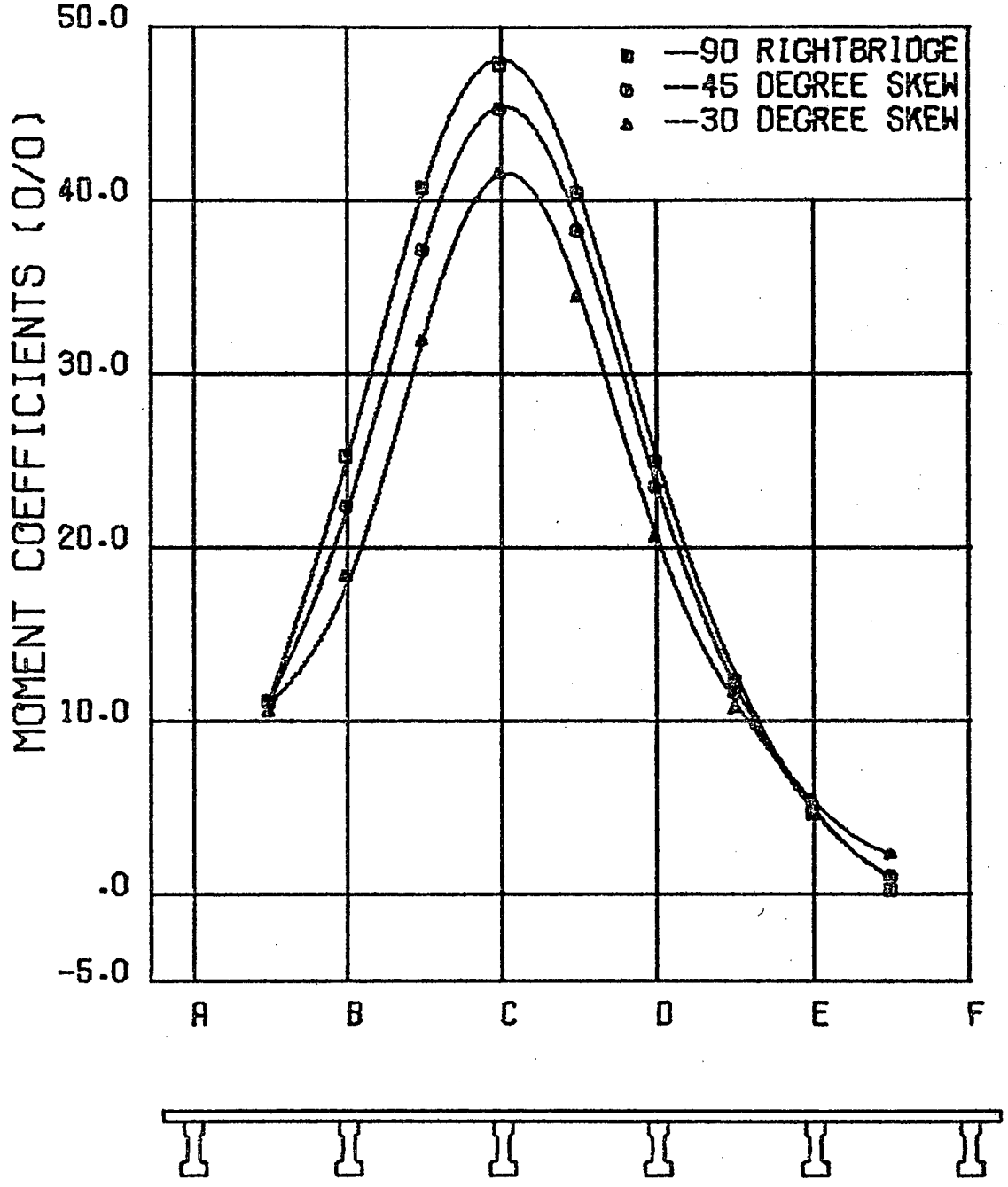


Fig. 22 Influence Lines for Moment - Beam C
(Bridge No. 16)

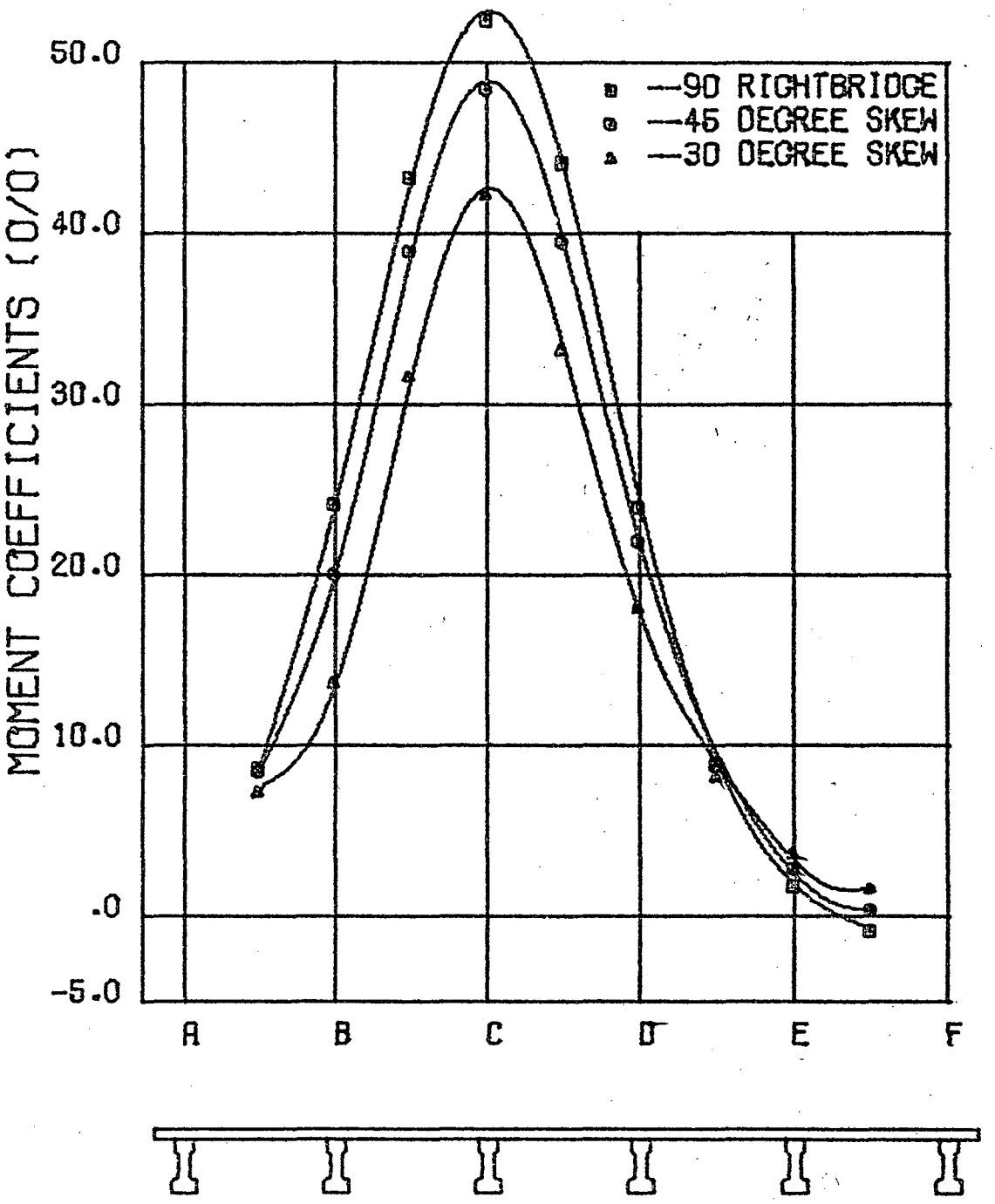
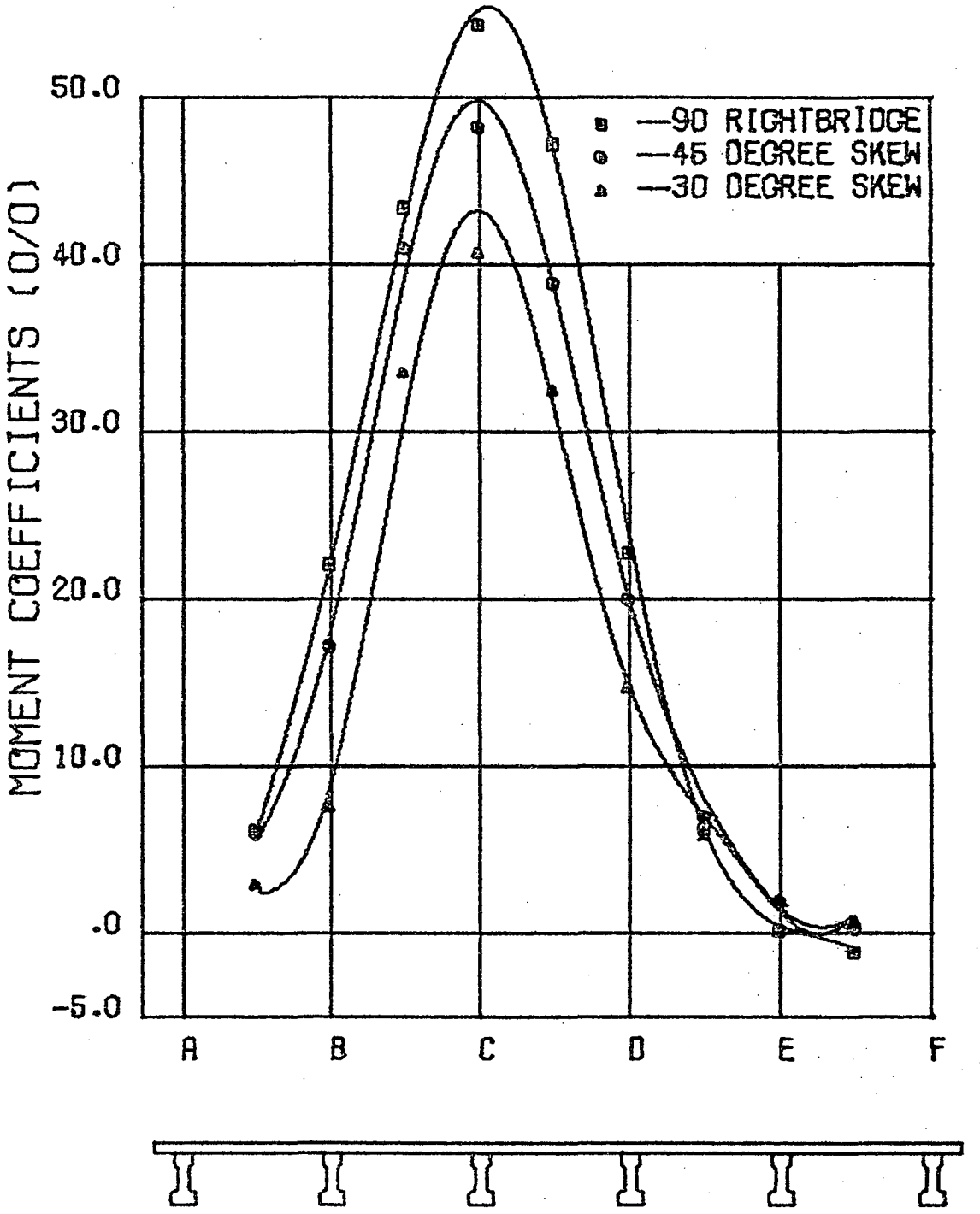


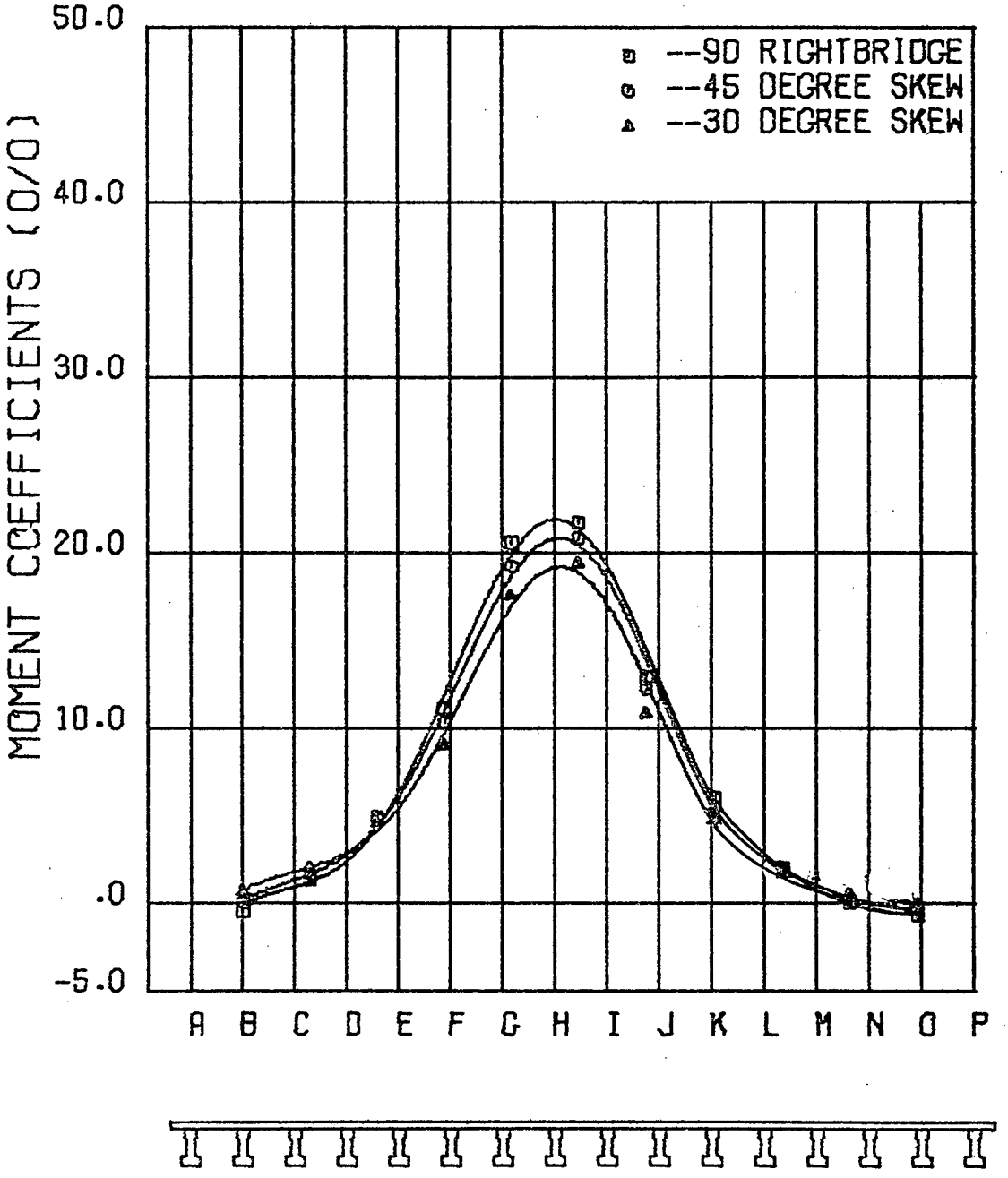
Fig. 23 Influence Lines for Moment - Beam C
(Bridge No. 17)



20/33 SP= 9 FT 7 INS L= 38 FT 5 INS S/L= 1/4

48 FT WIDE INFLUENCE MOMENT FOR BEAM C

Fig. 24 Influence Lines for Moment - Beam C
(Bridge No. 18)



AASHO-6 SP= 4 FT 10 INS L=120 FT 0 INS S/L= 1/25

72 FT WIDE INFLUENCE MOMENT FOR BEAM H

Fig. 25 Influence Lines for Moment - Beam H
(Bridge No. 19)

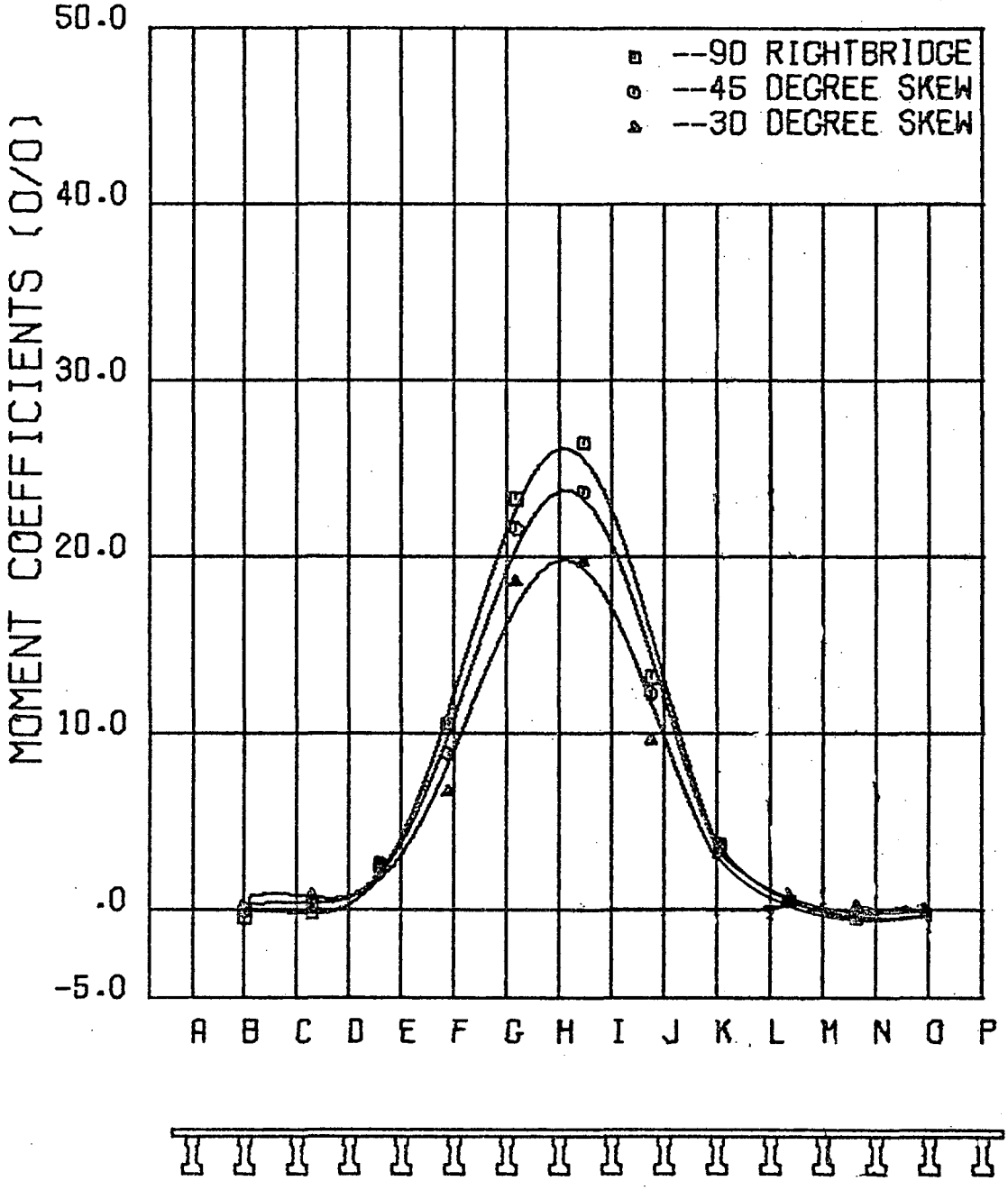
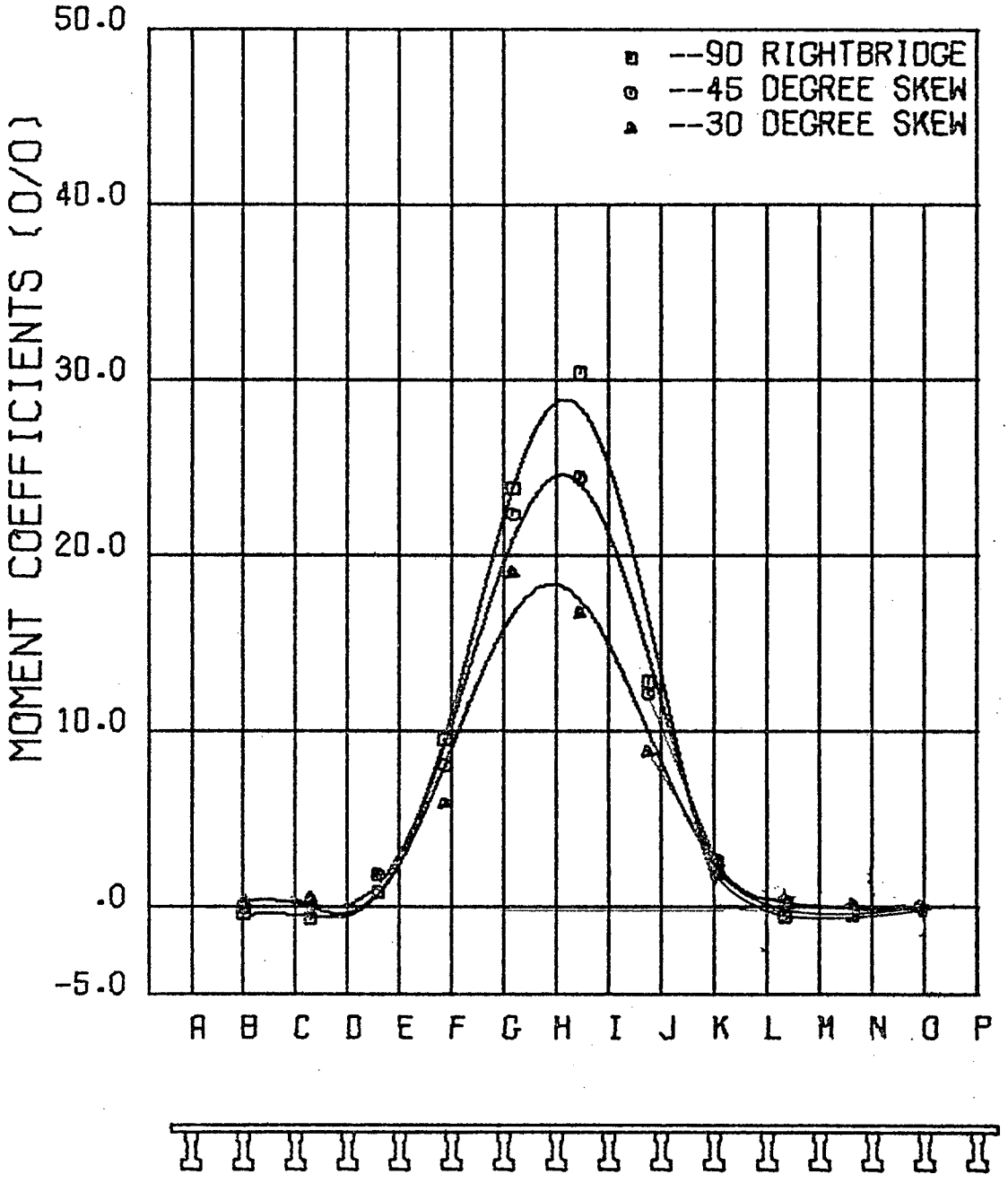


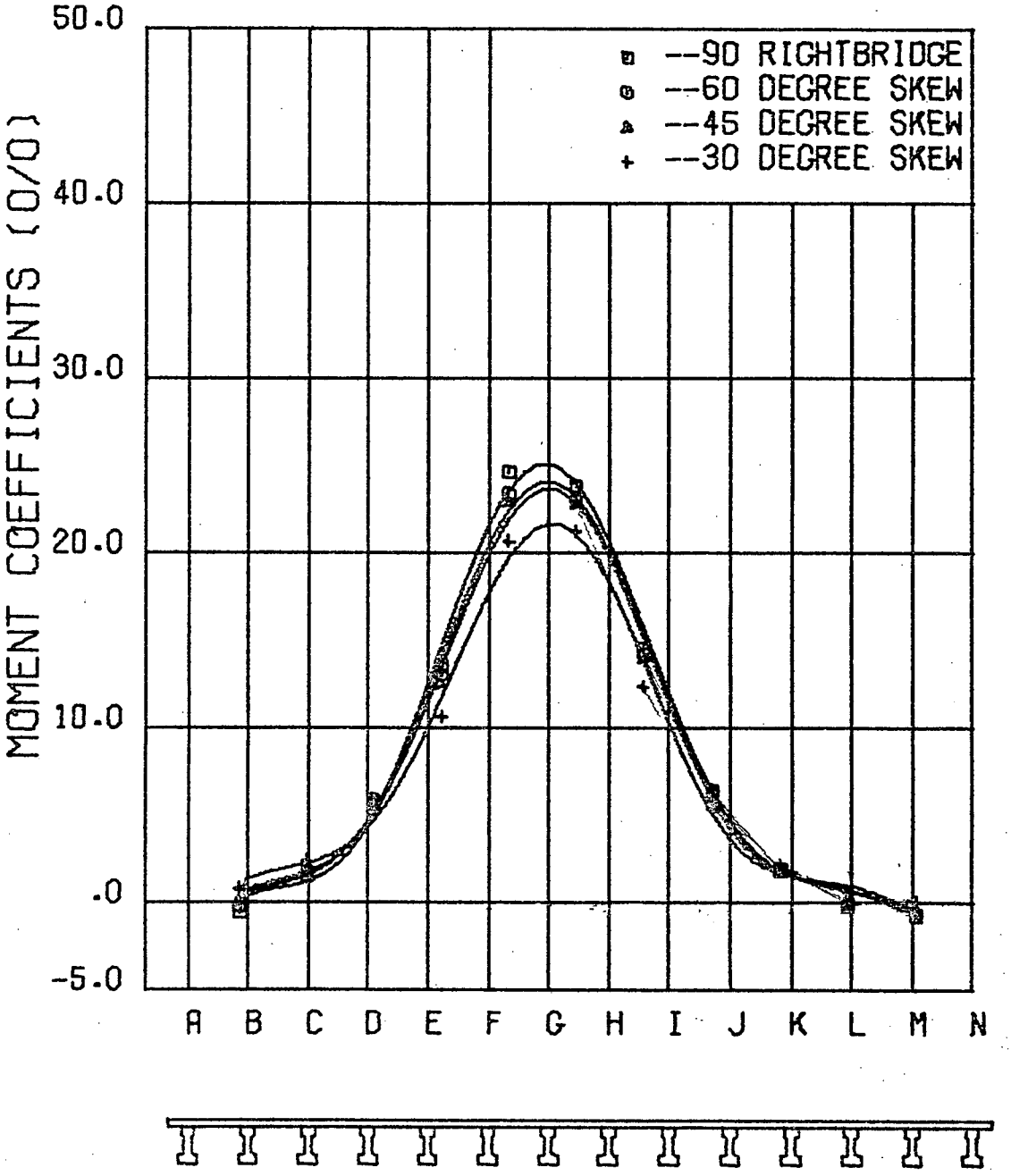
Fig. 26 Influence Lines for Moment - Beam H
(Bridge No. 20)



AASHO-1 SP= 4 FT 10 INS L= 38 FT 5 INS S/L= 1/8

72 FT WIDE INFLUENCE MOMENT FOR BEAM H

Fig. 27 Influence Lines for Moment - Beam H
(Bridge No. 21)



AASHO-6 SP= 5 FT 7 INS L=110 FT10 INS S/L= 1/20

72 FT WIDE INFLUENCE MOMENT FOR BEAM G

Fig. 28 Influence Lines for Moment - Beam G
(Bridge No. 22)

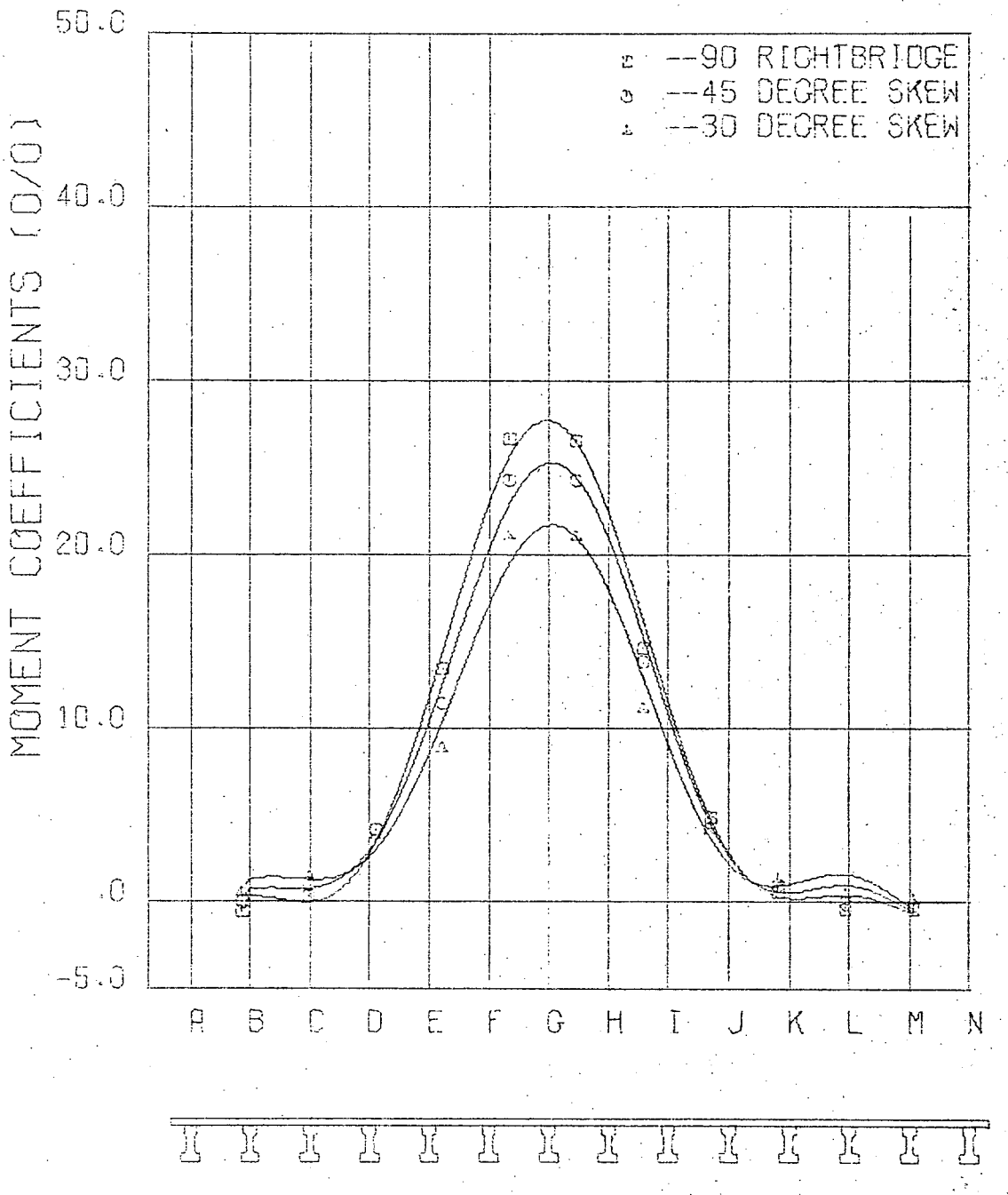


Fig. 29 Influence Lines for Moment - Beam G
(Bridge No. 23)

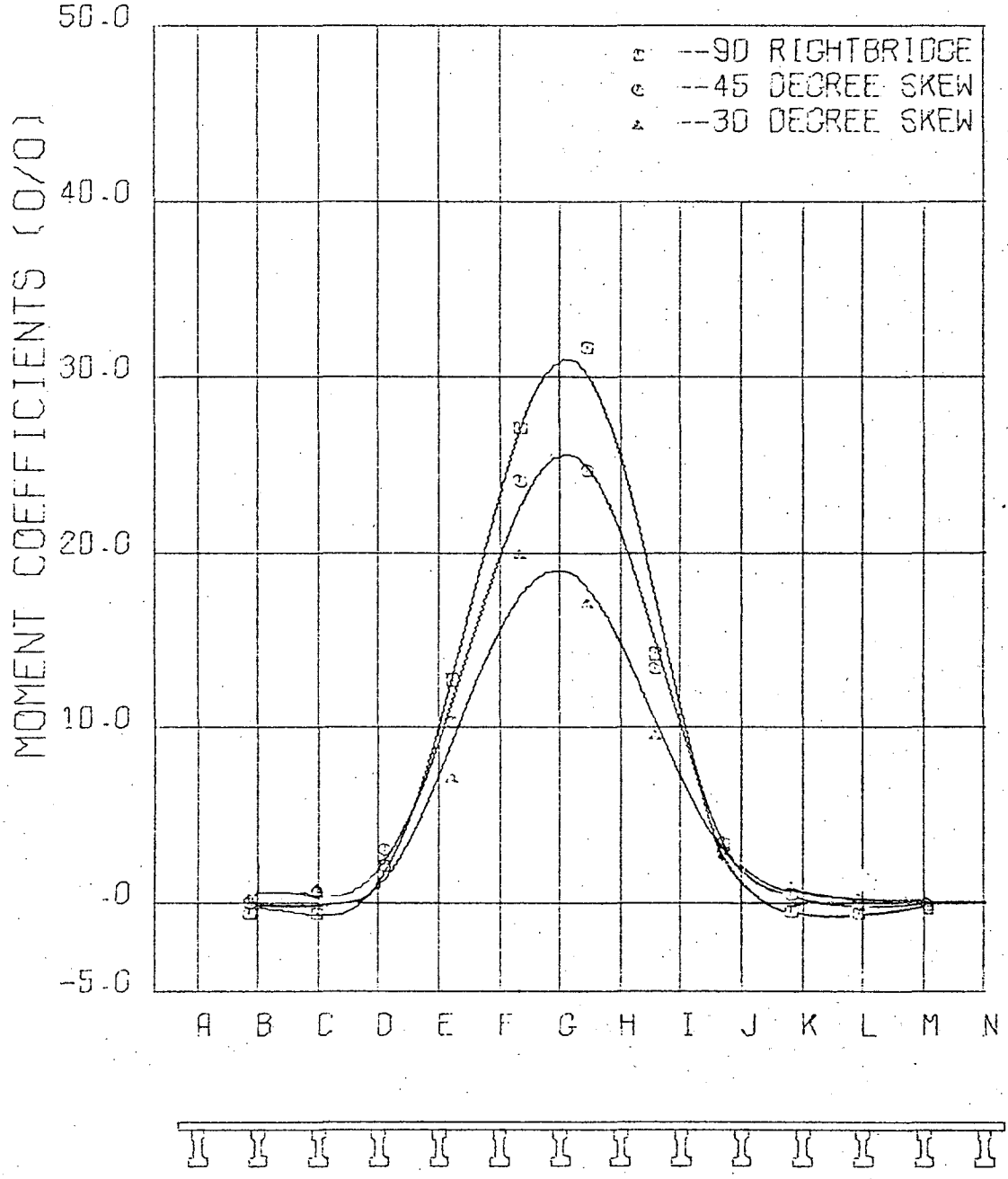
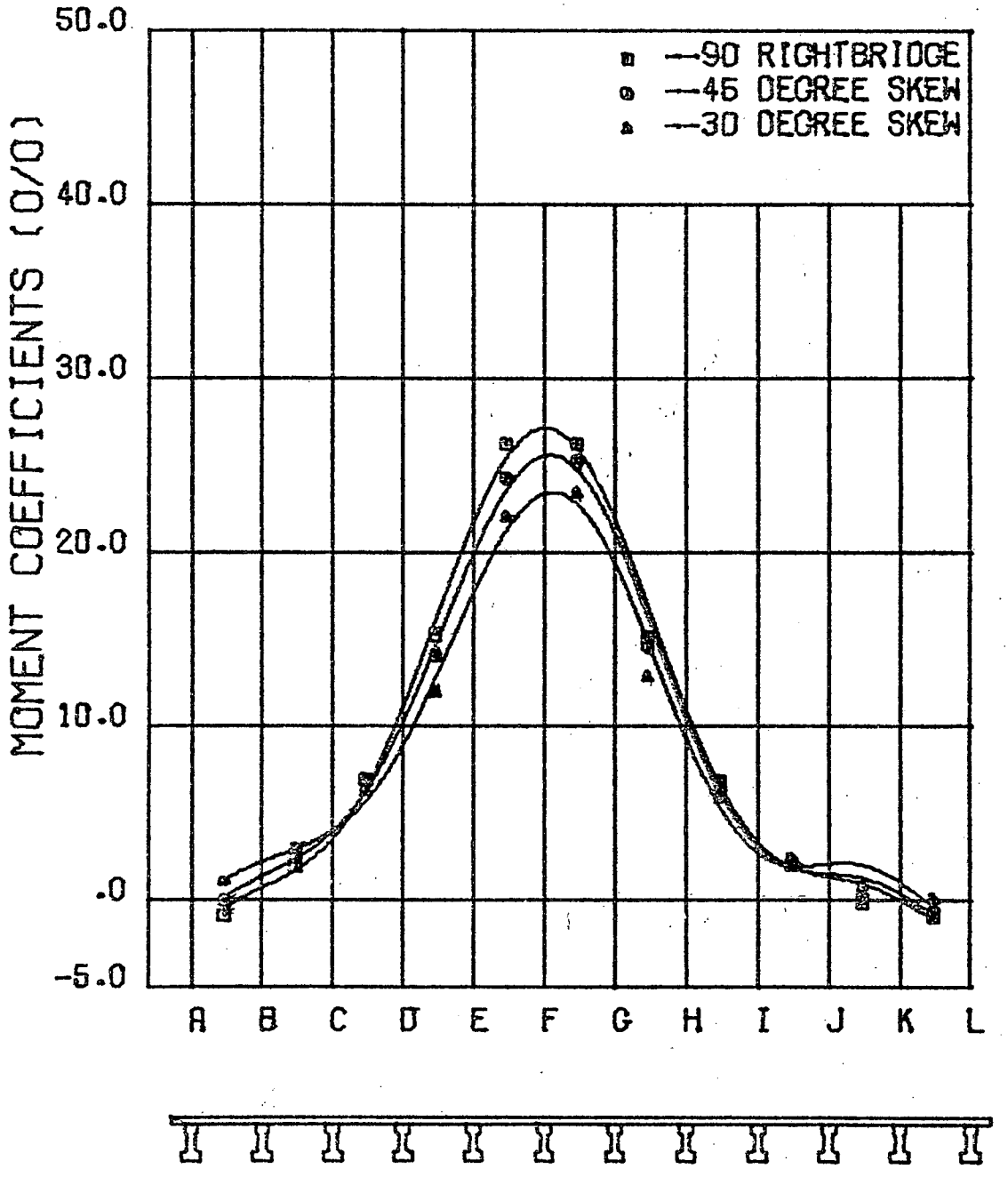
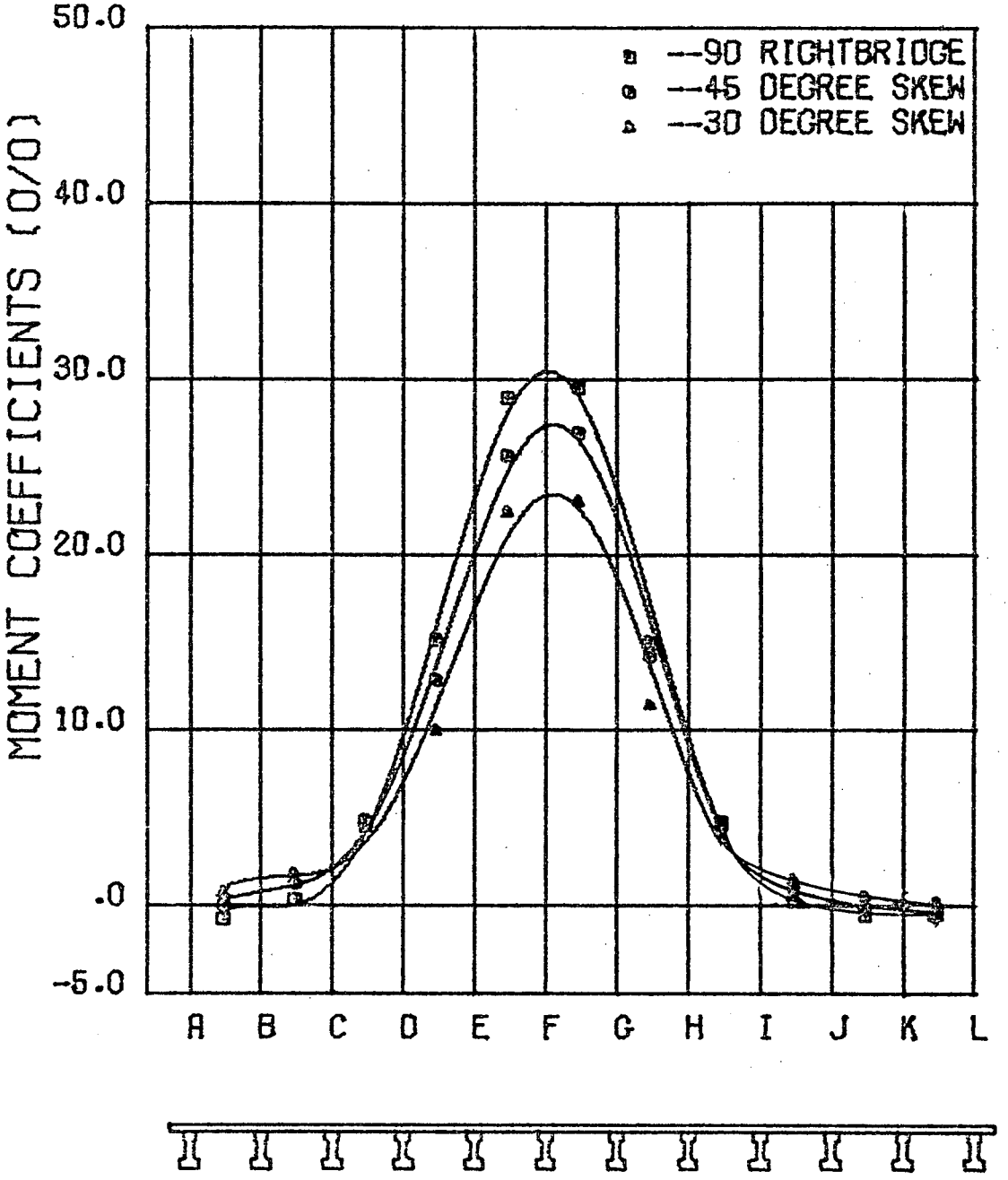


Fig. 30 Influence Lines for Moment - Beam G
(Bridge No. 24)



AASHO-6 SP= 6 FT 7 INS L=114 FT 6INS S/L= 1/17.6
72 FT WIDE INFLUENCE MOMENT FOR BEAM F

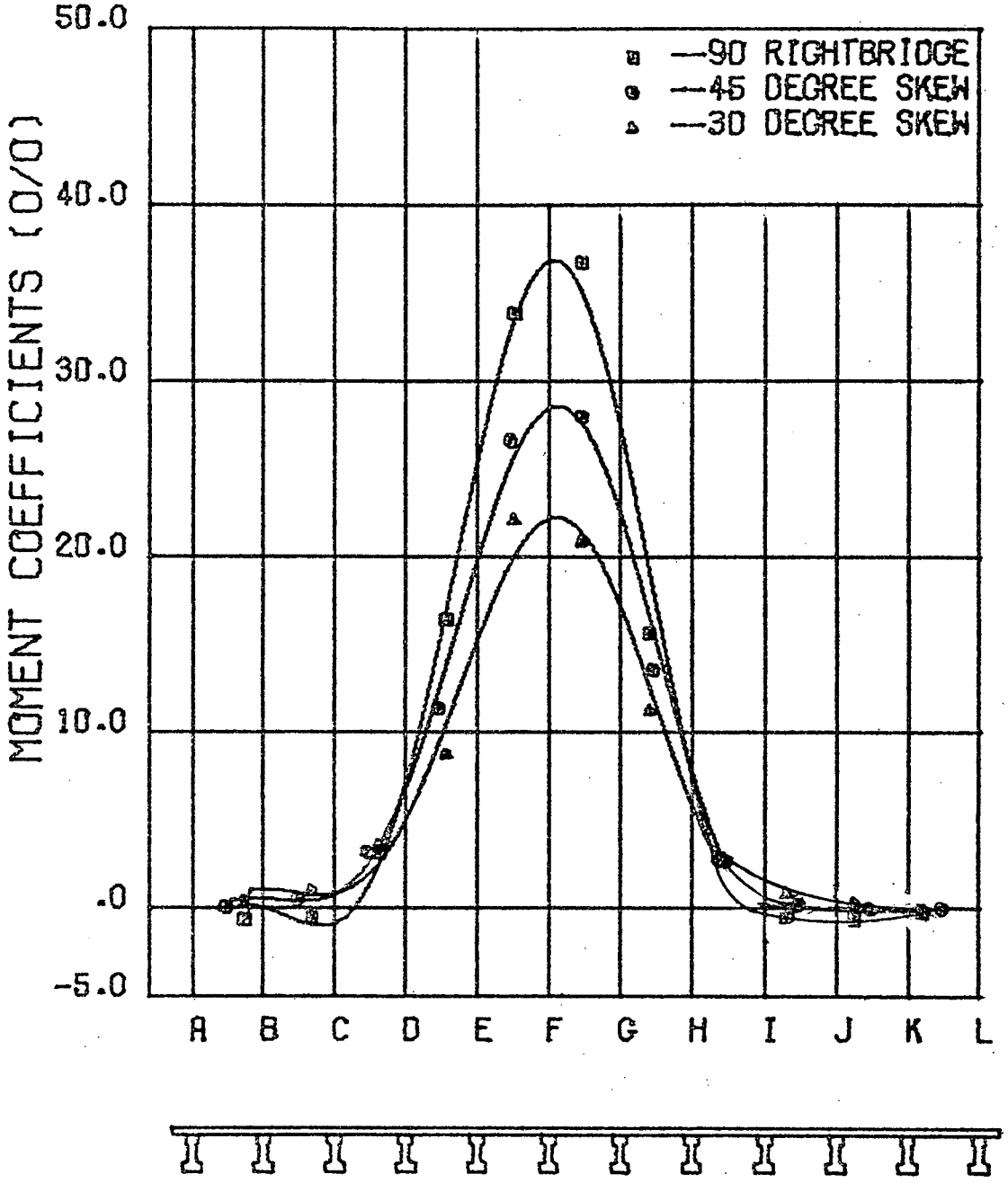
Fig. 31 Influence Lines for Moment - Beam F
(Bridge No. 25)



24/42 SP= 6 FT 7 INS L= 65 FT 6INS S/L= 1/10

72 FT WIDE INFLUENCE MOMENT FOR BEAM F

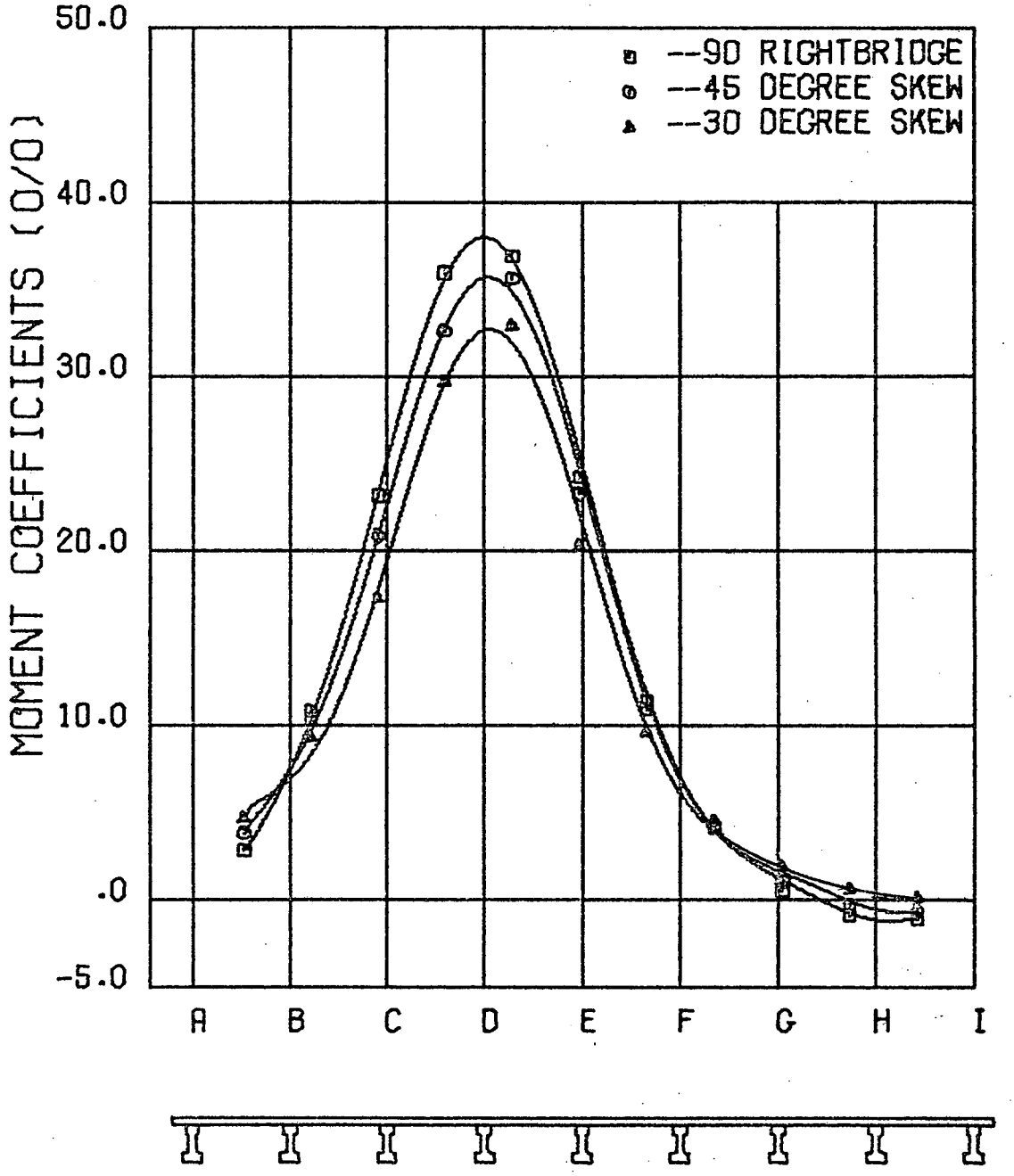
Fig. 32 Influence Lines for Moment - Beam F
(Bridge No. 26)



20/30 SP= 6 FT 7 INS L= 39 FT 4 INS S/L= 1/6

72 FT WIDE INFLUENCE MOMENT FOR BEAM F

Fig. 33 Influence Lines for Moment - Beam F
(Bridge No. 27)



AASHO-6 SP= 9 FT 0 INS L=108 FT 0 INS S/L= 1/12

72 FT WIDE INFLUENCE MOMENT FOR BEAM D

Fig. 34 Influence Lines for Moment - Beam D
(Bridge No. 28)

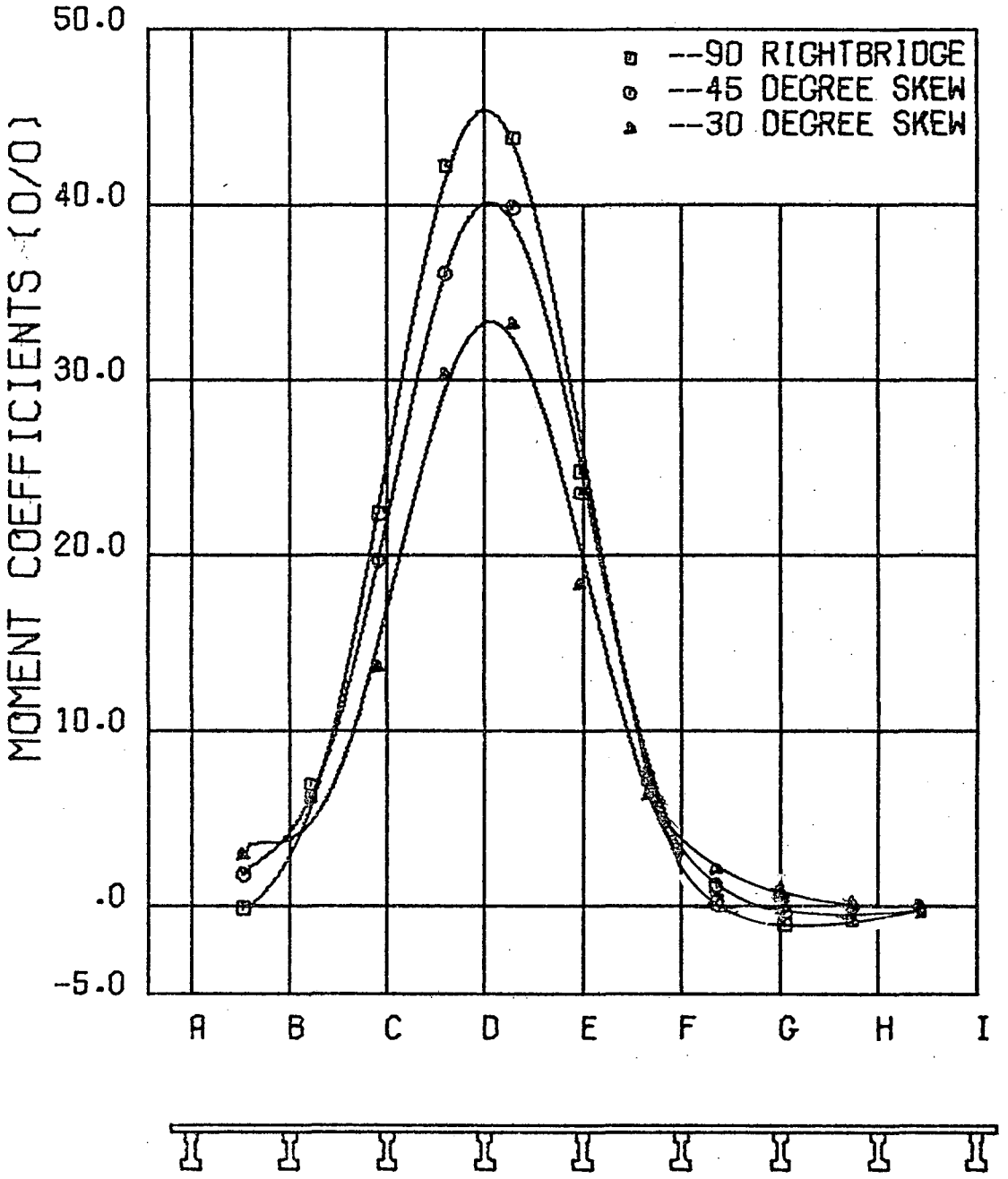


Fig. 35 Influence Lines for Moment - Beam D
(Bridge No. 29)

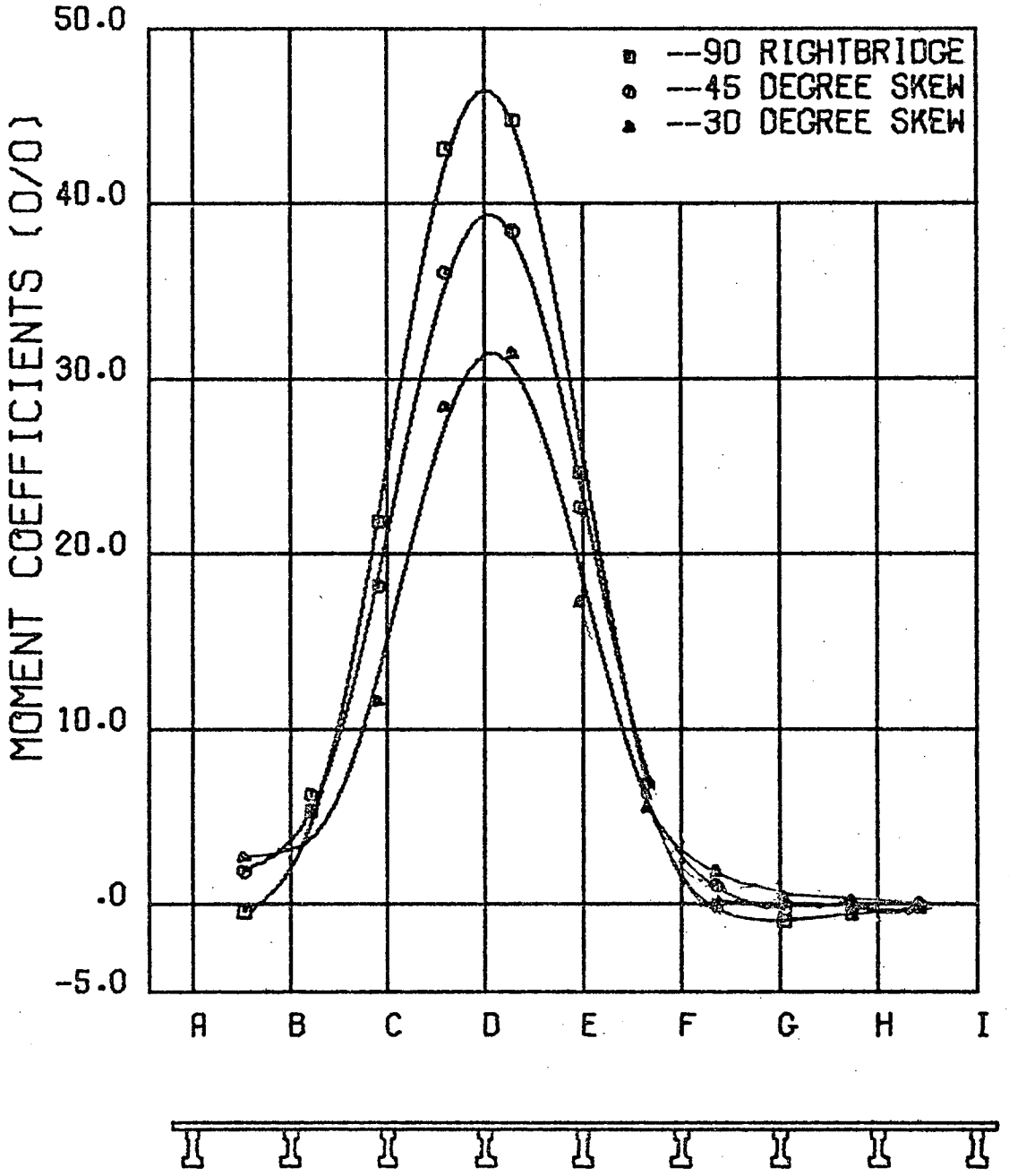
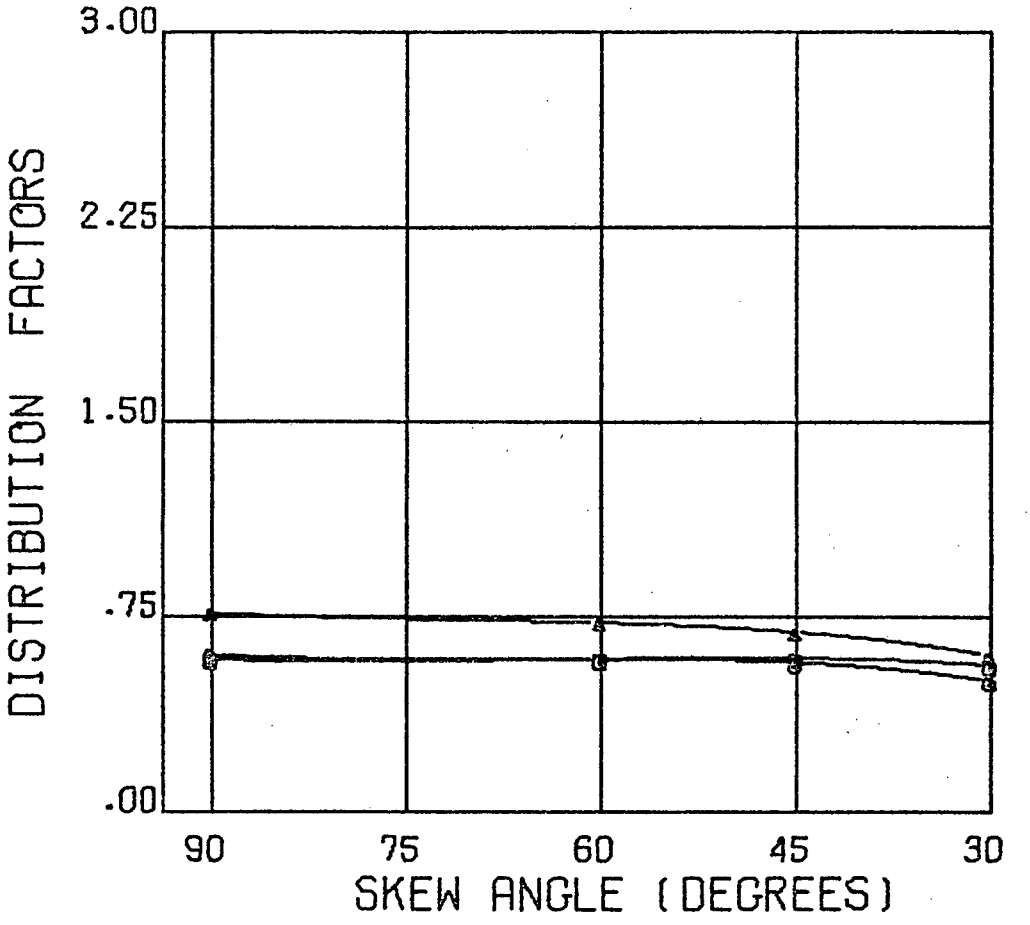


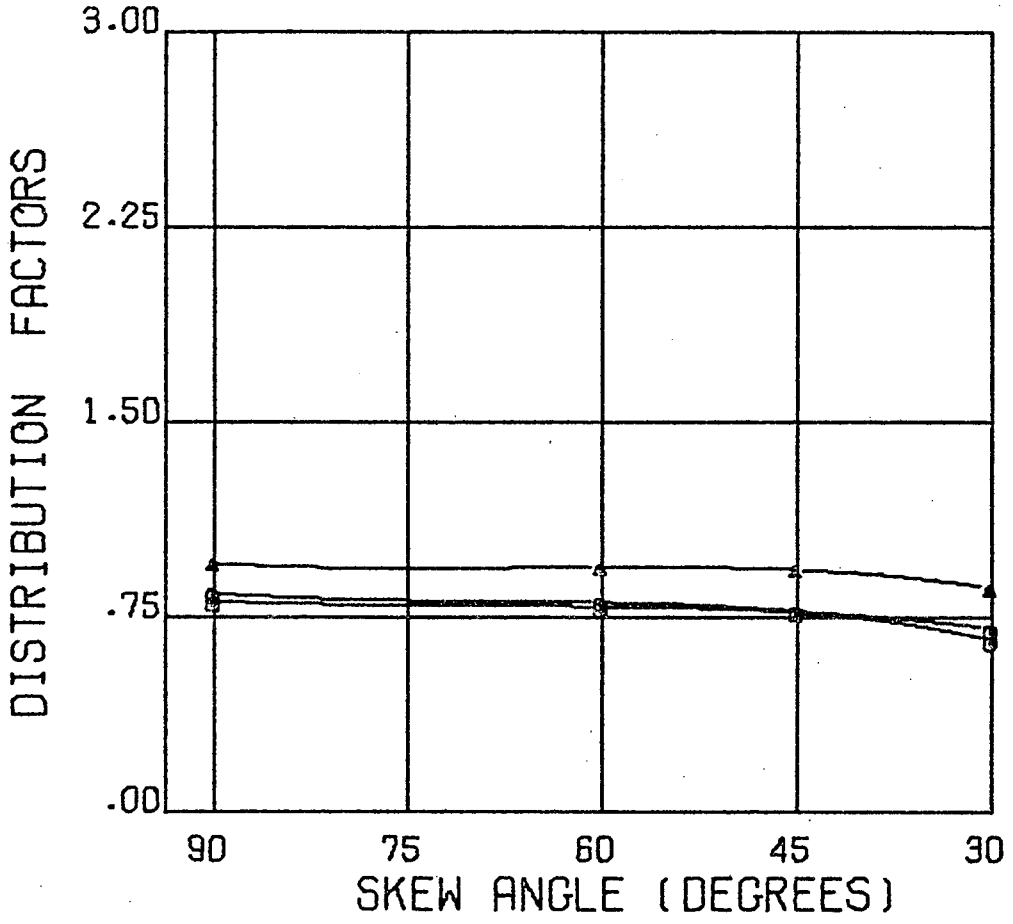
Fig. 36 Influence Lines for Moment - Beam D
(Bridge No. 30)



24 FT. WIDE 6 BEAMS 57.60 SPACING 1 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	120.00	AASHO-6	.0400
○	72.00	24/42	.0667
△	38.40	20/30	.1250

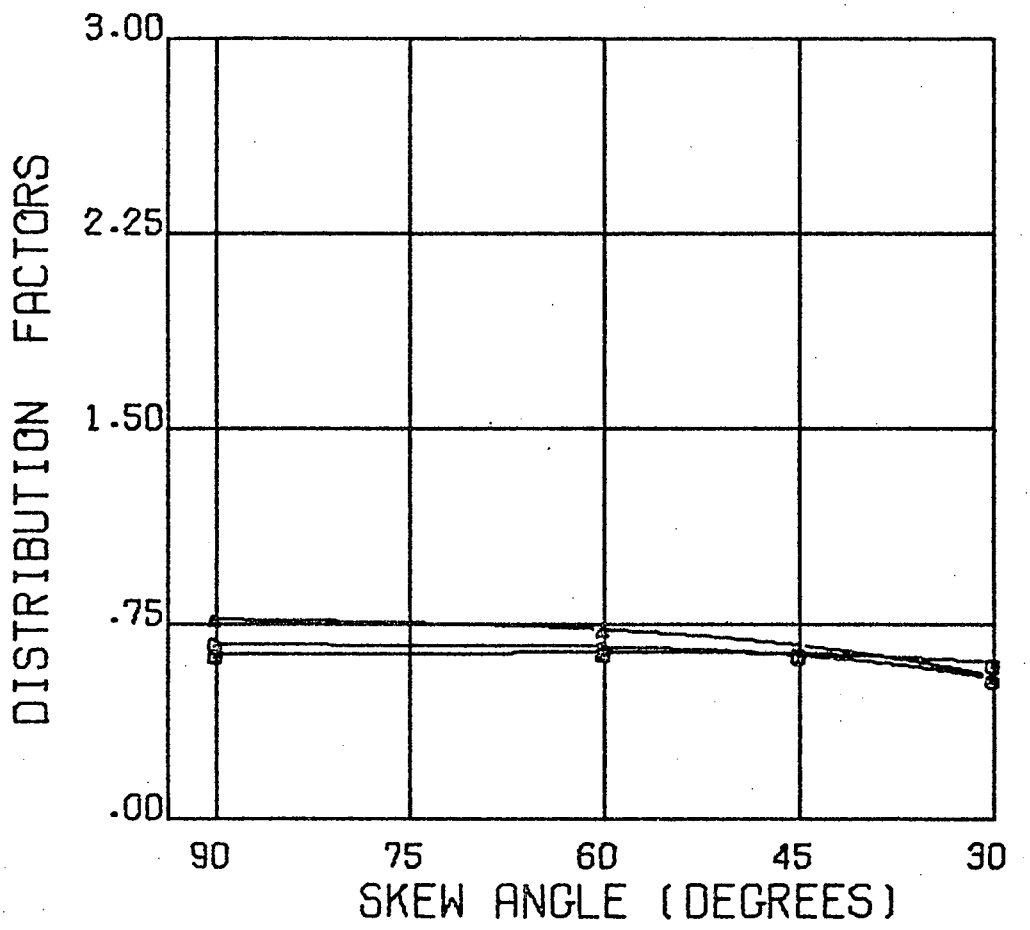
Fig. 37 Distribution Factors
Bridge Nos. 1, 2 and 3



24 FT. WIDE 6 BEAMS 57.60 SPACING 2 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	120.00	AASHO-6	.0400
○	72.00	24/42	.0667
△	38.40	20/30	.1250

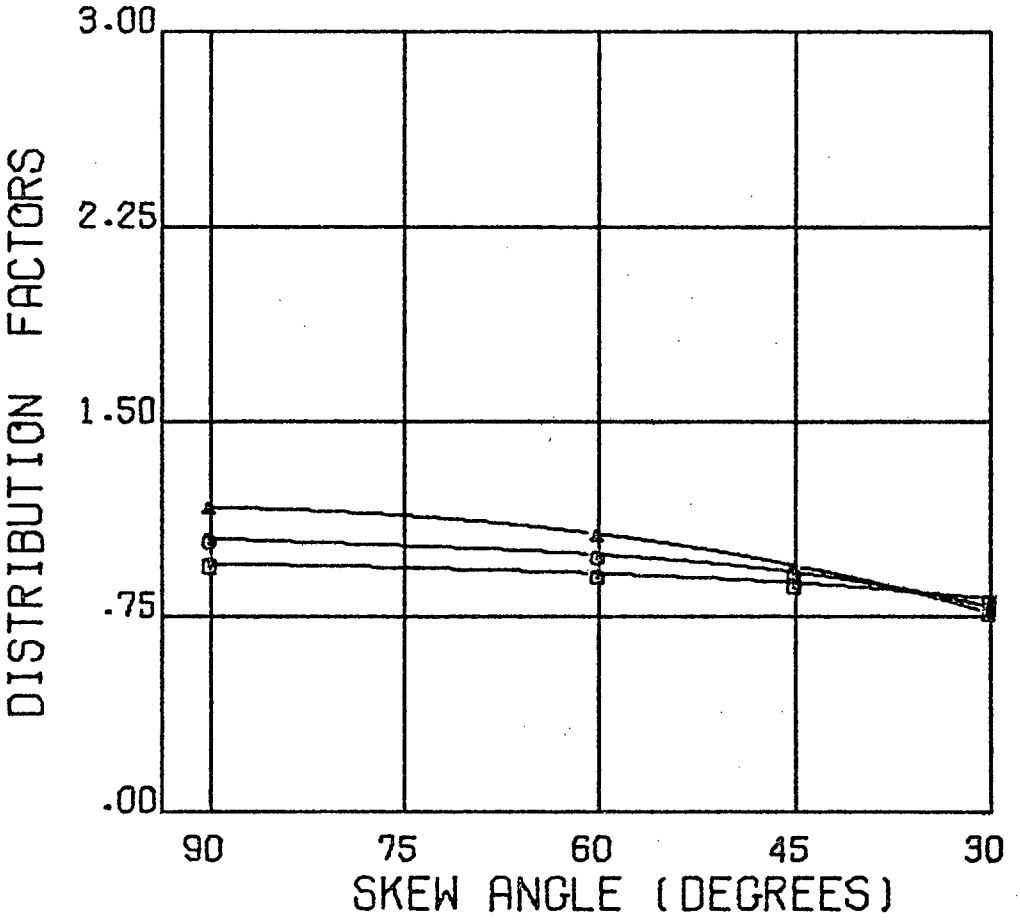
Fig. 38 Distribution Factors
Bridge Nos. 1, 2 and 3



24 FT. WIDE 5 BEAMS 72.00 SPACING 1 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	120.00	AASHO-6	.0500
○	60.00	20/39	.1000
▲	42.00	20/30	.1429

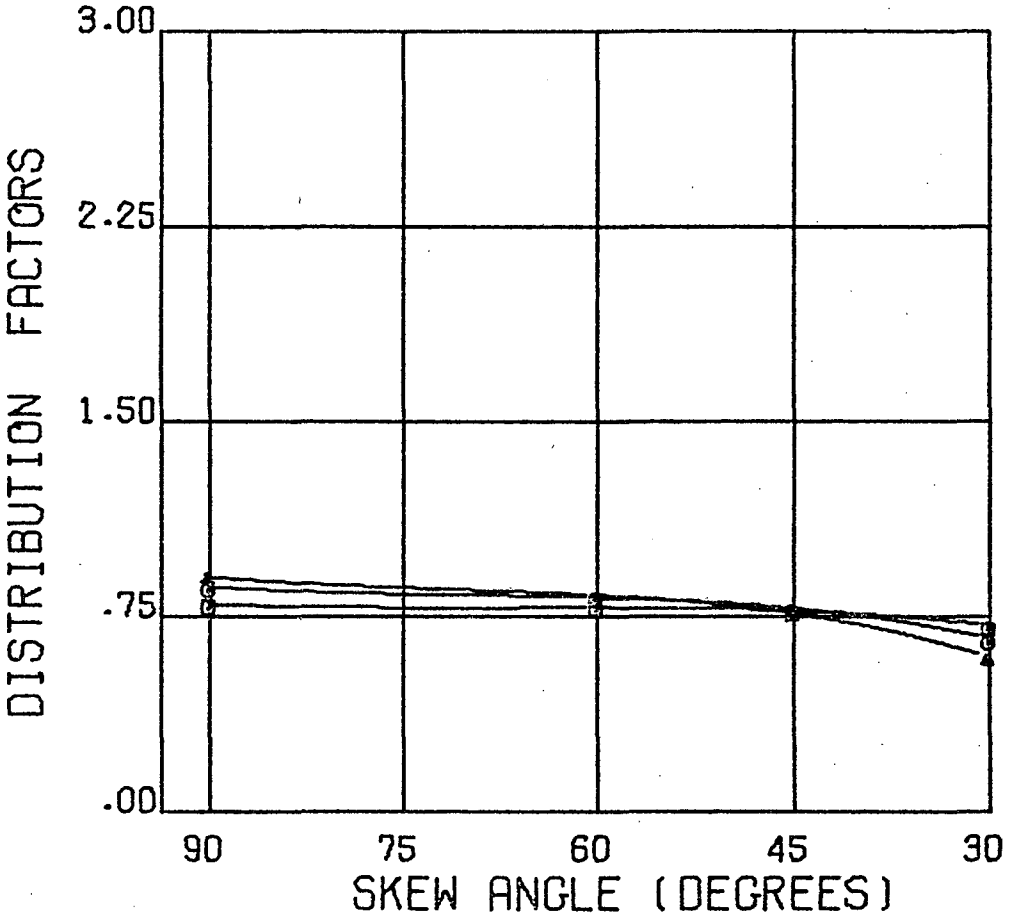
Fig. 39 Distribution Factors
Bridge Nos. 4, 5 and 6



24 FT. WIDE 5 BEAMS 72.00 SPACING 2 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	120.00	AASHO-6	.0500
○	60.00	20/39	.1000
△	42.00	20/30	.1429

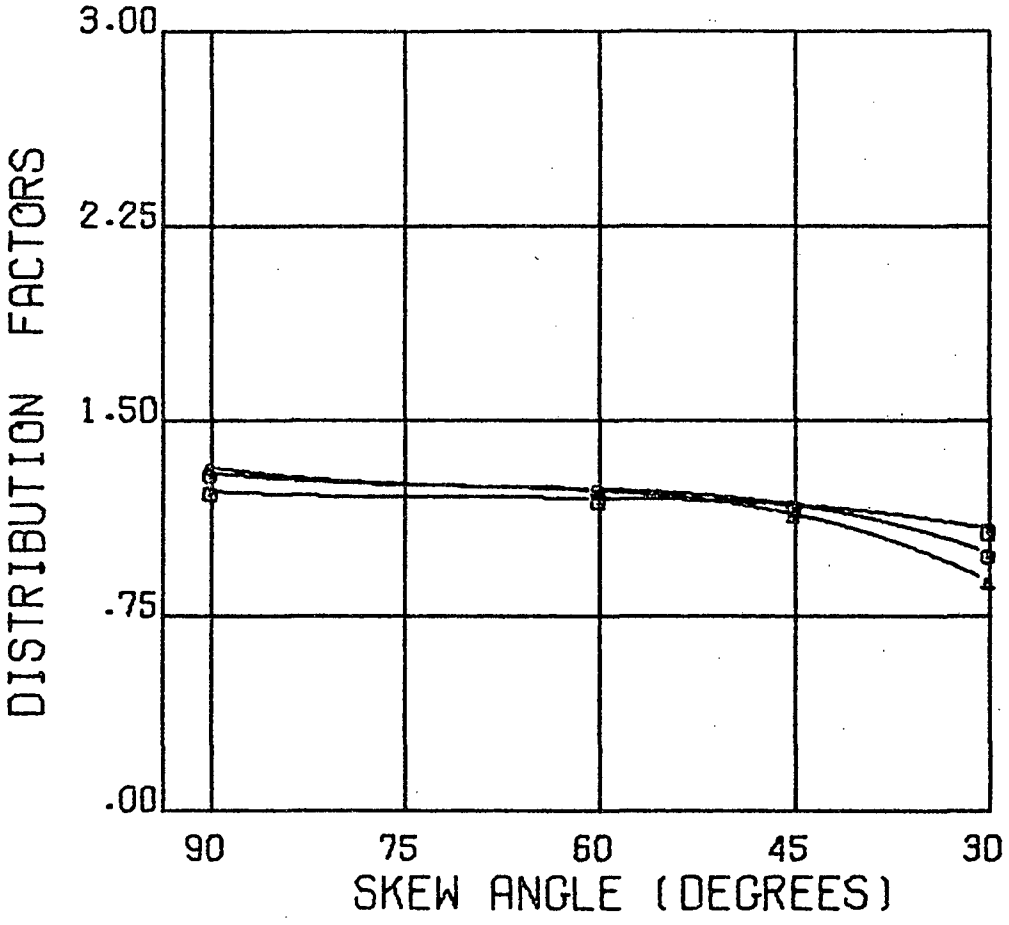
Fig. 40 Distribution Factors
Bridge Nos. 4, 5 and 6



24 FT. WIDE 4 BEAMS 96.00 SPACING 1 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	120.00	AASHO-6	.0667
○	64.00	24/45	.1250
△	40.00	20/30	.2000

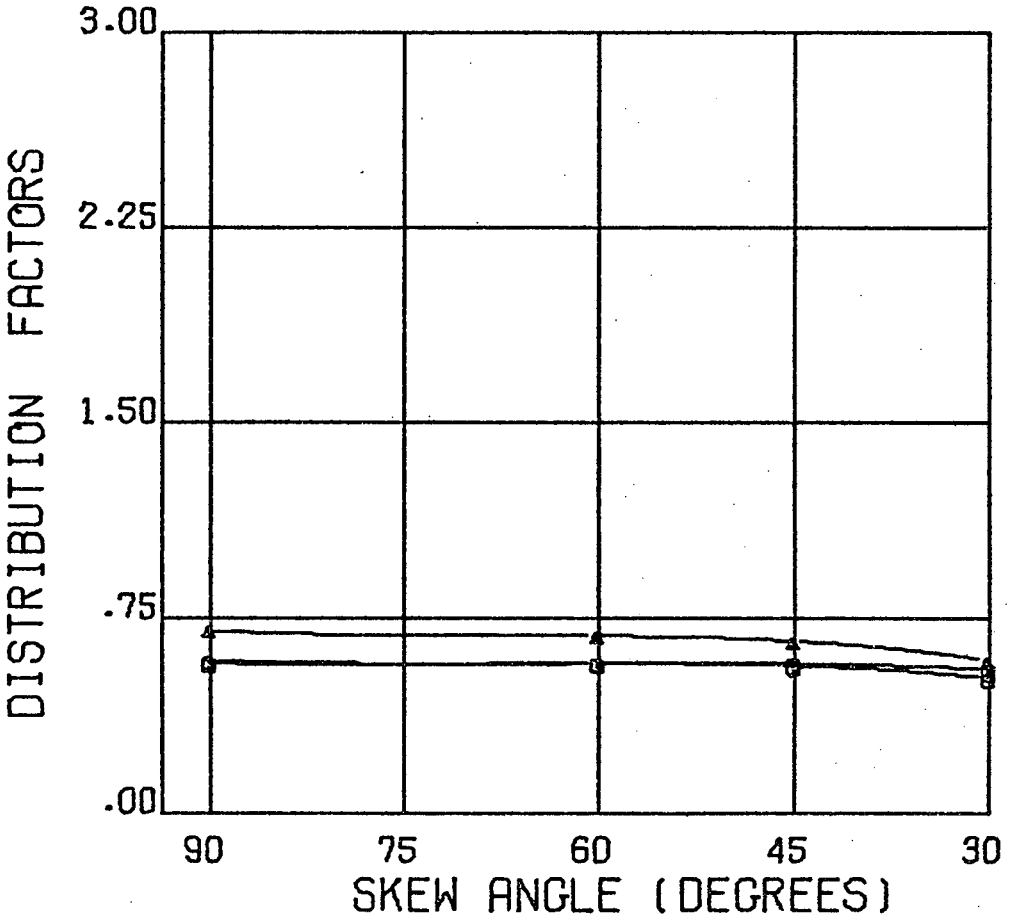
Fig. 41 Distribution Factors
Bridge Nos. 7, 8 and 9



24 FT. WIDE 4 BEAMS 96.00 SPACING 2 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	120.00	AASHO-6	.0667
○	64.00	24/45	.1250
▲	40.00	20/30	.2000

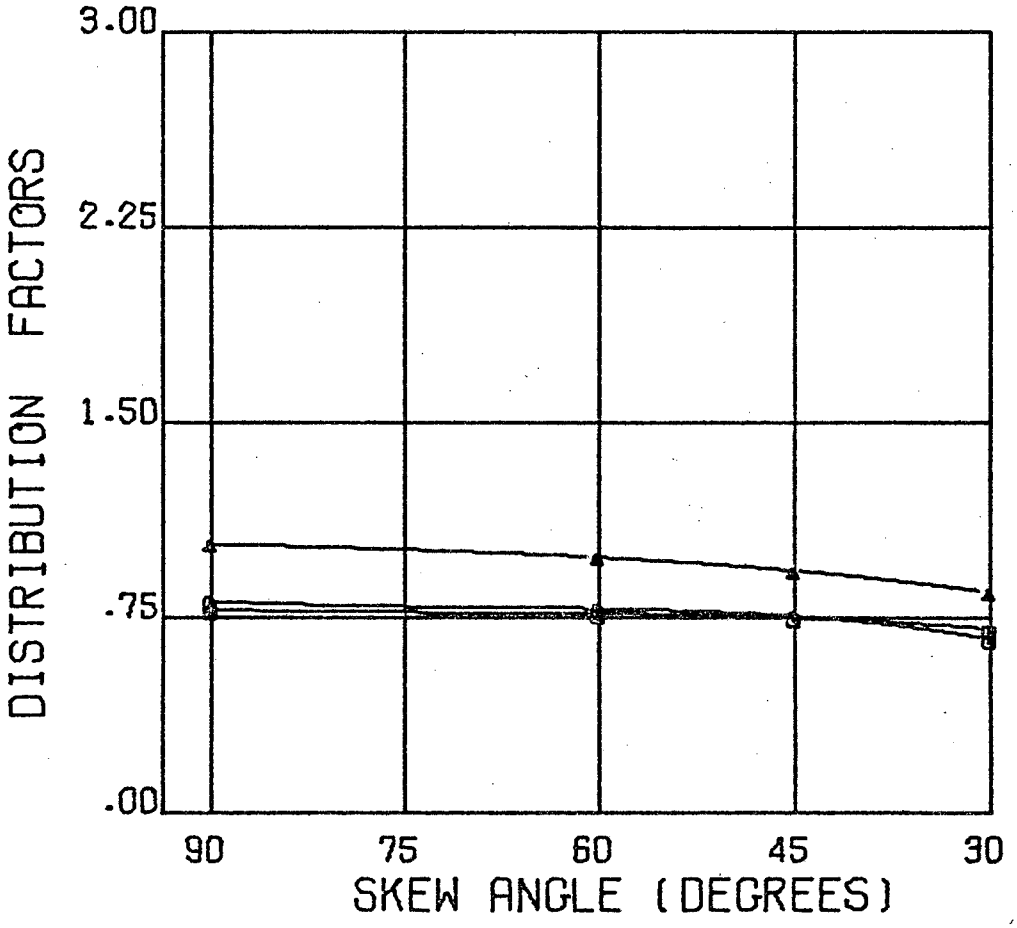
Fig. 42 Distribution Factors
Bridge Nos. 7, 8 and 9



48 FT. WIDE 11 BEAMS 57.60 SPACING 1 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	120.00	AASHO-6	.0400
○	84.00	24/48	.0671
△	48.00	20/30	.1000

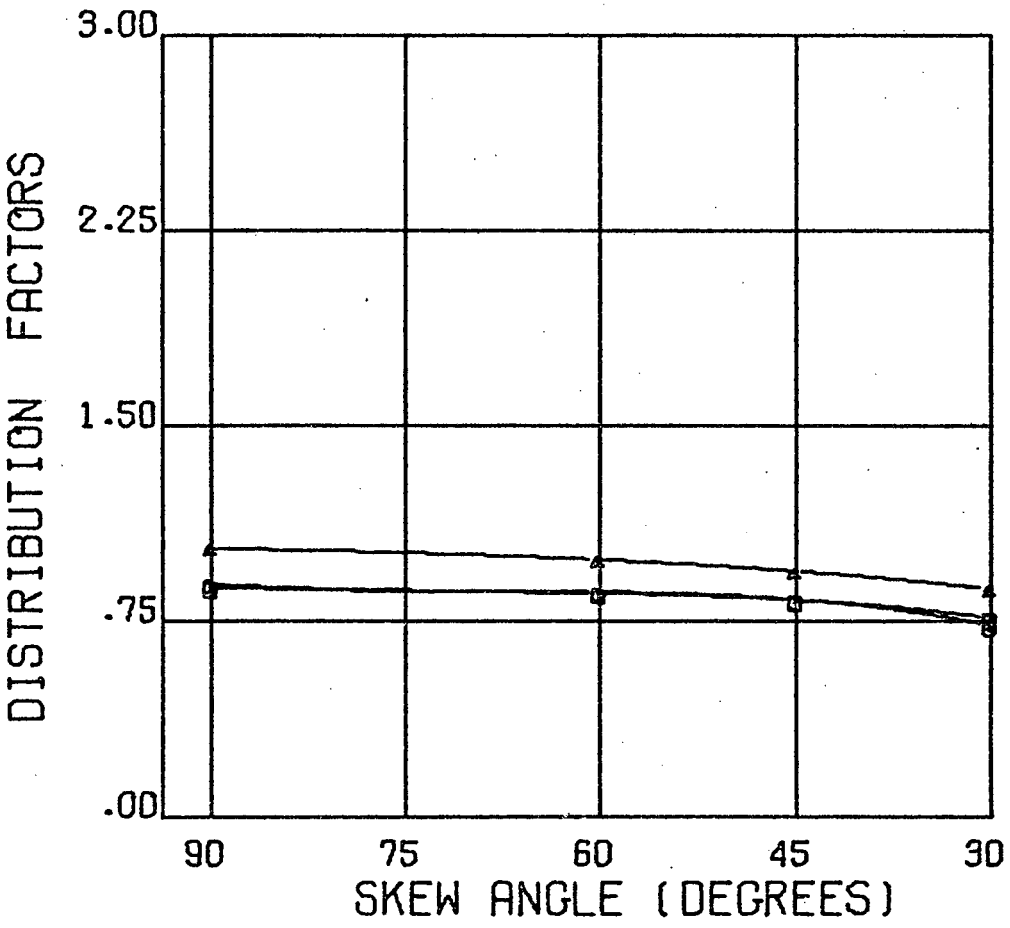
Fig. 43 Distribution Factors
Bridge Nos. 10, 11 and 12



48 FT. WIDE 11 BEAMS 57.60 SPACING 2 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	120.00	AASHO-6	.0400
○	84.00	24/48	.0571
△	48.00	20/30	.1000

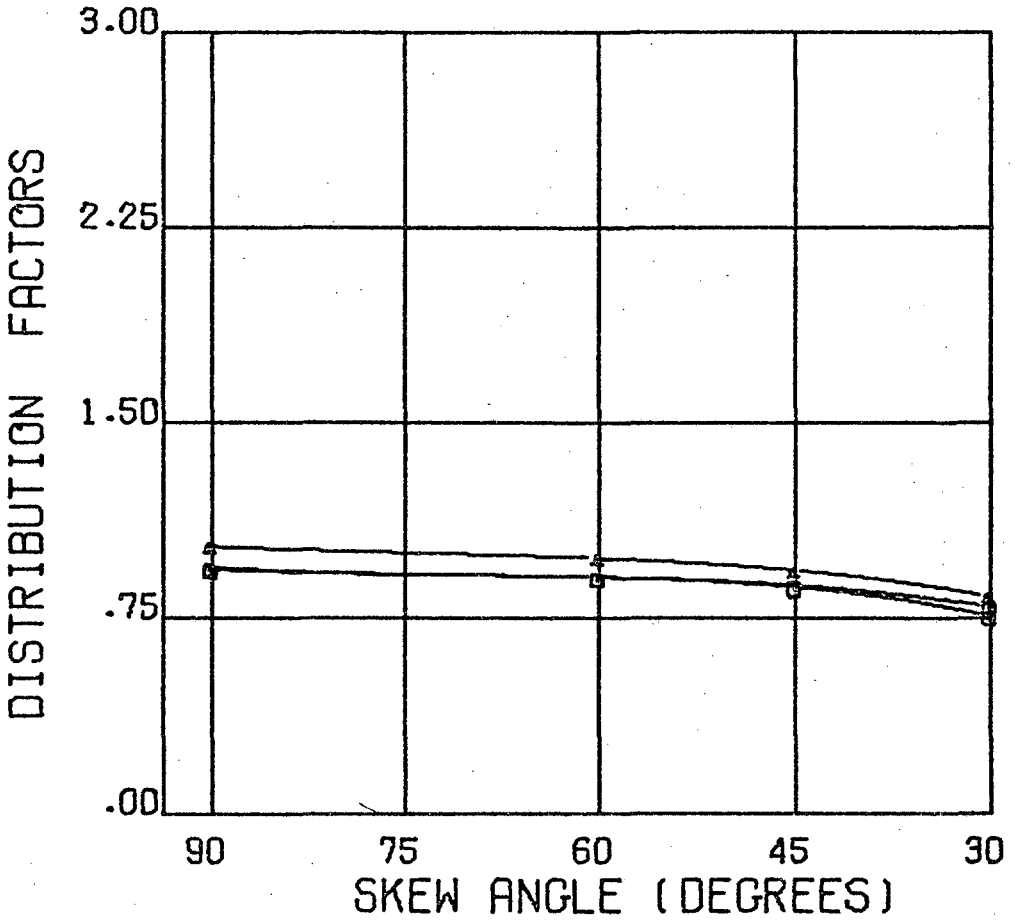
Fig. 44 Distribution Factors
Bridge Nos. 10, 11 and 12



48 FT. WIDE 11 BEAMS 57.60 SPACING 3 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	120.00	AASHO-6	.0400
▫	84.00	24/48	.0671
△	48.00	20/30	.1000

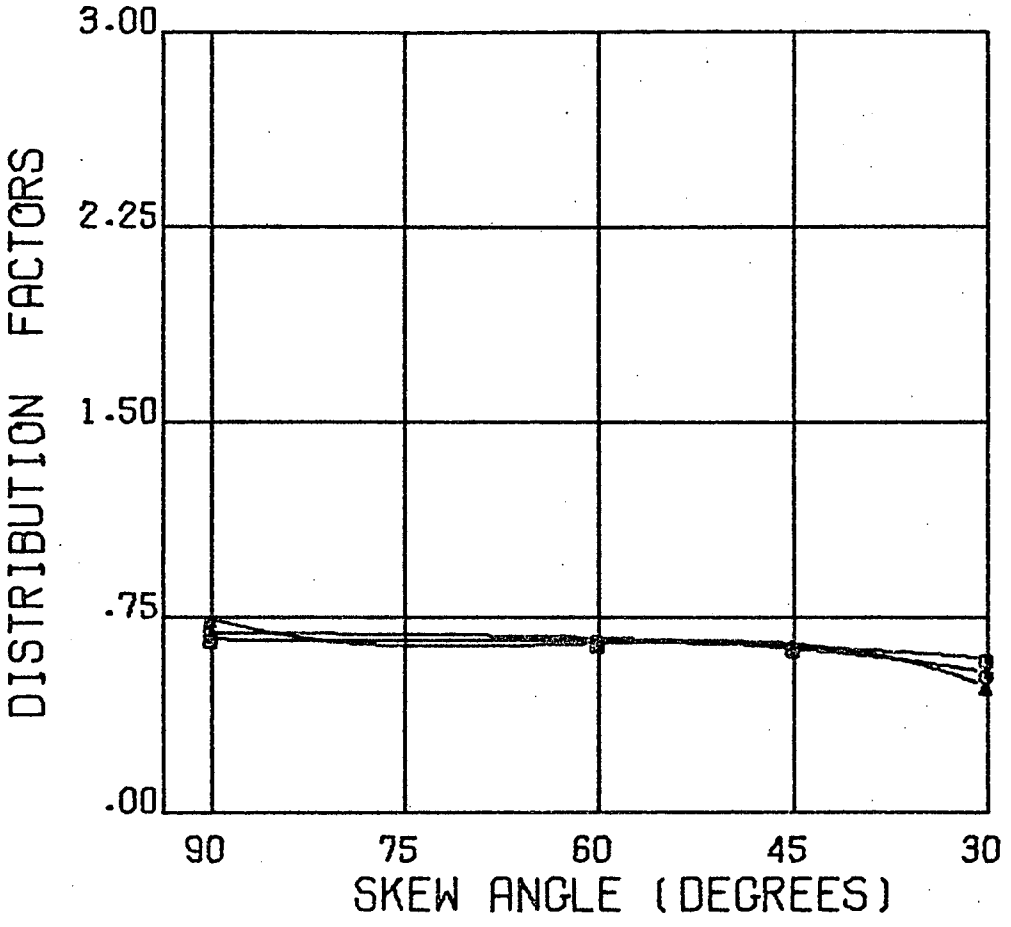
Fig. 45 Distribution Factors
Bridge Nos. 10, 11 and 12



48 FT. WIDE 11 BEAMS 57.60 SPACING 4 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	120.00	AASHO-6	.0400
○	84.00	24/48	.0671
△	48.00	20/30	.1000

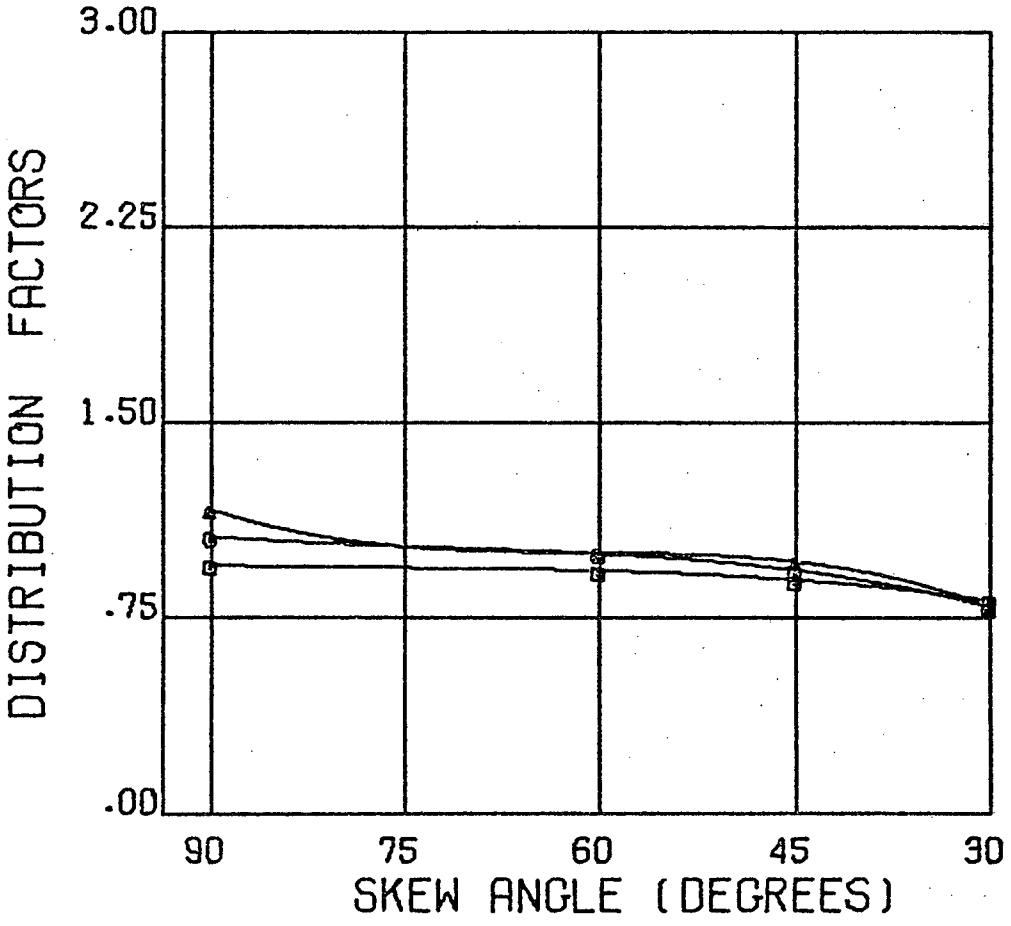
Fig. 46 Distribution Factors
Bridge Nos. 10, 11 and 12



48 FT. WIDE 9 BEAMS 72.00 SPACING 1 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	105.00	28/63	.0571
○	60.00	20/39	.1000
▲	42.00	20/30	.1429

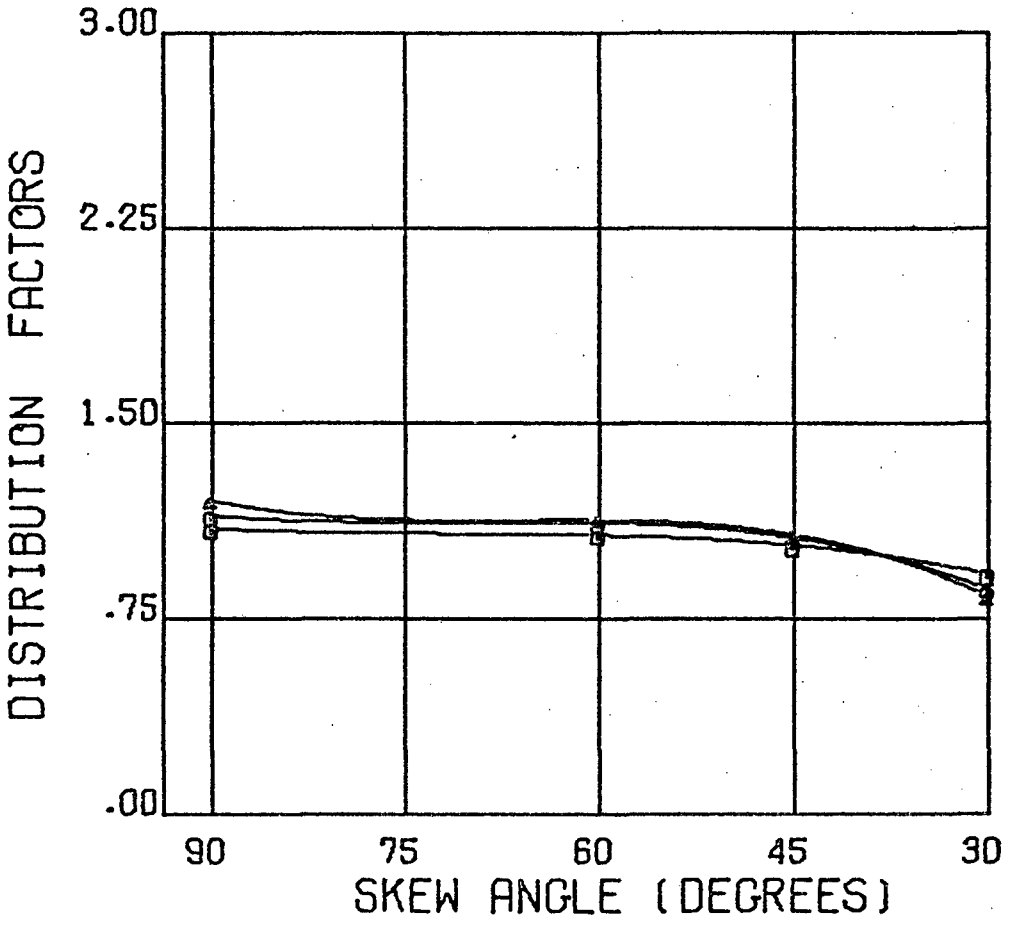
Fig. 47 Distribution Factors
Bridge Nos. 13, 14 and 15



48 FT. WIDE 9 BEAMS 72.00 SPACING 2 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	105.00	28/63	.0571
○	60.00	20/39	.1000
△	42.00	20/30	.1429

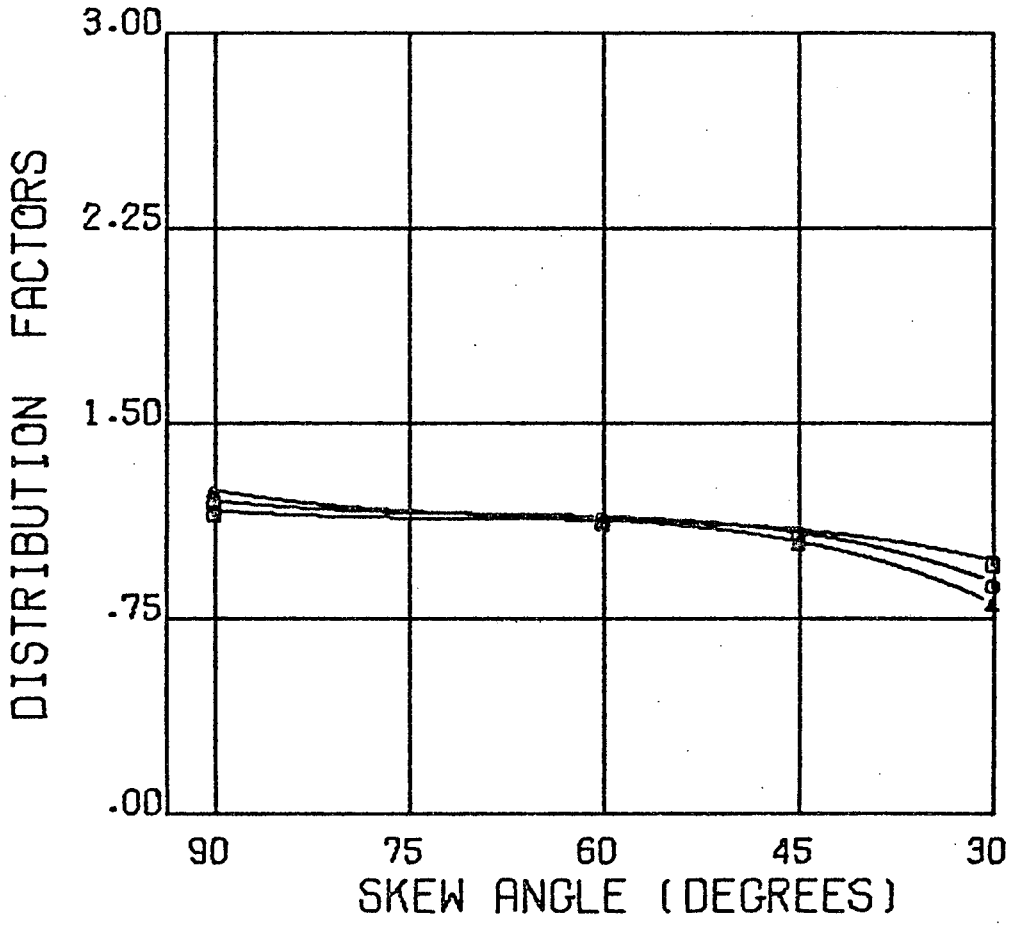
Fig. 48 Distribution Factors
Bridge Nos. 13, 14 and 15



48 FT. WIDE 9 BEAMS 72.00 SPACING 3 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	105.00	28/63	.0571
○	60.00	20/39	.1000
▲	42.00	20/30	.1429

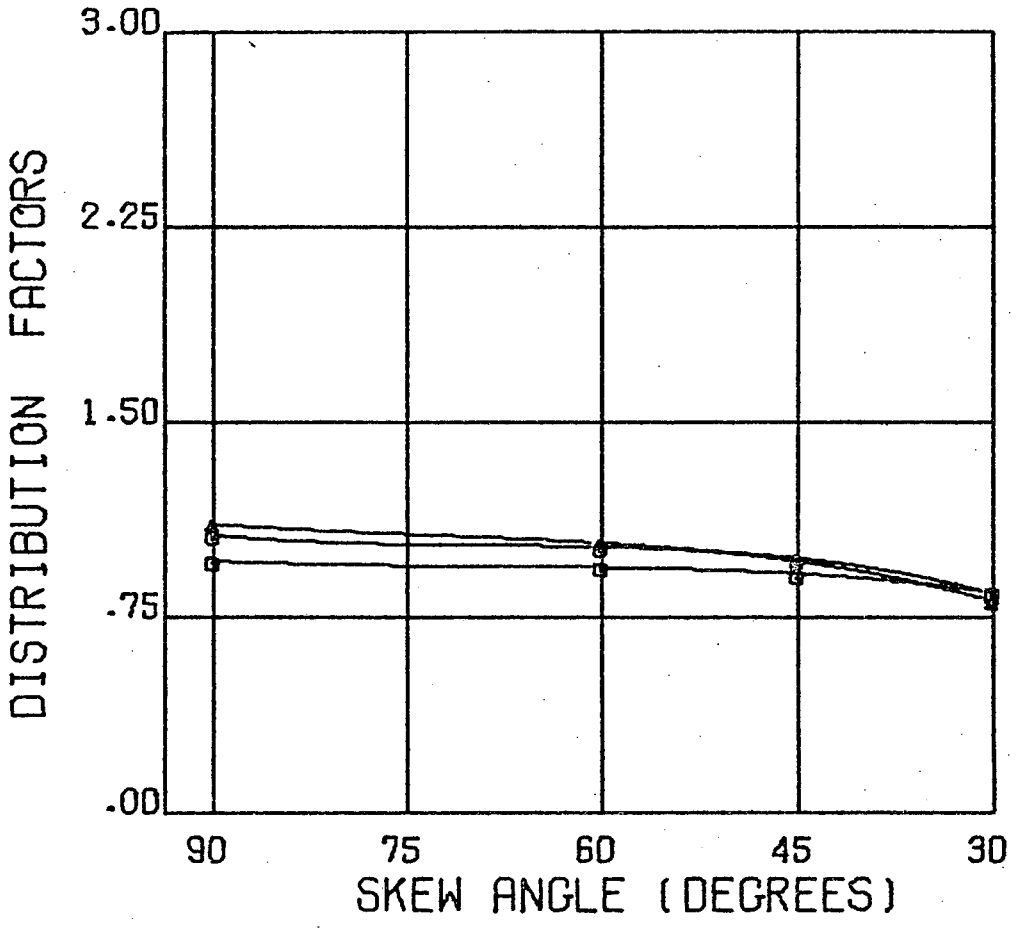
Fig. 49 Distribution Factors
Bridge Nos. 13, 14 and 15



48 FT. WIDE 9 BEAMS 72.00 SPACING 4 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	105.00	28/63	.0571
○	60.00	20/39	.1000
▲	42.00	20/30	.1429

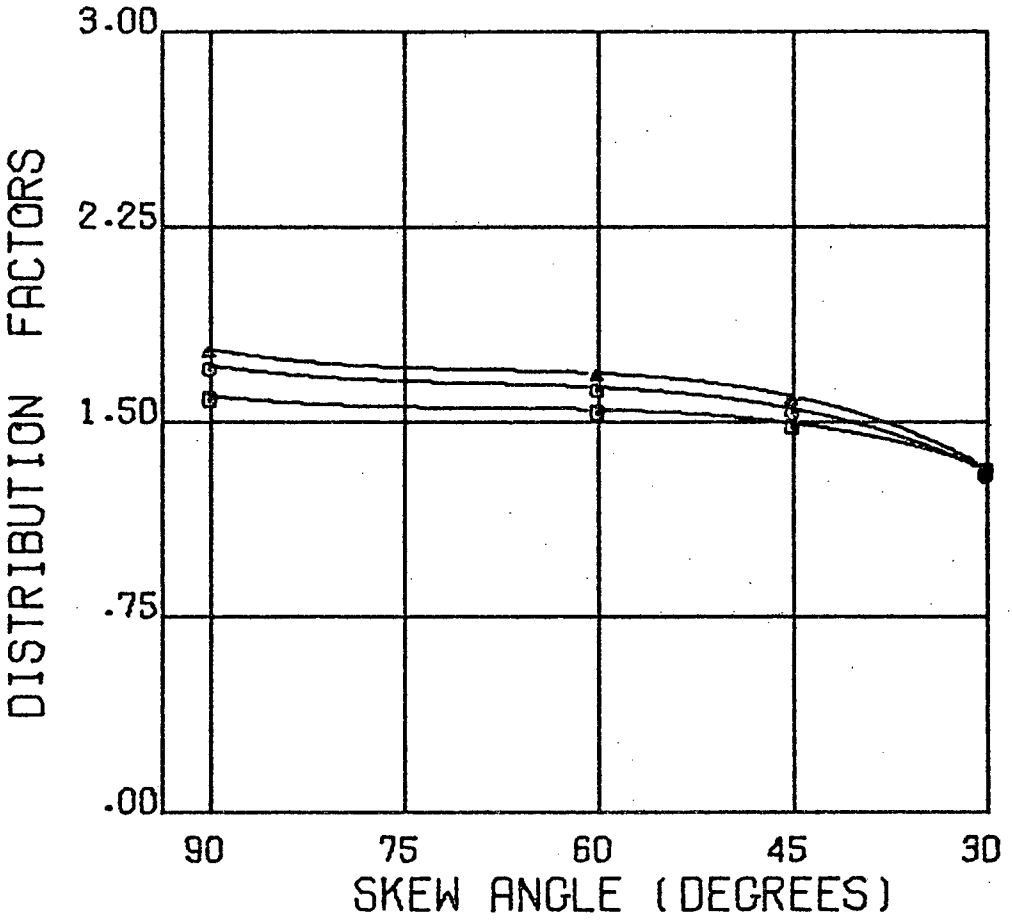
Fig. 50 Distribution Factors
Bridge Nos. 13, 14 and 15



48 FT. WIDE 6 BEAMS 96.00 SPACING 1 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
□	96.00	AASHO-6	.0833
○	57.60	24/45	.1389
△	38.40	20/33	.2083

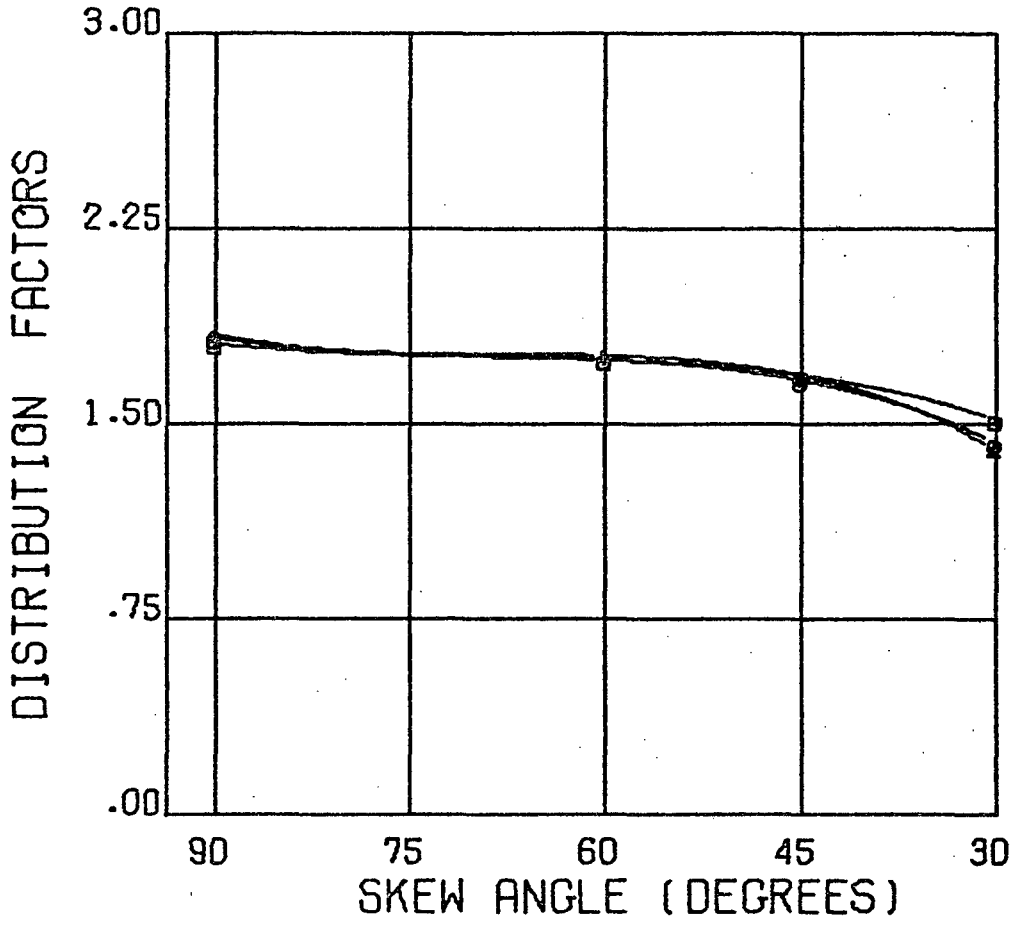
Fig. 51 Distribution Factors
Bridge Nos. 16, 17 and 18



48 FT. WIDE 6 BEAMS 96.00 SPACING 2 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	96.00	AASHO-6	.0833
○	57.60	24/45	.1389
△	38.40	20/33	.2083

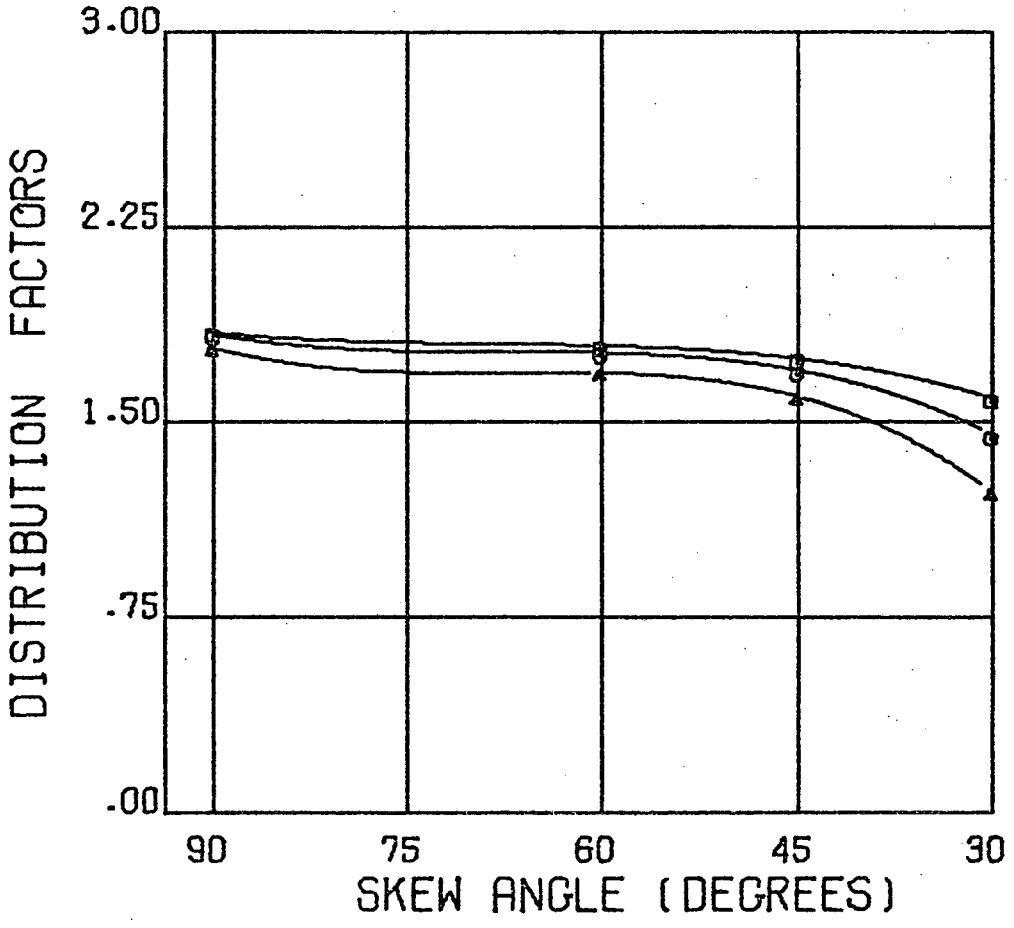
Fig. 52 Distribution Factors
Bridge Nos. 16, 17 and 18



48 FT. WIDE 6 BEAMS 96.00 SPACING 3 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	96.00	AASHO-6	.0833
○	67.60	24/45	.1389
▲	38.40	20/33	.2083

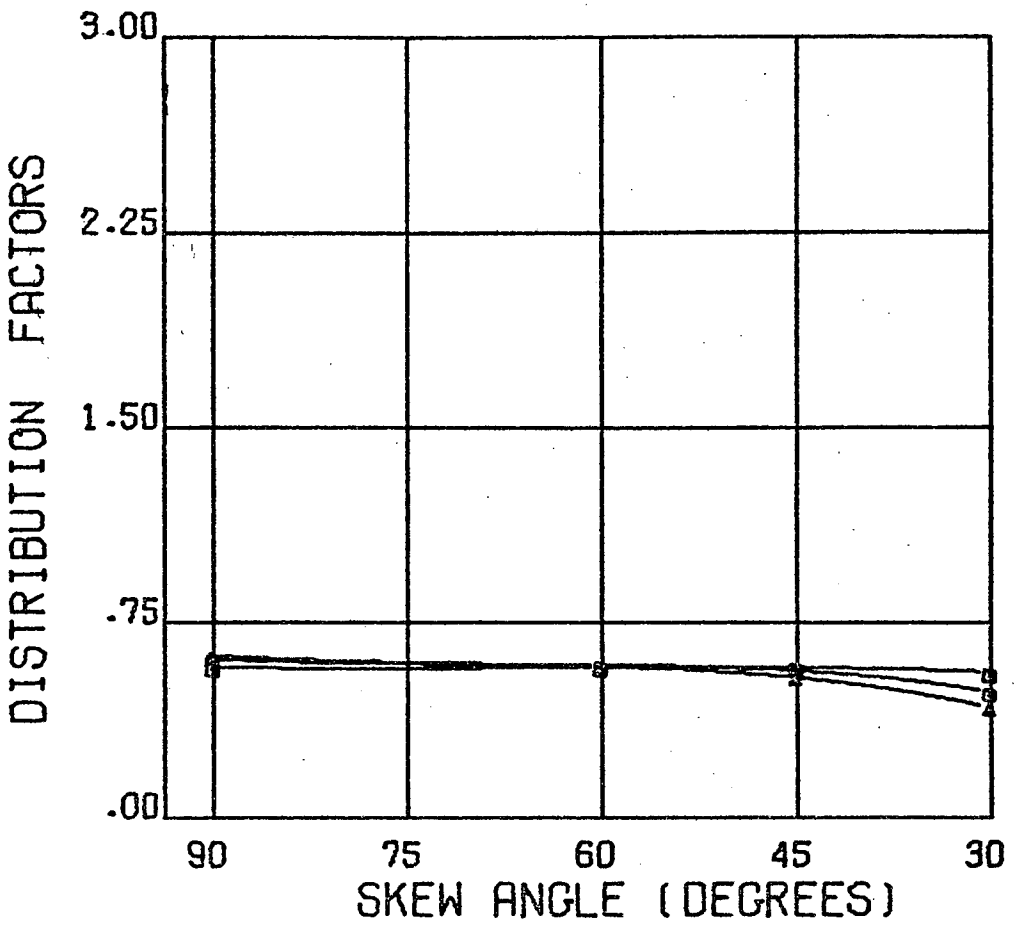
Fig. 53 Distribution Factors
Bridge Nos. 16, 17 and 18



48 FT. WIDE 6 BEAMS 96.00 SPACING 4 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	96.00	AASHO-6	.0833
○	67.60	24/45	.1389
△	38.40	20/33	.2083

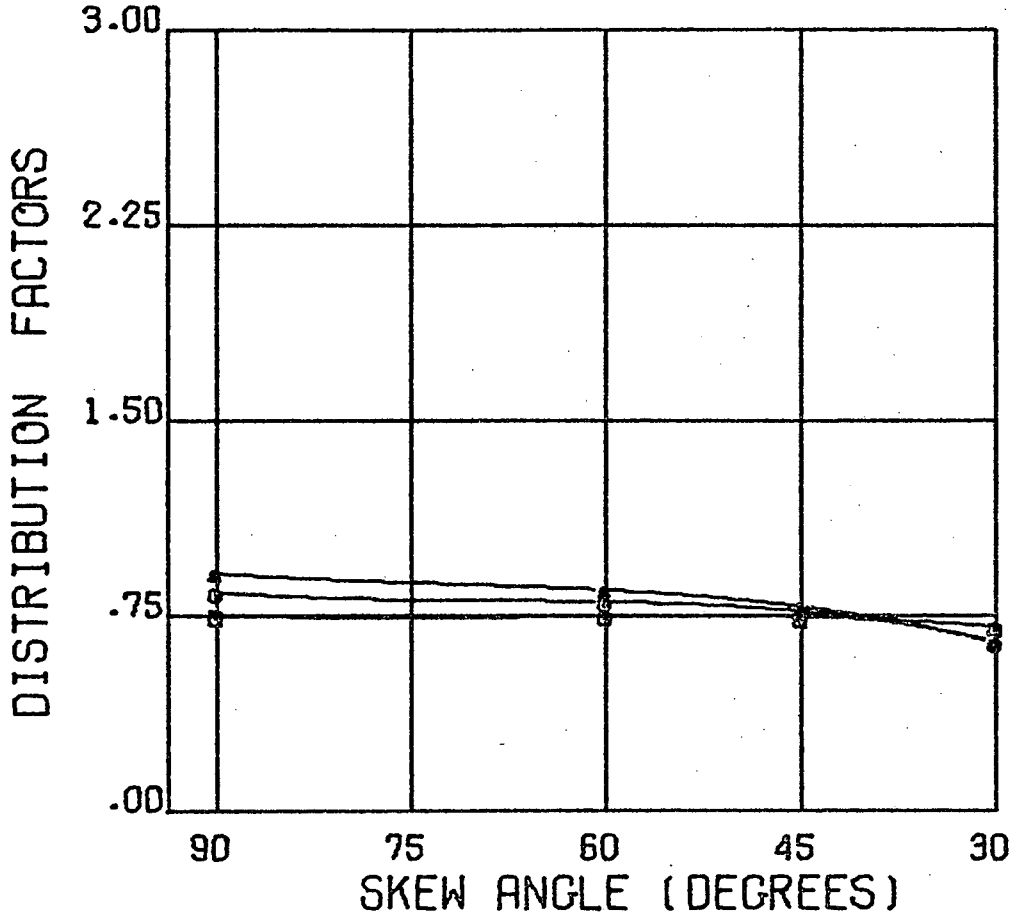
Fig. 54 Distribution Factors
Bridge Nos. 16, 17 and 18



72 FT. WIDE 16 BEAMS 57.60 SPACING 1 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
■	120.00	AASHO-6	.0400
●	57.60	20/36	.0833
▲	38.40	AASHO-1	.1250

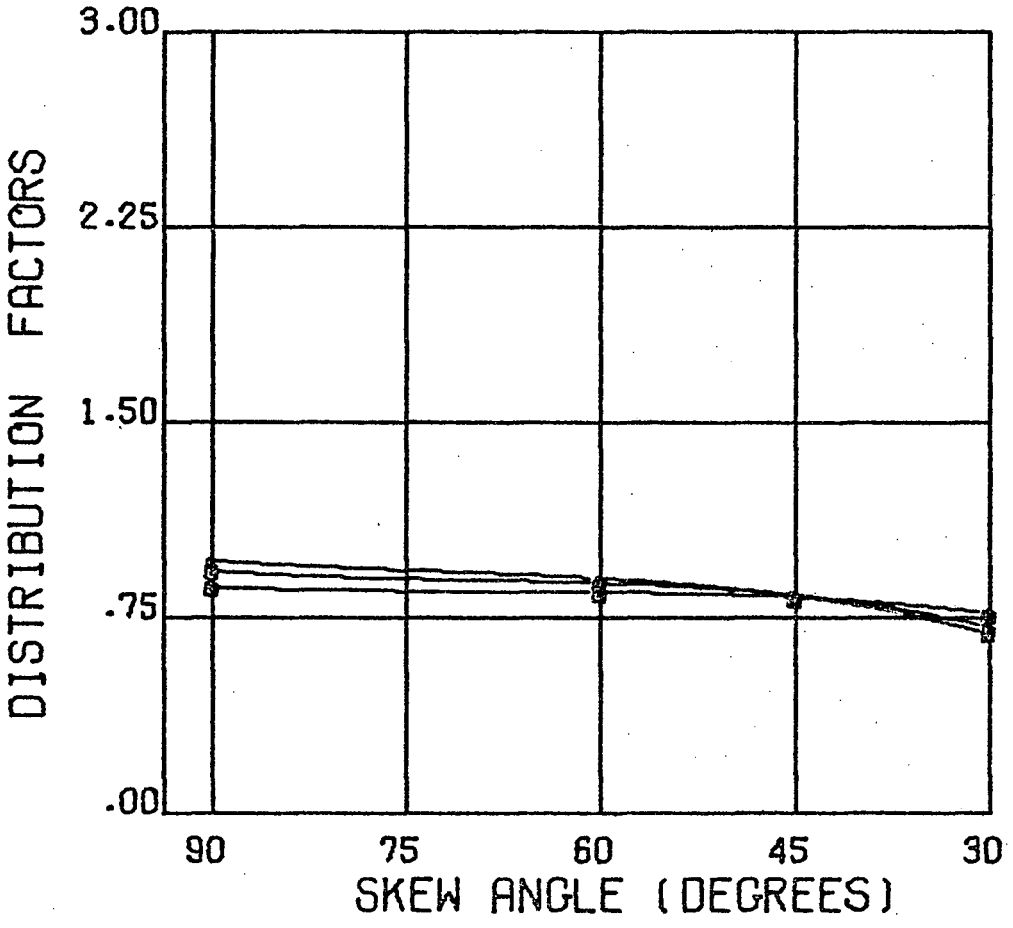
Fig. 55 Distribution Factors
Bridge Nos. 19, 20 and 21



72 FT. WIDE 16 BEAMS 57.60 SPACING 2 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	120.00	AASHO-6	.0400
○	57.60	20/36	.0833
△	38.40	AASHO-1	.1250

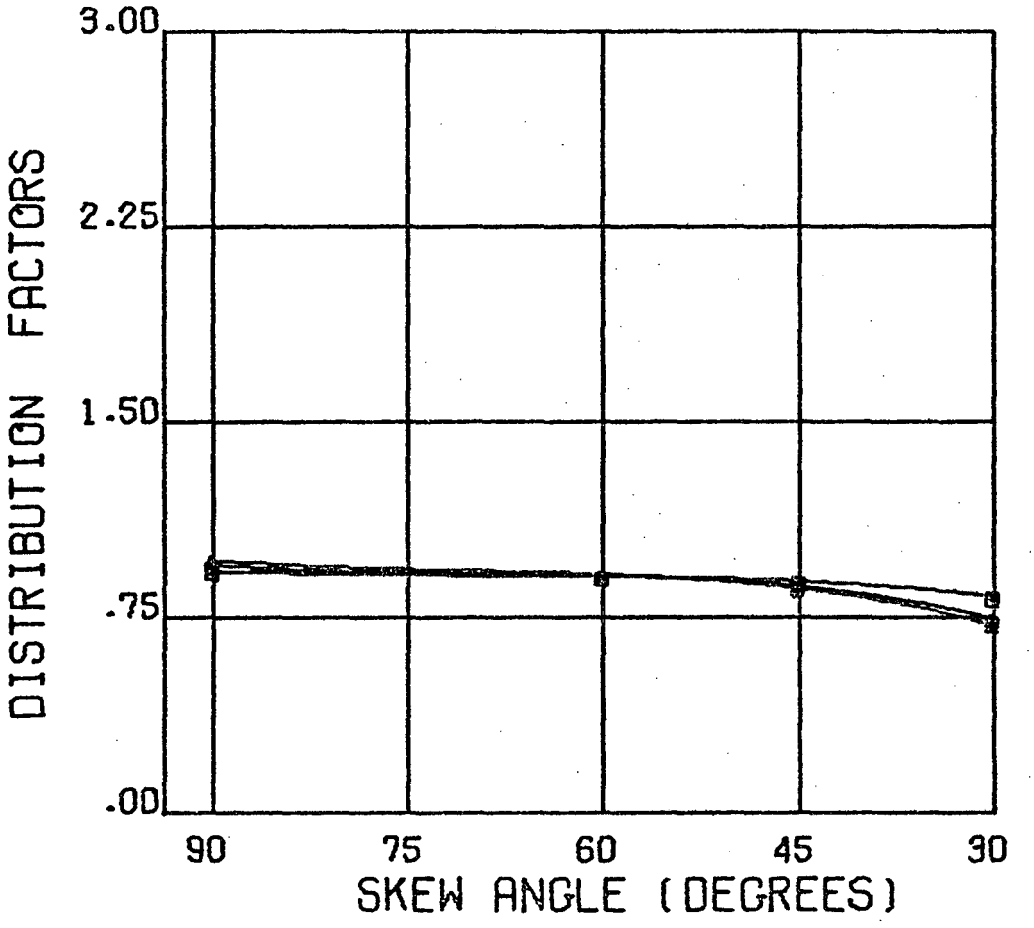
Fig. 56 Distribution Factors
Bridge Nos. 19, 20 and 21



72 FT. WIDE 16 BEAMS 57.60 SPACING 3 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	120.00	AASHO-6	.0400
○	57.60	20/36	.0833
▲	38.40	AASHO-1	.1250

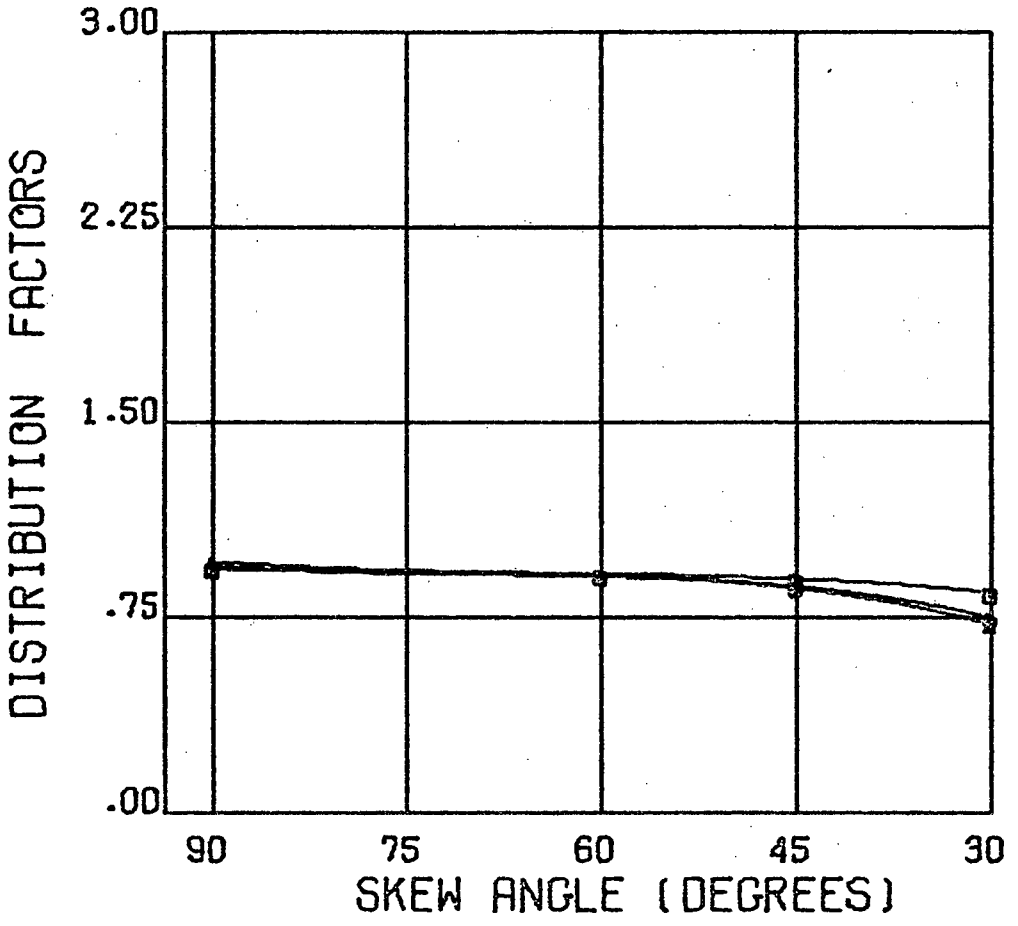
Fig. 57 Distribution Factors
Bridge Nos. 19, 20 and 21



72 FT. WIDE 16 BEAMS 57.60 SPACING 4 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	120.00	AASHO-6	.0400
○	57.60	20/36	.0833
△	38.40	AASHO-1	.1250

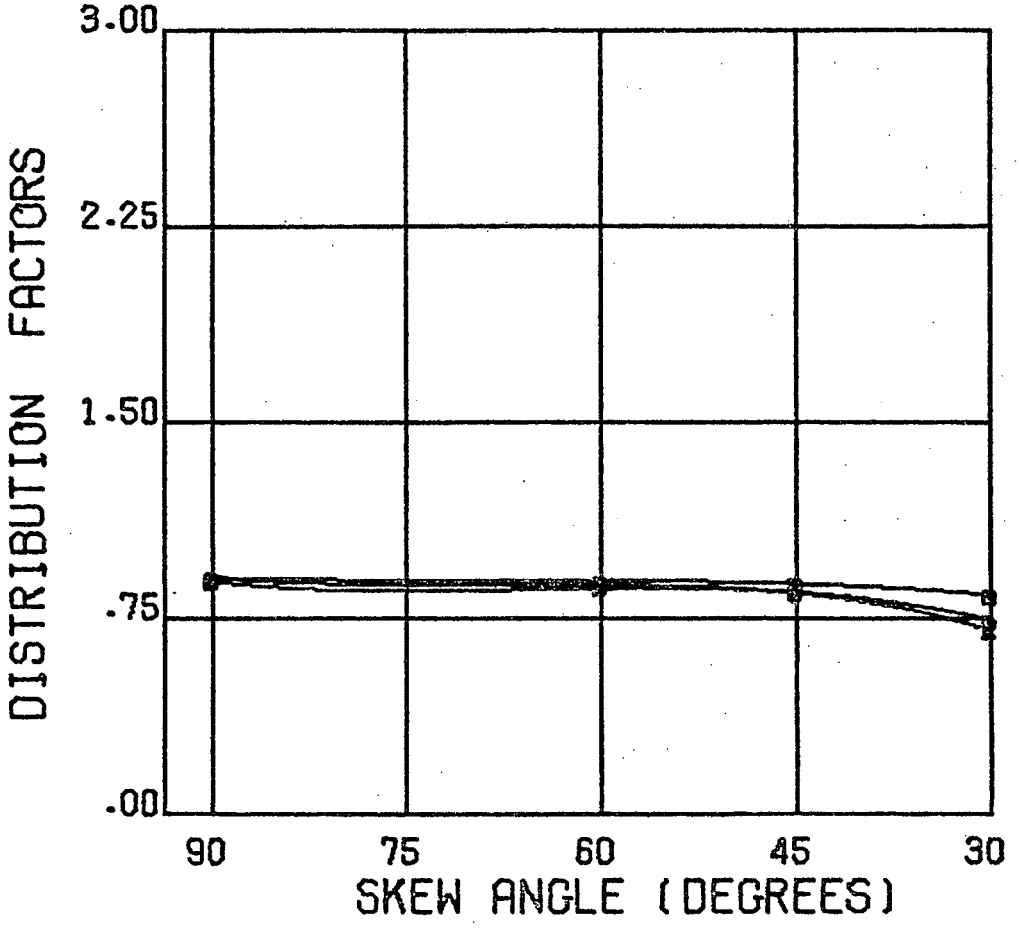
Fig. 58 Distribution Factors
Bridge Nos. 19, 20 and 21



72 FT. WIDE 16 BEAMS 57.60 SPACING 5 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	120.00	AASHO-6	.0400
○	57.60	20/36	.0833
△	38.40	AASHO-1	.1250

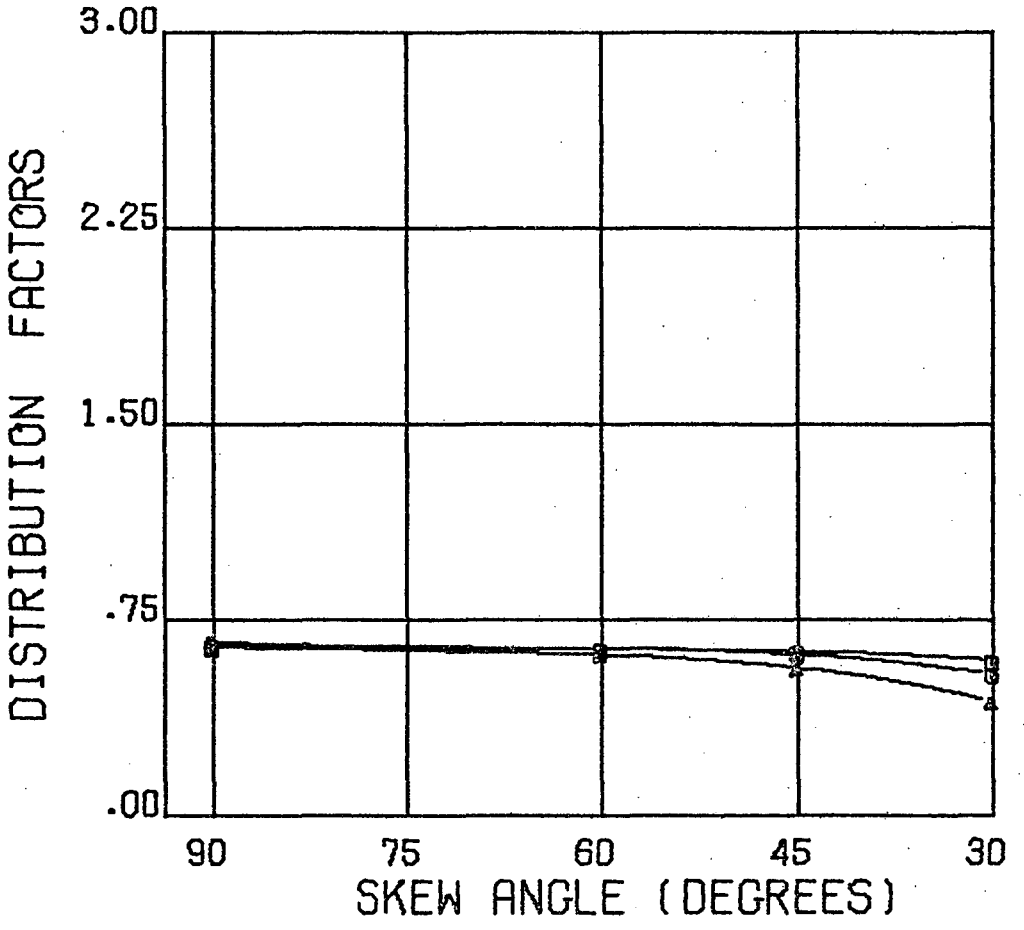
Fig. 59 Distribution Factors
Bridge Nos. 19, 20 and 21



72 FT. WIDE 16 BEAMS 57.60 SPACING 6 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	120.00	AASHO-6	.0400
▫	57.60	20/36	.0833
△	38.40	AASHO-1	.1250

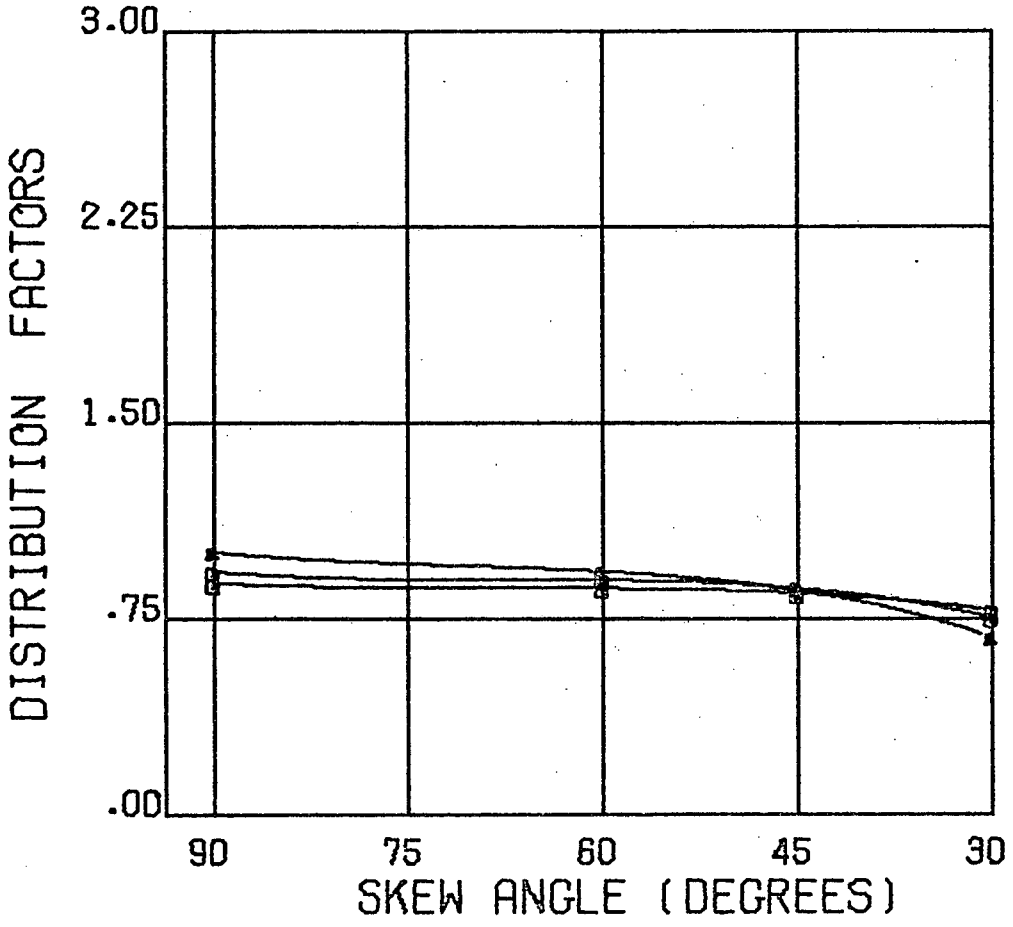
Fig. 60 Distribution Factors
Bridge Nos. 19, 20 and 21



72 FT. WIDE 14 BEAMS 66.50 SPACING 1 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	110.80	AASHO-6	.0500
▫	66.50	24/42	.0833
△	38.80	AASHO-1	.1428

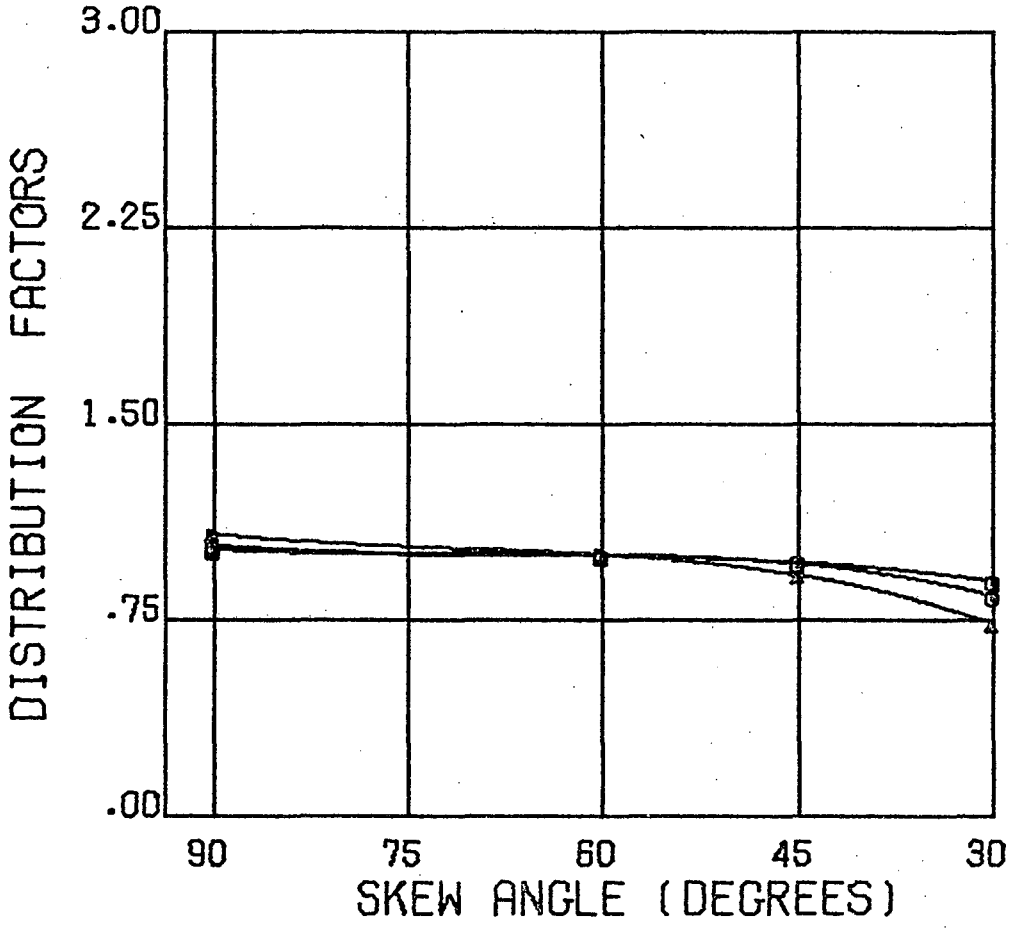
Fig. 61 Distribution Factors
Bridge Nos. 22, 23 and 24



72 FT. WIDE 14 BEAMS 66.50 SPACING 2 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
◻	110.80	AASHO-6	.0500
◻	66.50	24/42	.0833
△	38.80	AASHO-1	.1428

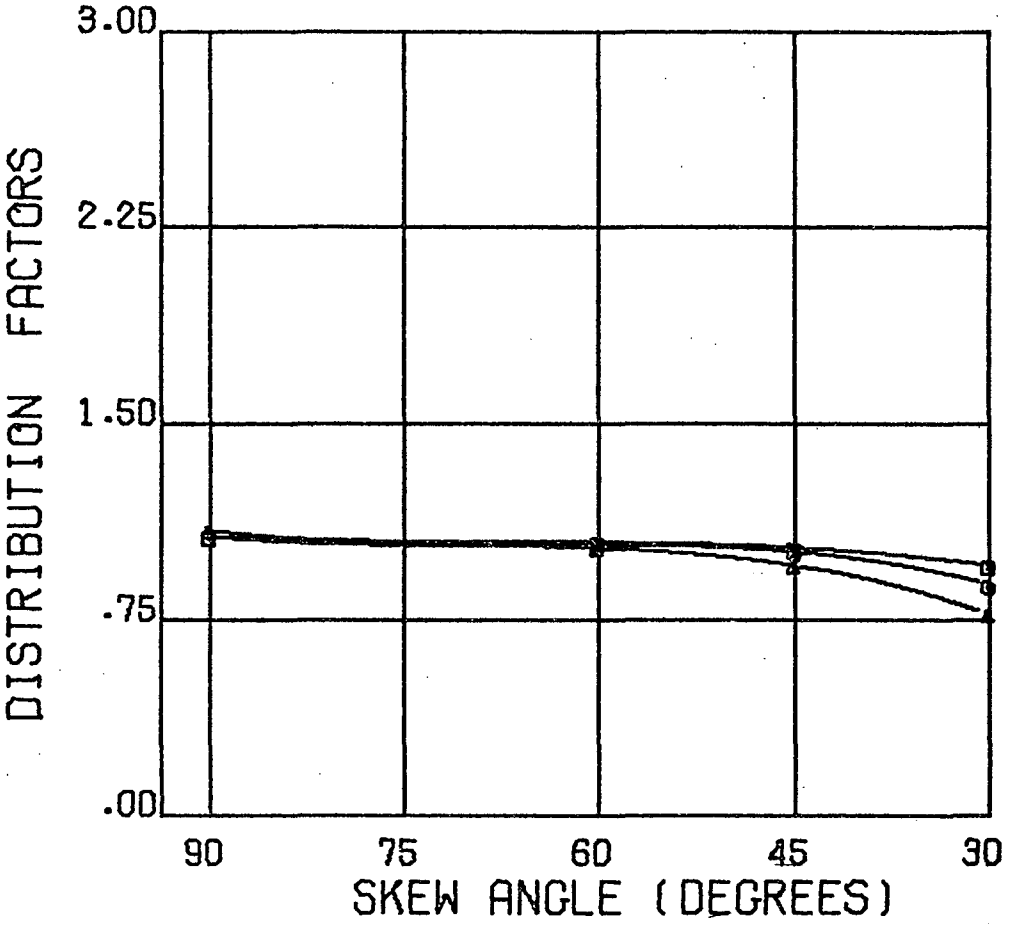
Fig. 62 Distribution Factors
Bridge Nos. 22, 23 and 24



72 FT. WIDE 14 BEAMS 66.50 SPACING 3 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	110.80	AASHO-6	.0500
○	68.60	24/42	.0833
▲	38.80	AASHO-1	.1428

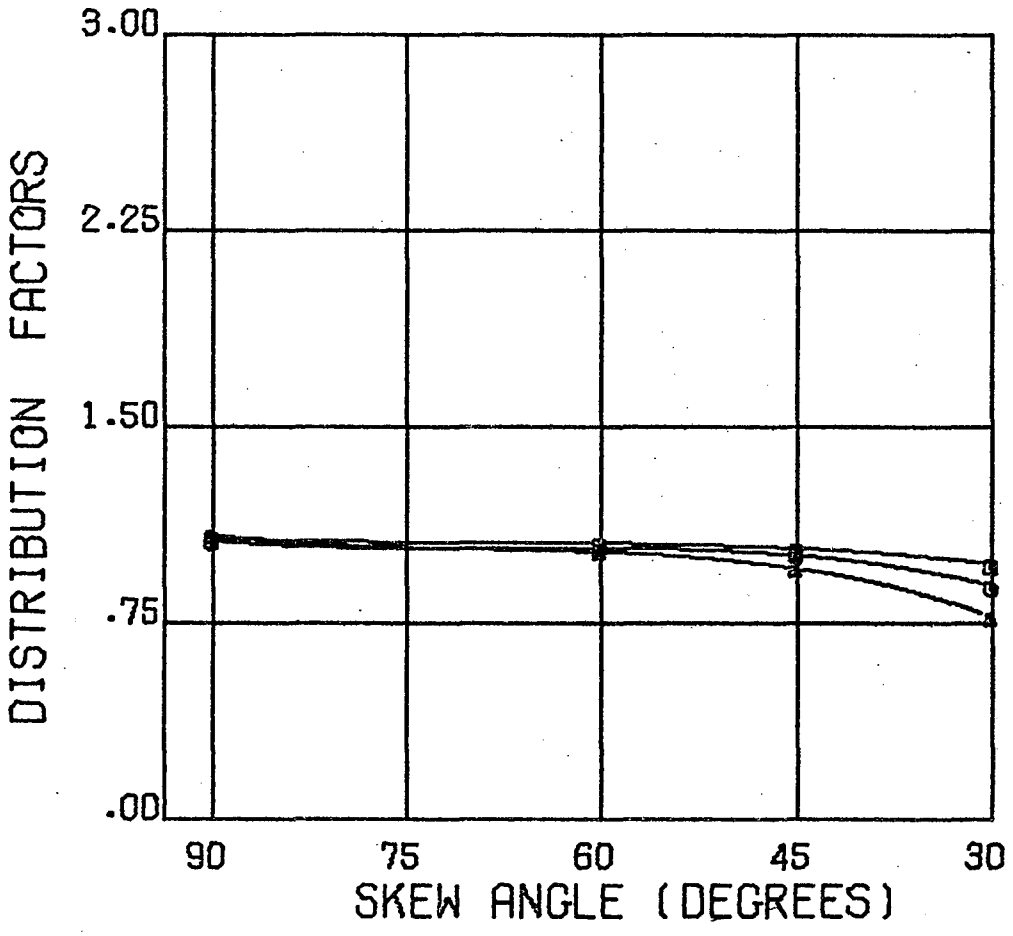
Fig. 63 Distribution Factors
Bridge Nos. 22, 23 and 24



72 FT. WIDE 14 BEAMS 66.50 SPACING 4 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	110.80	AASHO-6	.0500
○	68.50	24/42	.0833
▲	38.80	AASHO-1	.1428

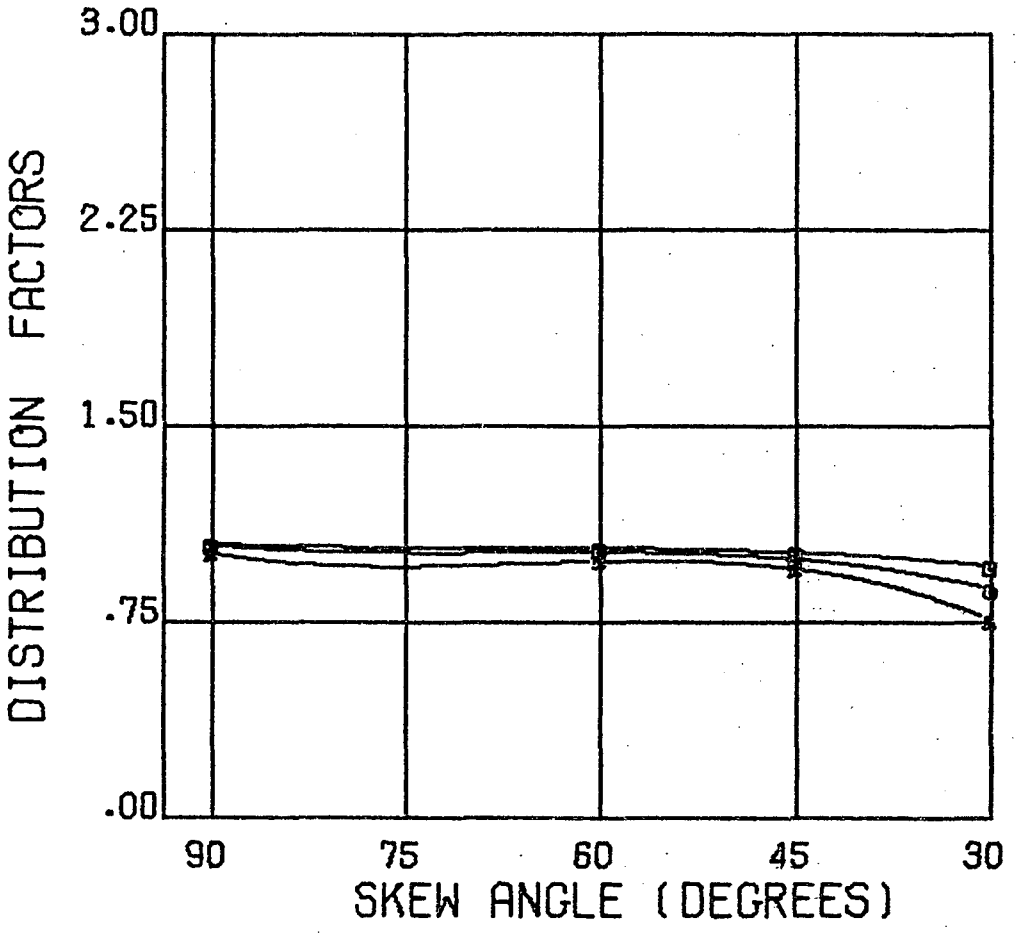
Fig. 64 Distribution Factors
Bridge Nos. 22, 23 and 24



72 FT. WIDE 14 BEAMS 66.50 SPACING 5 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	110.80	AASHO-6	.0500
○	66.50	24/42	.0833
△	38.80	AASHO-1	.1428

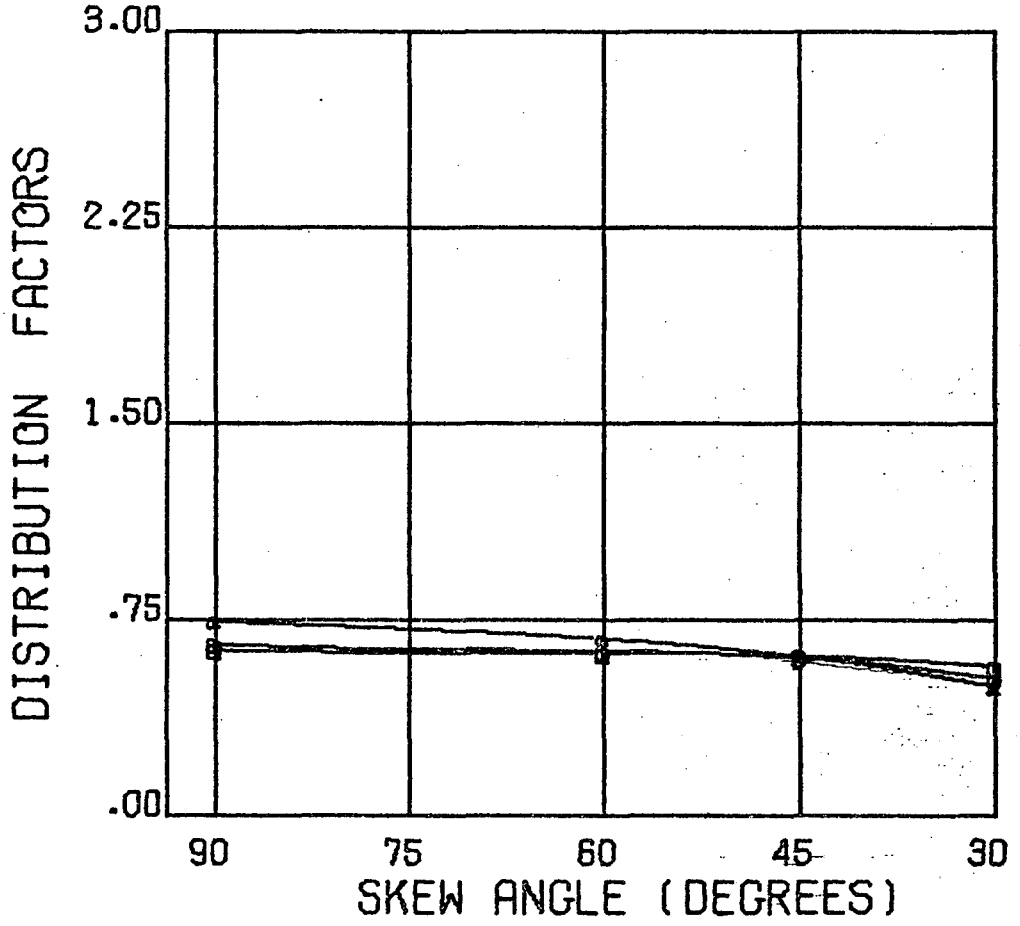
Fig. 65 Distribution Factors
Bridge Nos. 22, 23 and 24



72 FT. WIDE 14 BEAMS 66.50 SPACING 6 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	110.80	AASHO-6	.0500
○	66.50	24/42	.0833
▲	38.80	AASHO-1	.1428

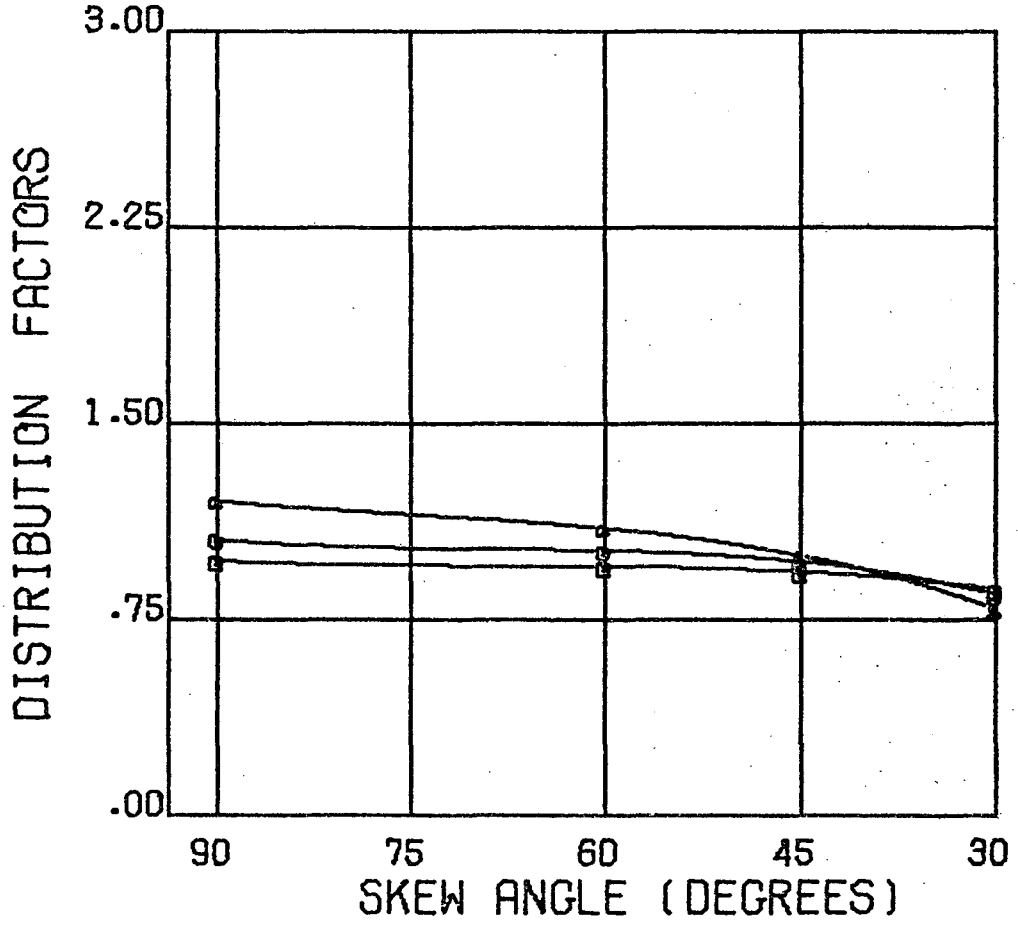
Fig. 66 Distribution Factors
Bridge Nos. 22, 23 and 24



72 FT. WIDE 12 BEAMS 78.50 SPACING 1 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
□	114.50	AASHO-6	.0571
○	66.60	24/42	.0999
△	39.30	20/30	.1665

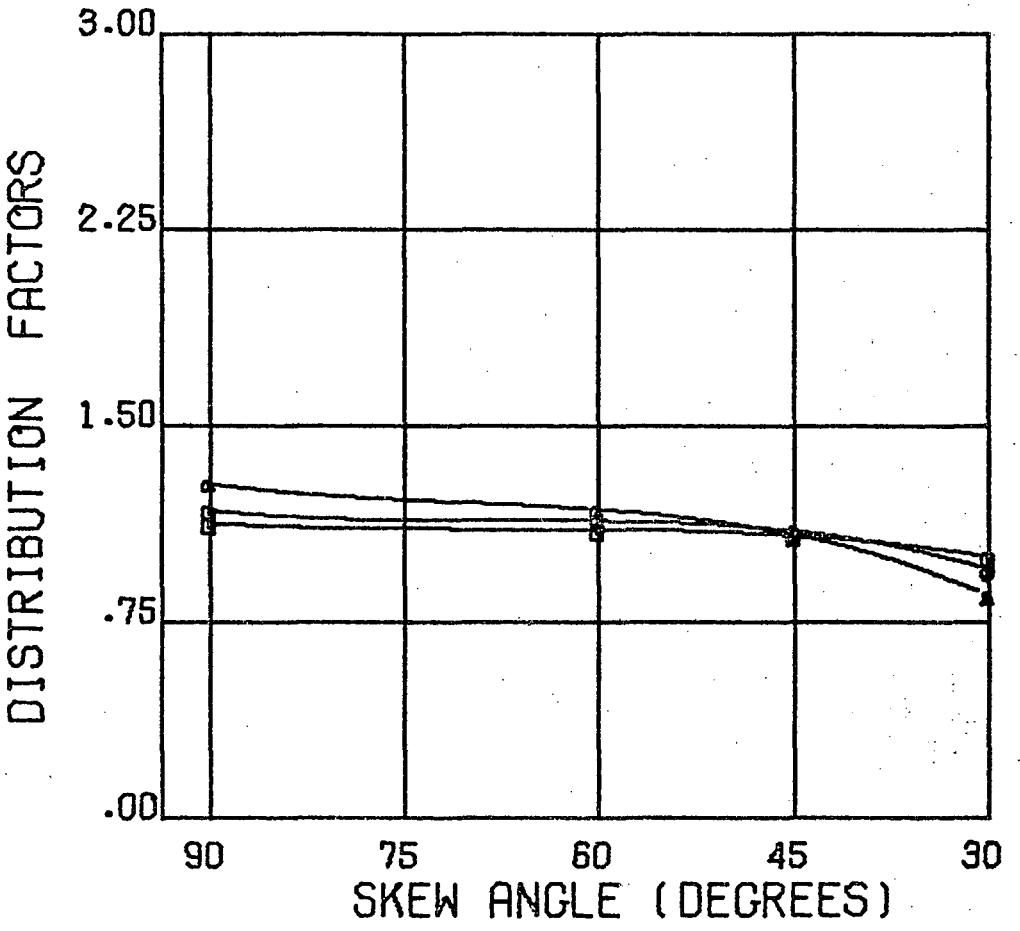
Fig. 67 Distribution Factors
Bridge Nos. 25, 26 and 27



72 FT. WIDE 12 BEAMS 78.50 SPACING 2 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	114.50	AASHO-6	.0571
▫	65.50	24/42	.0999
▲	39.30	20/30	.1665

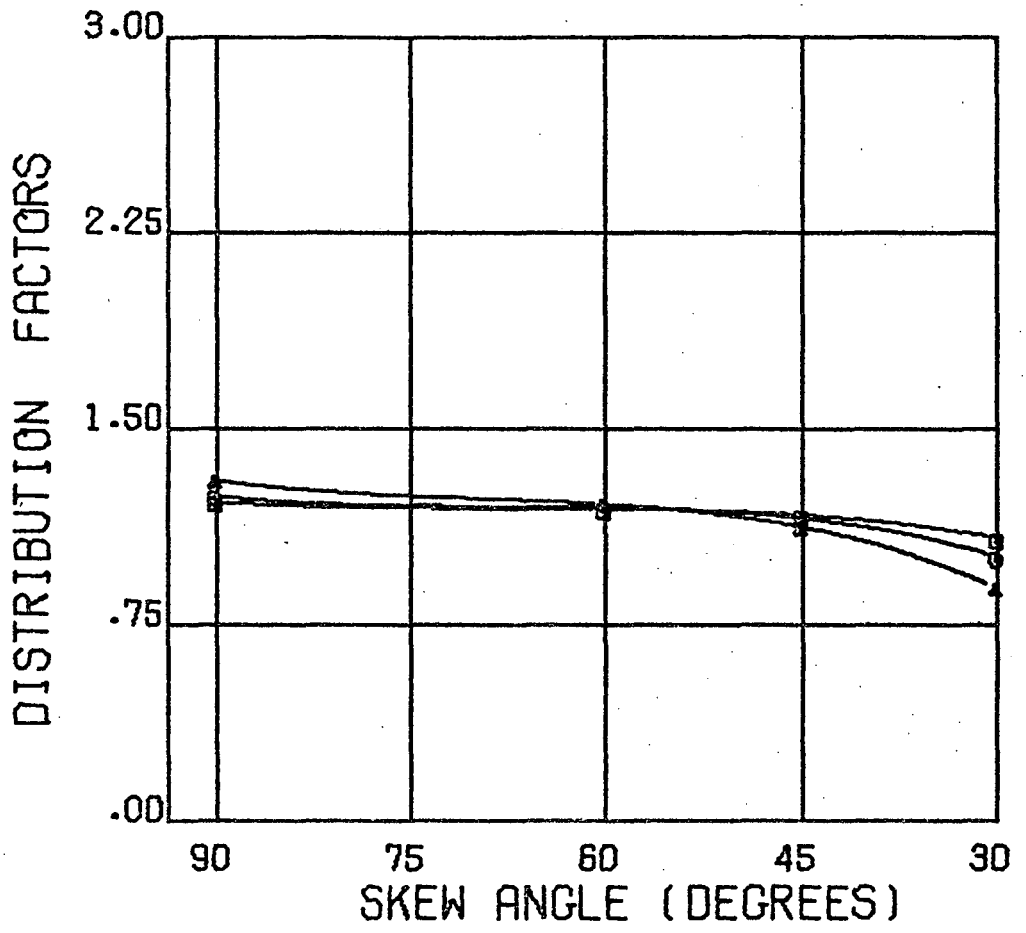
Fig. 68 Distribution Factors
Bridge Nos. 25, 26 and 27



72 FT. WIDE 12 BEAMS 78.50 SPACING 3 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
□	114.50	AASHO-6	.0571
○	66.60	24/42	.0999
△	39.30	20/30	.1665

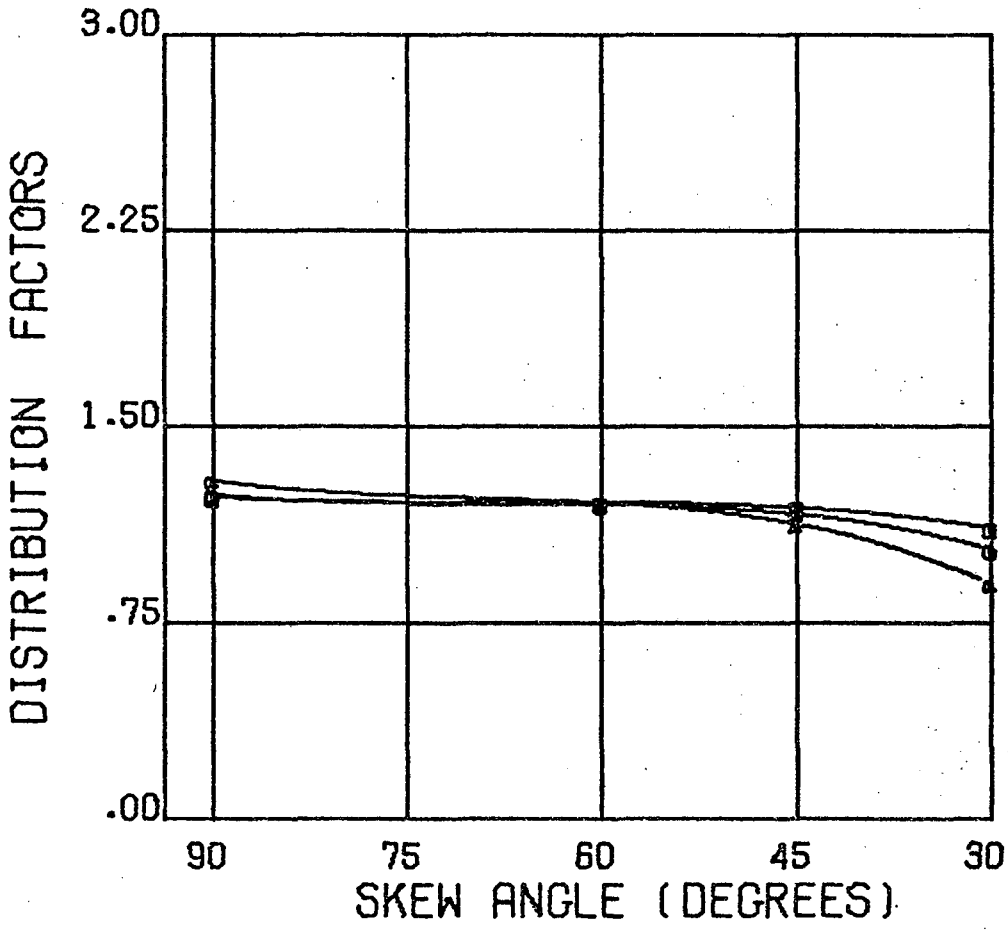
Fig. 69 Distribution Factors
Bridge Nos. 25, 26 and 27



72 FT. WIDE 12 BEAMS 78.50 SPACING 4 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
□	114.50	AASHO-6	.0571
○	66.60	24/42	.0999
△	39.30	20/30	.1665

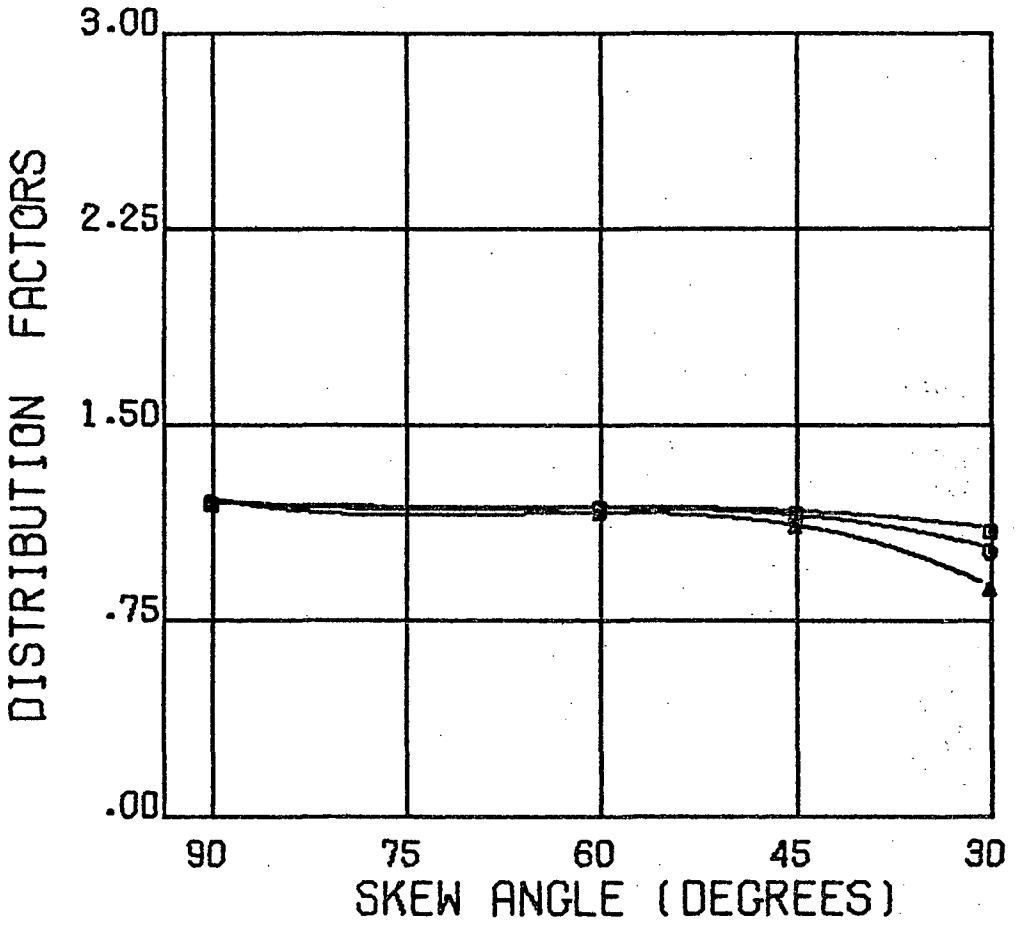
Fig. 70 Distribution Factors
Bridge Nos. 25, 26 and 27



72 FT. WIDE 12 BEAMS 78.50 SPACING 5 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	114.50	AASHO-6	.0571
○	66.60	24/42	.0999
△	39.30	20/30	.1665

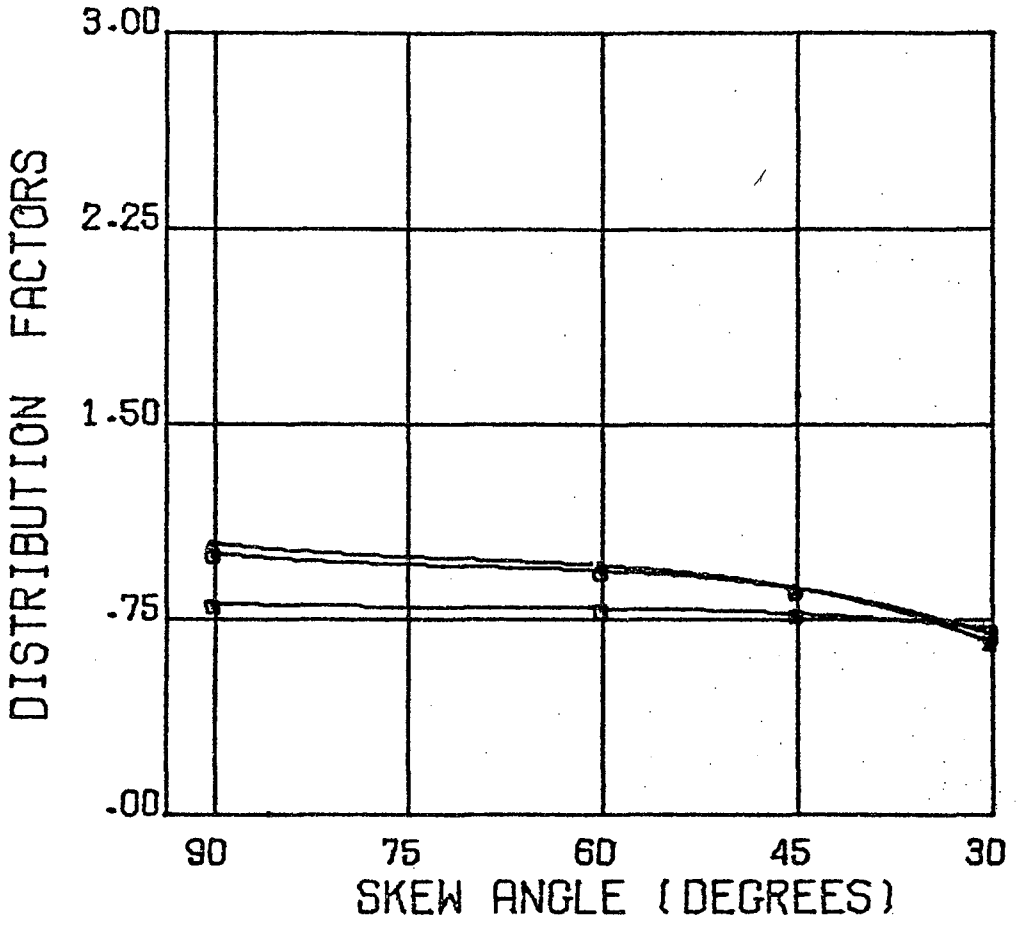
Fig. 71 Distribution Factors
Bridge Nos. 25, 26 and 27



72 FT. WIDE 12 BEAMS 78.50 SPACING 6 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
□	114.50	AASHO-6	.0571
○	66.50	24/42	.0999
△	39.30	20/30	.1665

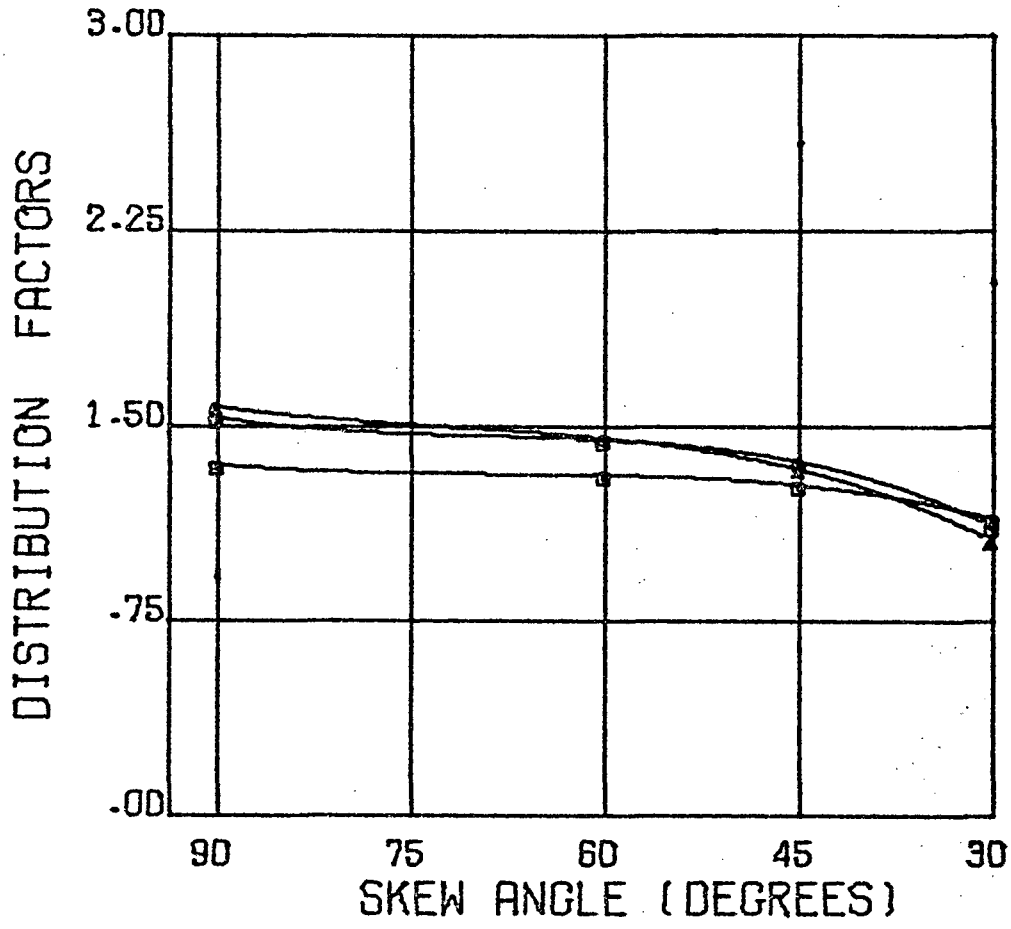
Fig. 72 Distribution Factors
Bridge Nos. 25, 26 and 27



72 FT. WIDE 9 BEAMS 8.00 SPACING 1 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	108.00	AASHO-6	.0833
○	64.00	24/42	.1667
△	45.00	24/36	.2000

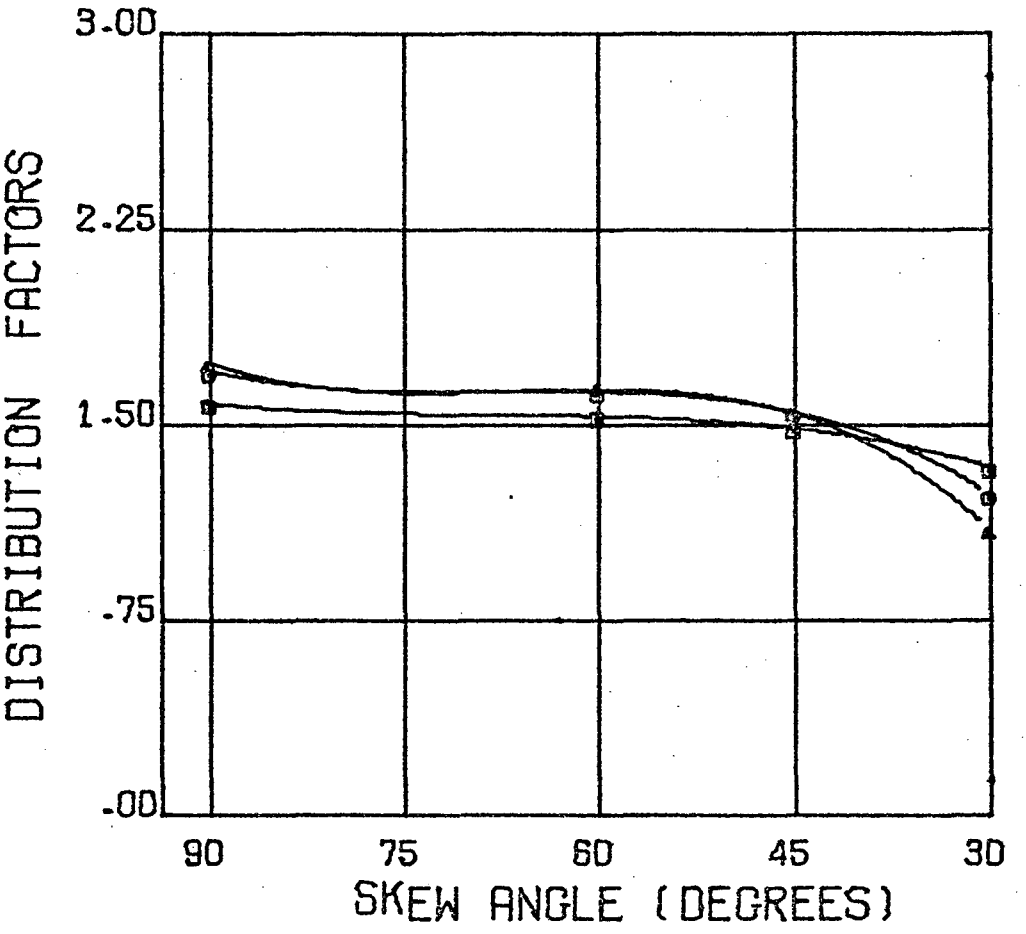
Fig. 73 Distribution Factors
Bridge Nos. 28, 29 and 30



72 FT. WIDE 9 BEAMS 8.00 SPACING 2 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	108.00	AASHO-6	.0833
○	64.00	24/42	.1667
△	45.00	24/36	.2000

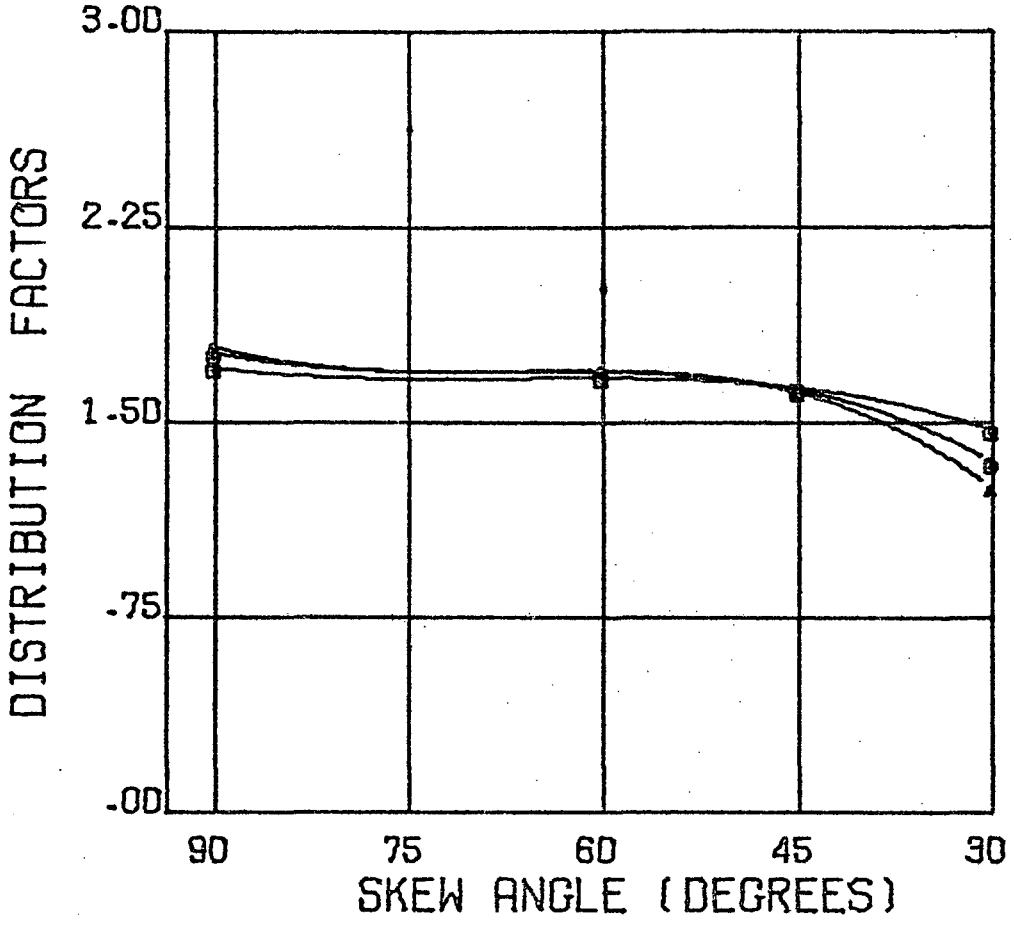
Fig. 74 Distribution Factors
Bridge Nos. 28, 29 and 30



72 FT. WIDE 9 BEAMS 8.00 SPACING 3 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	108.00	AASHO-6	.0833
○	64.00	24/42	.1667
△	45.00	24/36	.2000

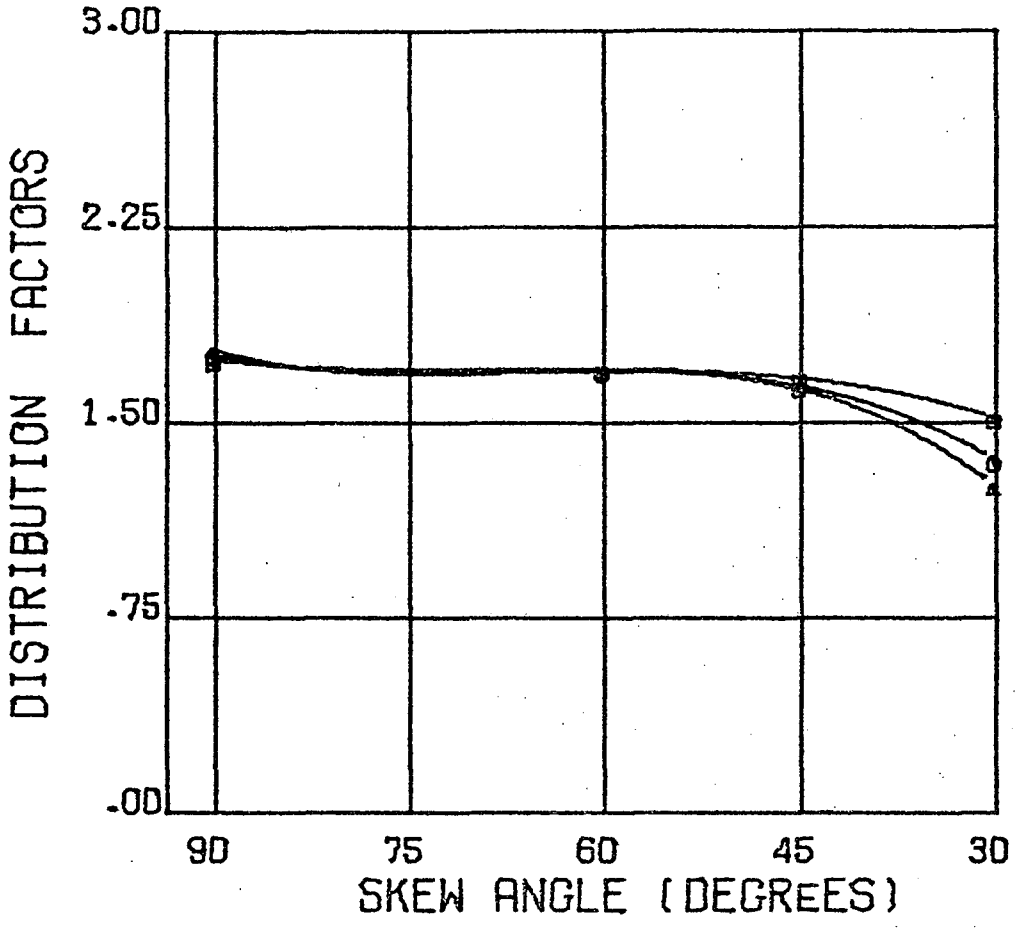
Fig. 75 Distribution Factors
Bridge Nos. 28, 29 and 30



72 FT. WIDE 9 BEAMS 8.00 SPACING 4 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	108.00	AASHO-6	.0833
○	64.00	24/42	.1667
△	45.00	24/36	.2000

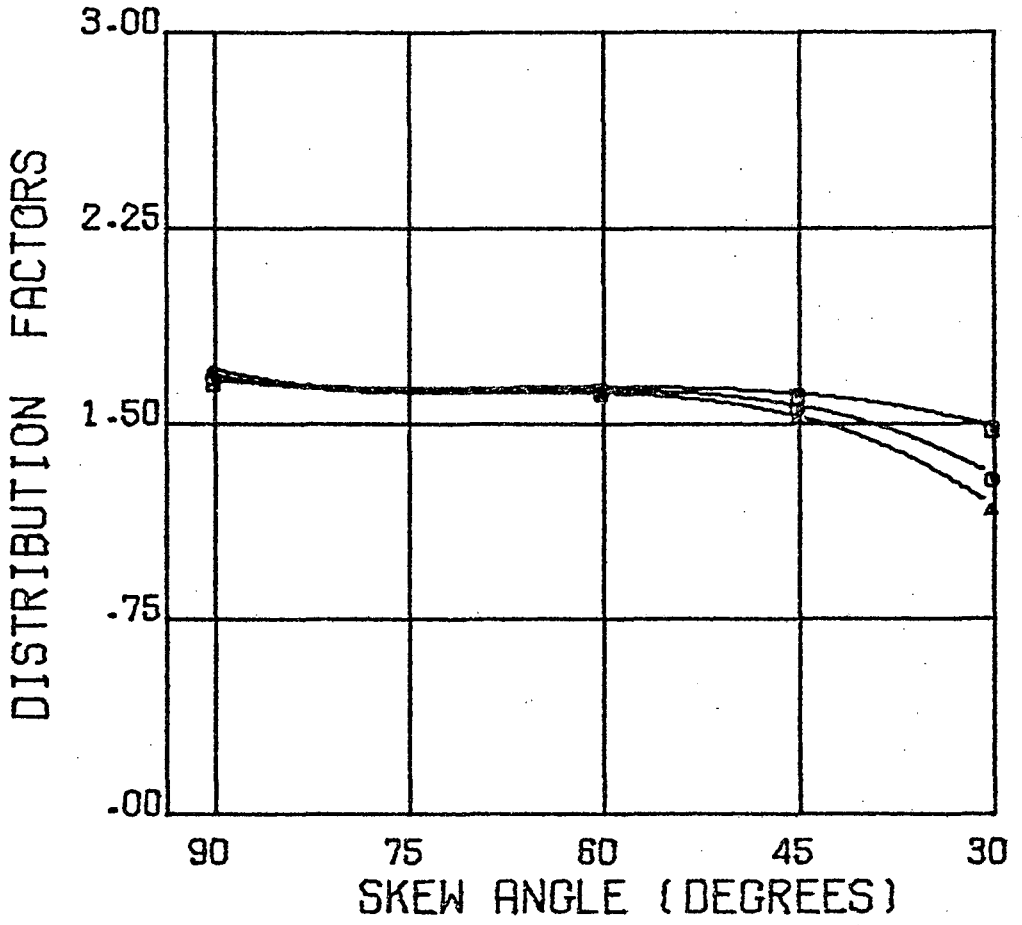
Fig. 76 Distribution Factors
Bridge Nos. 28, 29 and 30



72 FT. WIDE 9 BEAMS 8.00 SPACING 5 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
■	108.00	AASHO-6	.0833
●	64.00	24/42	.1667
▲	45.00	24/36	.2000

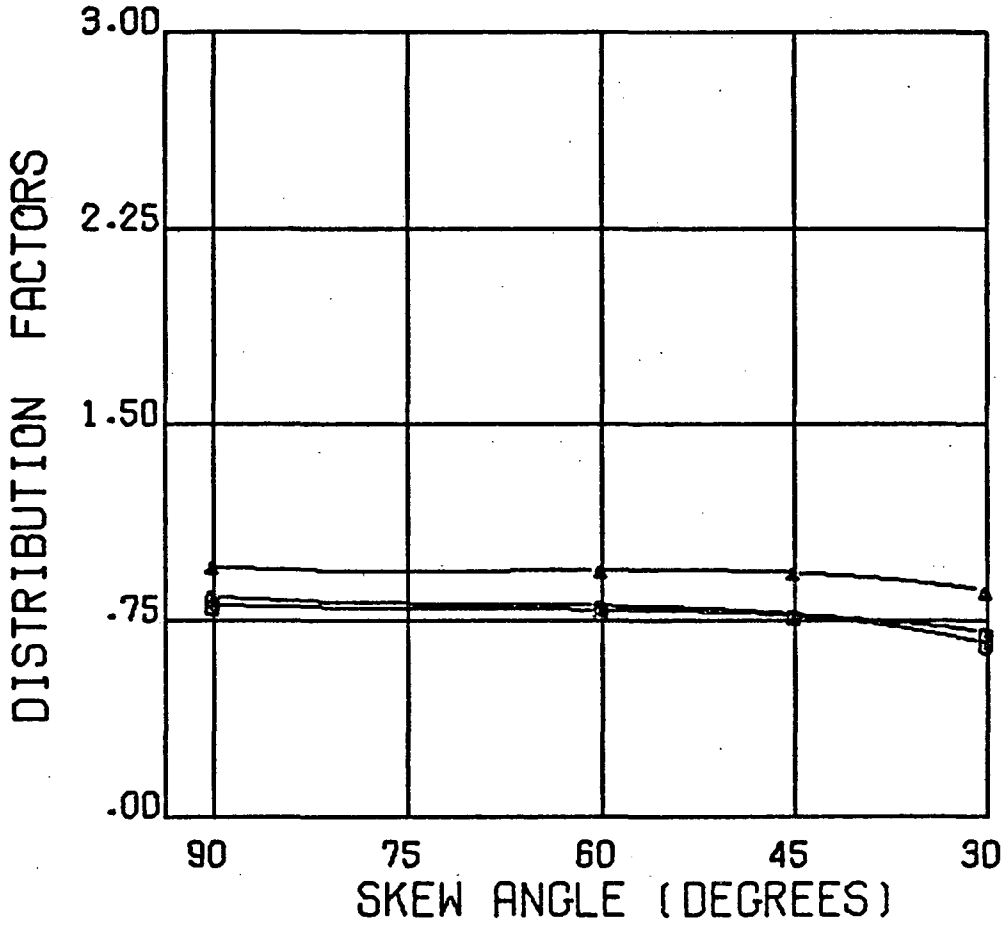
Fig. 77 Distribution Factors
Bridge Nos. 28, 29 and 30



72 FT. WIDE 9 BEAMS 8.00 SPACING 6 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
■	108.00	AASHO-6	.0833
●	64.00	24/42	.1667
▲	45.00	24/36	.2000

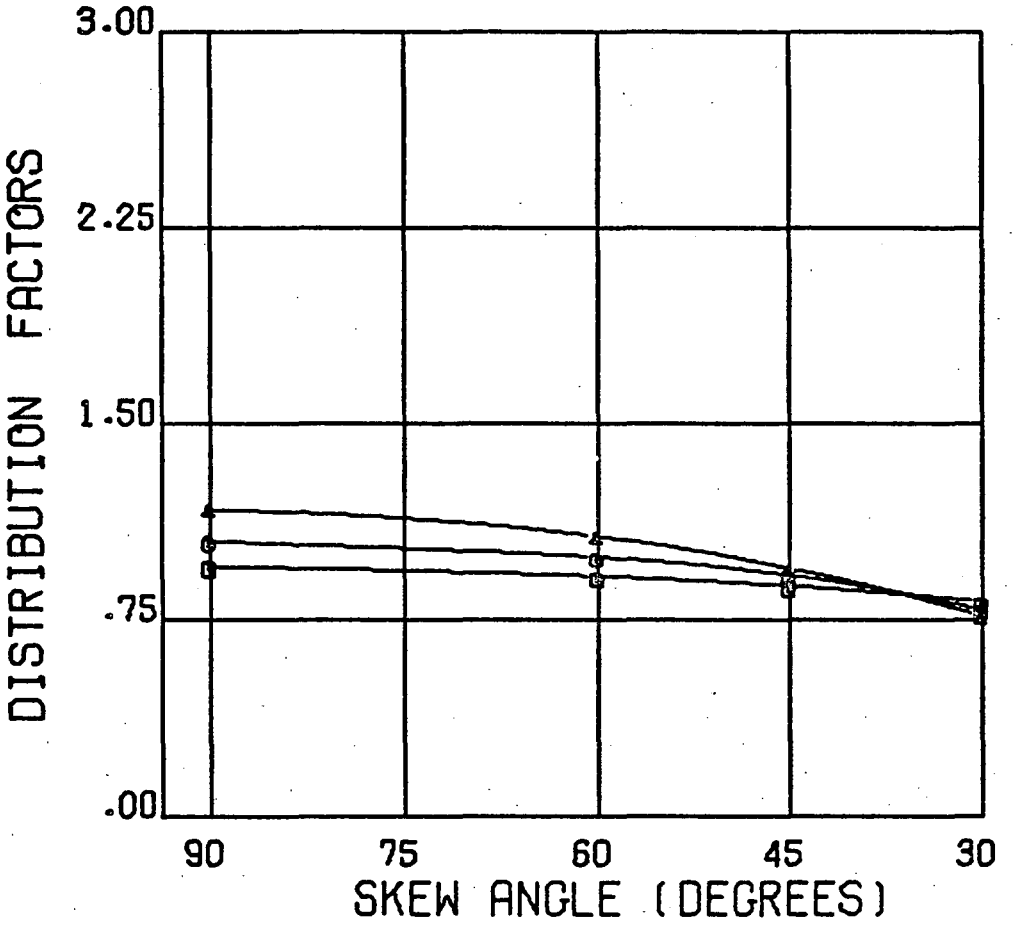
Fig. 78 Distribution Factors
Bridge Nos. 28, 29 and 30



24 FT. WIDE 6 BEAMS 57.60 SPACING

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	120.00	AASHO-6	.0400
○	72.00	24/42	.0667
▲	38.40	20/30	.1250

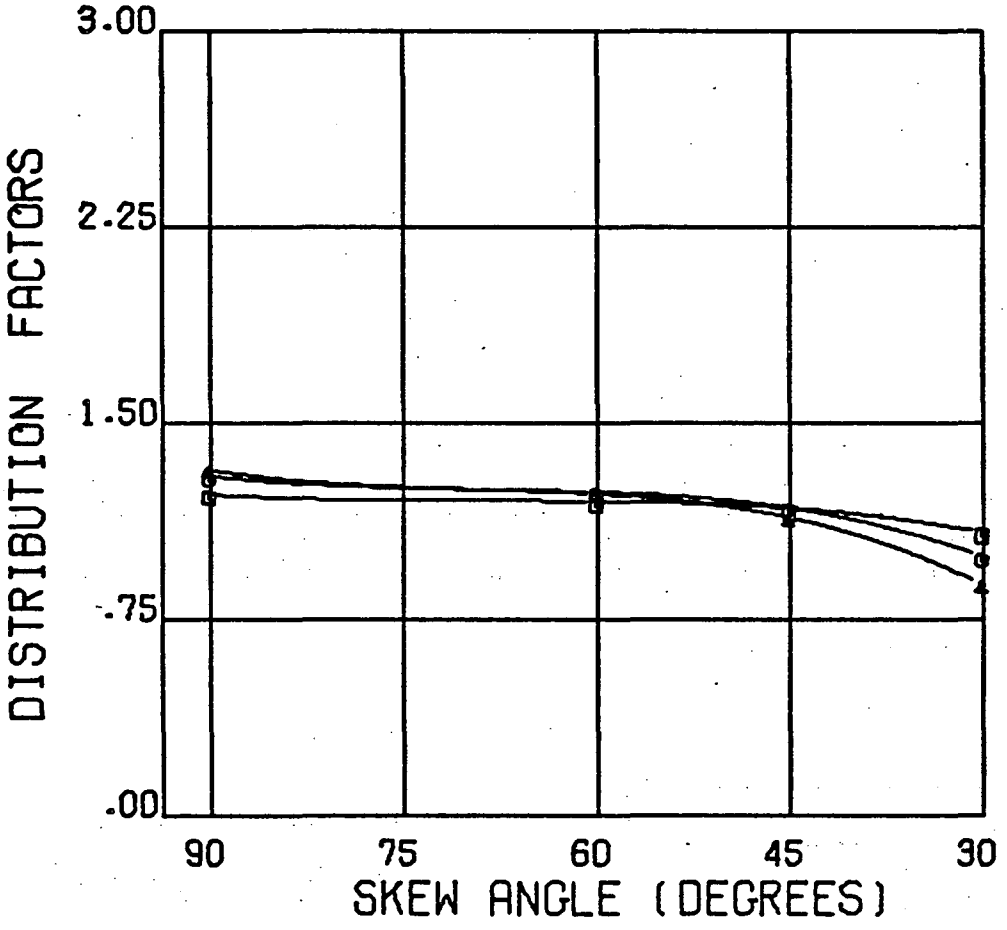
Fig. 79 Maximum Interior Beam Distribution Factors
Bridge Nos. 1, 2 and 3



24 FT. WIDE 5 BEAMS 72.00 SPACING

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	120.00	AASHO-6	.0500
○	60.00	20/39	.1000
▲	42.00	20/30	.1429

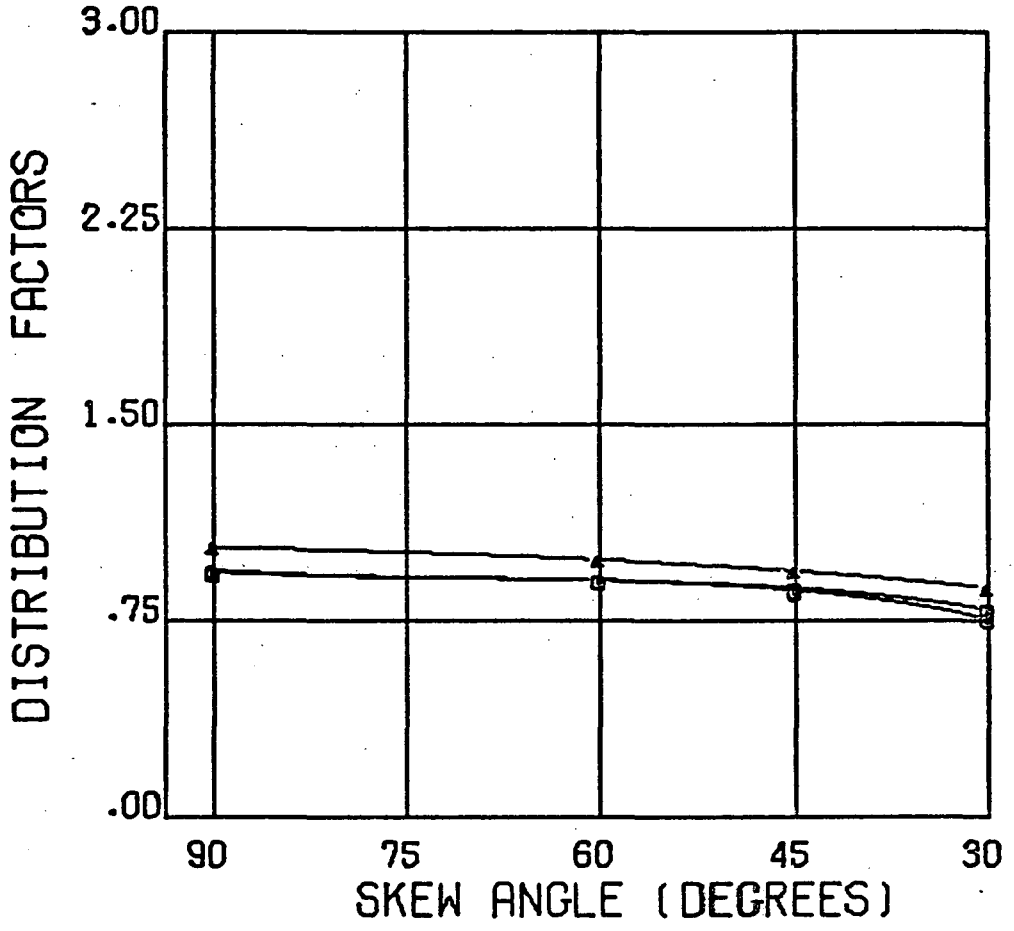
Fig. 80 Maximum Interior Beam Distribution Factors
Bridge Nos. 4, 5 and 6



24 FT. WIDE 4 BEAMS 96.00 SPACING

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
■	120.00	AASHO-6	.0667
●	64.00	24/45	.1250
▲	40.00	20/30	.2000

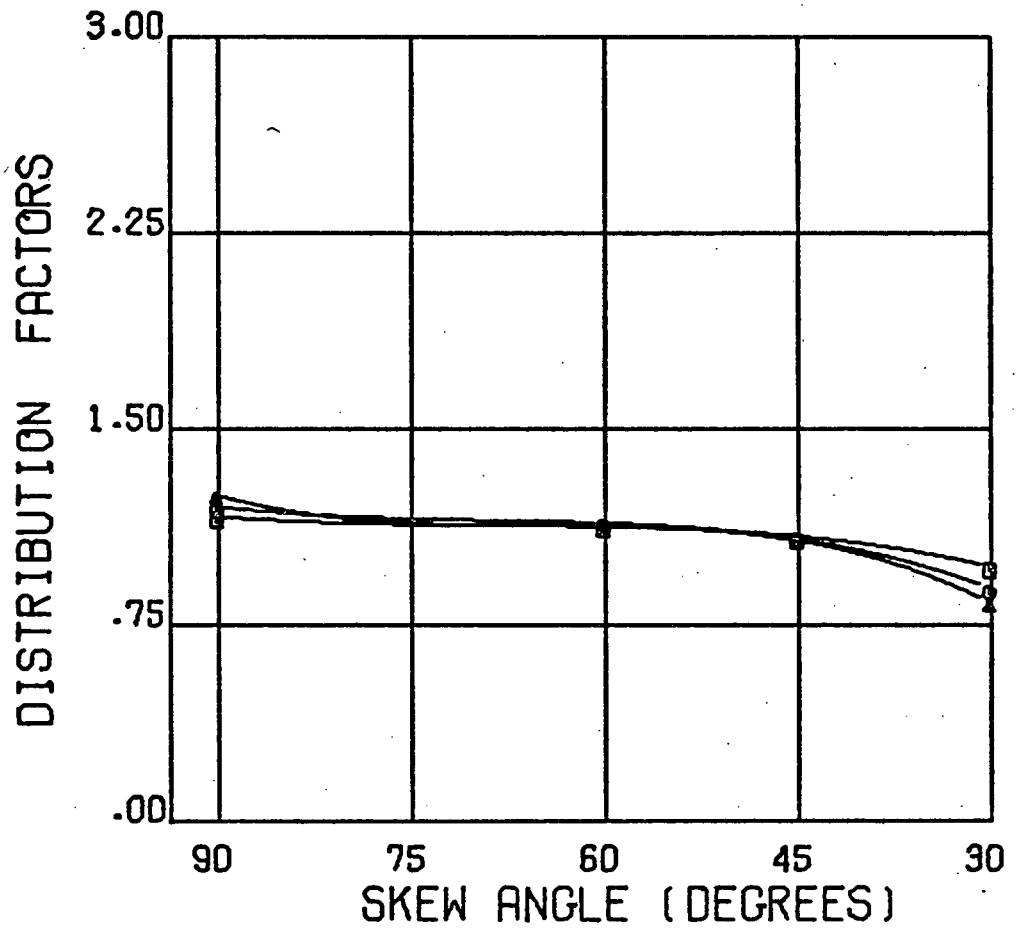
Fig. 81 Maximum Interior Beam Distribution Factors
Bridge Nos. 7, 8 and 9



48 FT. WIDE 11 BEAMS 57.60 SPACING

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	120.00	AASHO-6	.0400
○	84.00	24/48	.0671
▲	48.00	20/30	.1000

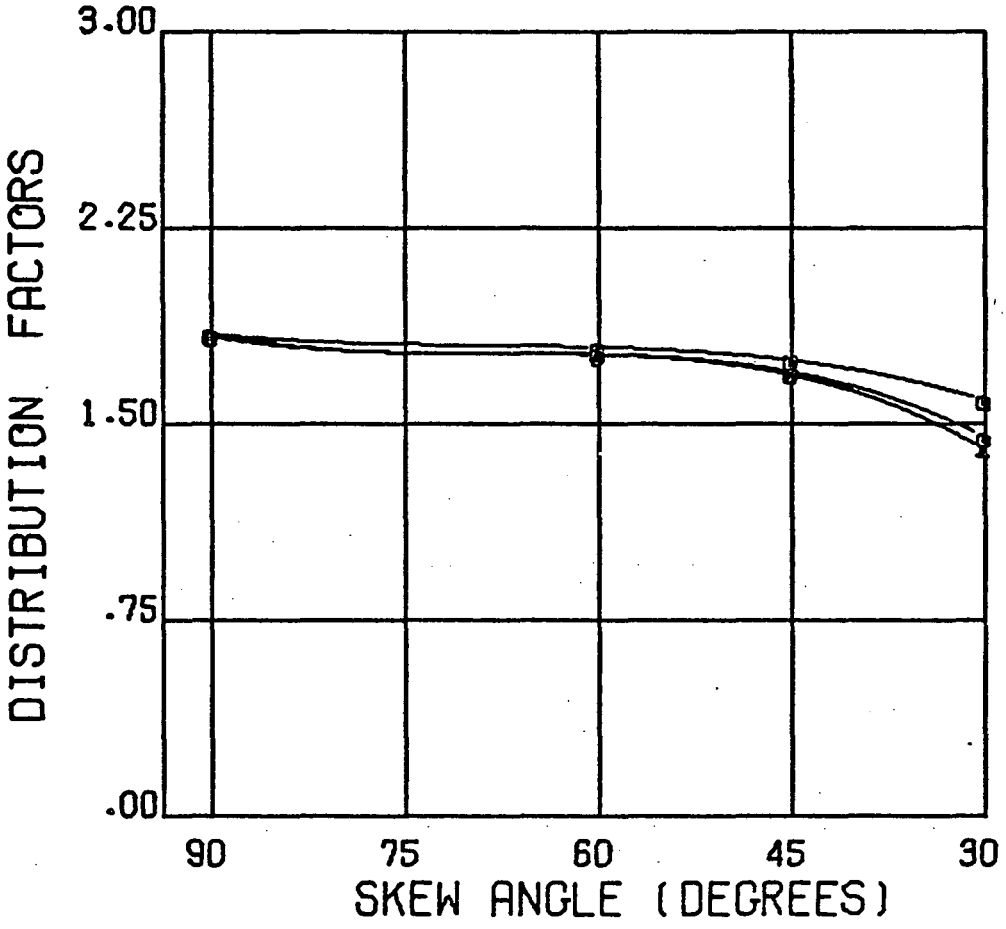
Fig. 82 Maximum Interior Beam Distribution Factors
Bridge Nos. 10, 11 and 12



48 FT. WIDE 9 BEAMS 72.00 SPACING

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	105.00	28/63	.0571
○	60.00	20/39	.1000
▲	42.00	20/30	.1429

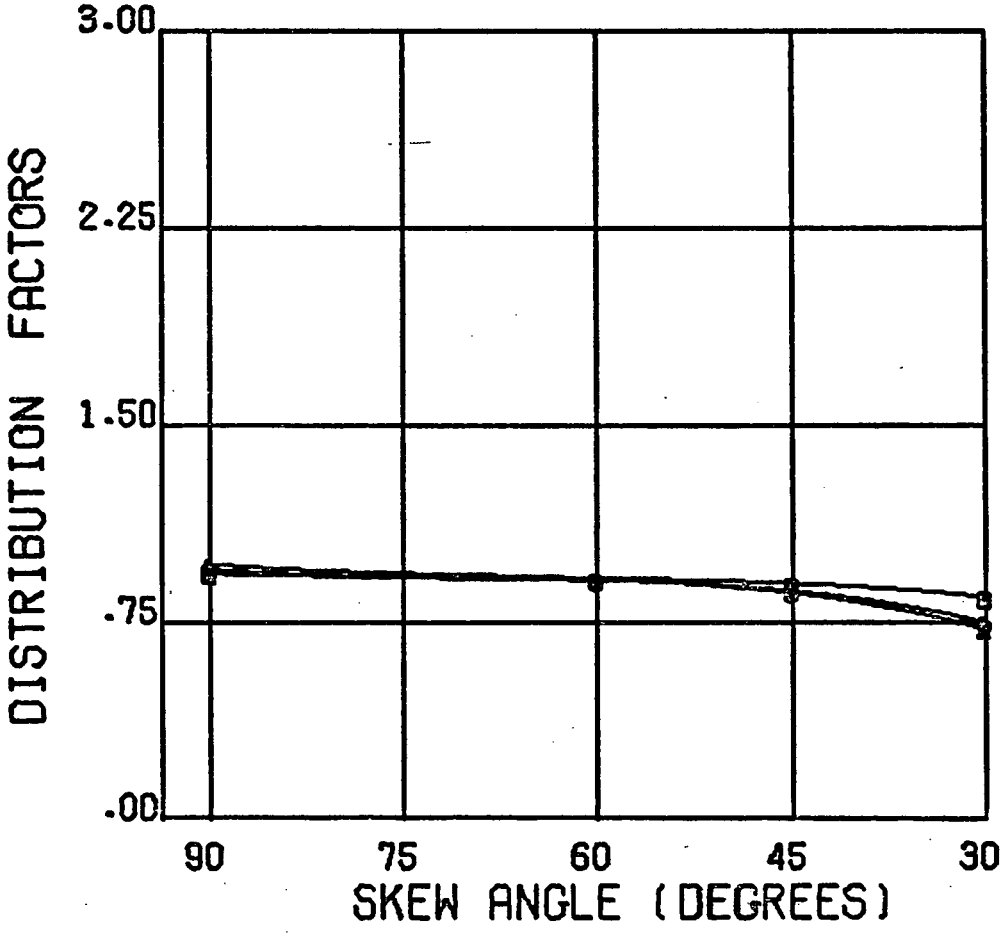
Fig. 83 Maximum Interior Beam Distribution Factors
Bridge Nos. 13, 14 and 15



48 FT. WIDE 6 BEAMS 96.00 SPACING

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
○	96.00	AASHO-6	.0833
○	57.60	24/45	.1389
▲	38.40	20/33	.2083

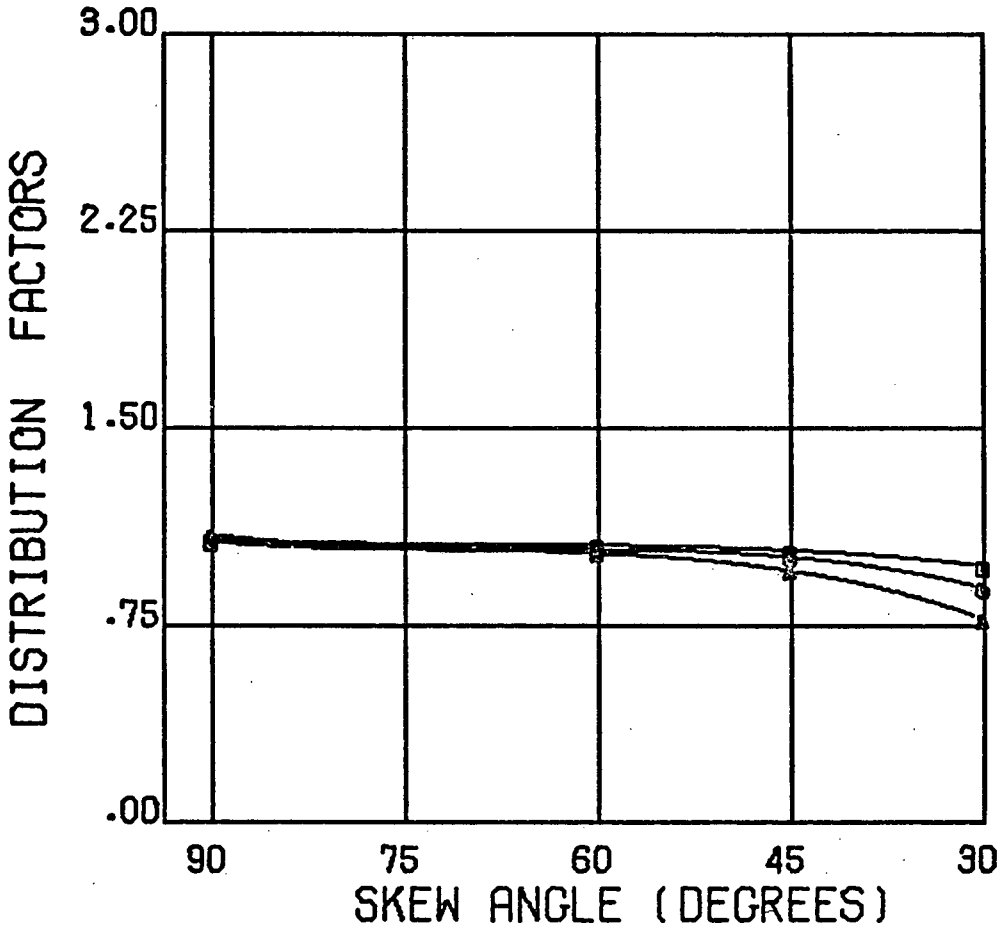
Fig. 84 Maximum Interior Beam Distribution Factors
Bridge Nos. 16, 17 and 18



72 FT. WIDE 16 BEAMS 57.60 SPACING

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
■	120.00	AASHO-6	.0400
●	57.60	20/36	.0833
▲	38.40	AASHO-1	.1250

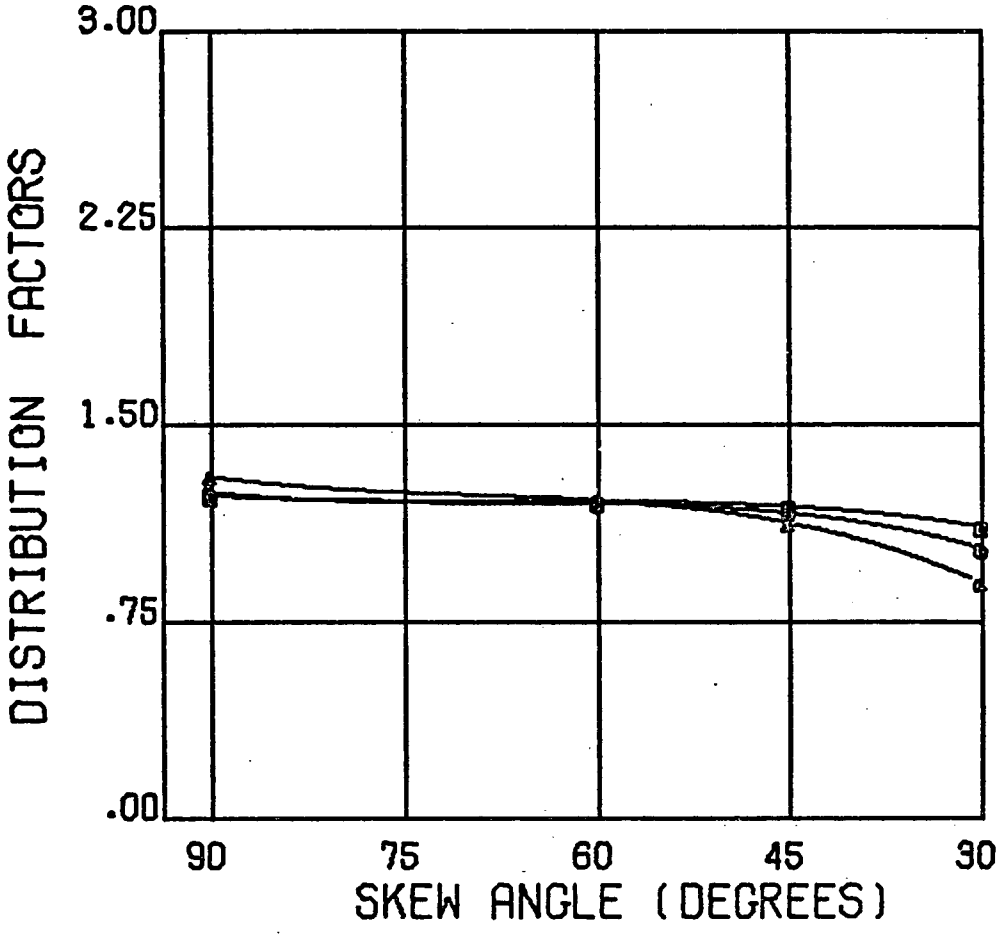
Fig. 85 Maximum Interior Beam Distribution Factors
Bridge Nos. 19, 20 and 21



72 FT. WIDE 14 BEAMS 66.50 SPACING 7 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
■	110.80	AASHO-6	.0500
●	66.50	24/42	.0833
▲	38.80	AASHO-1	.1428

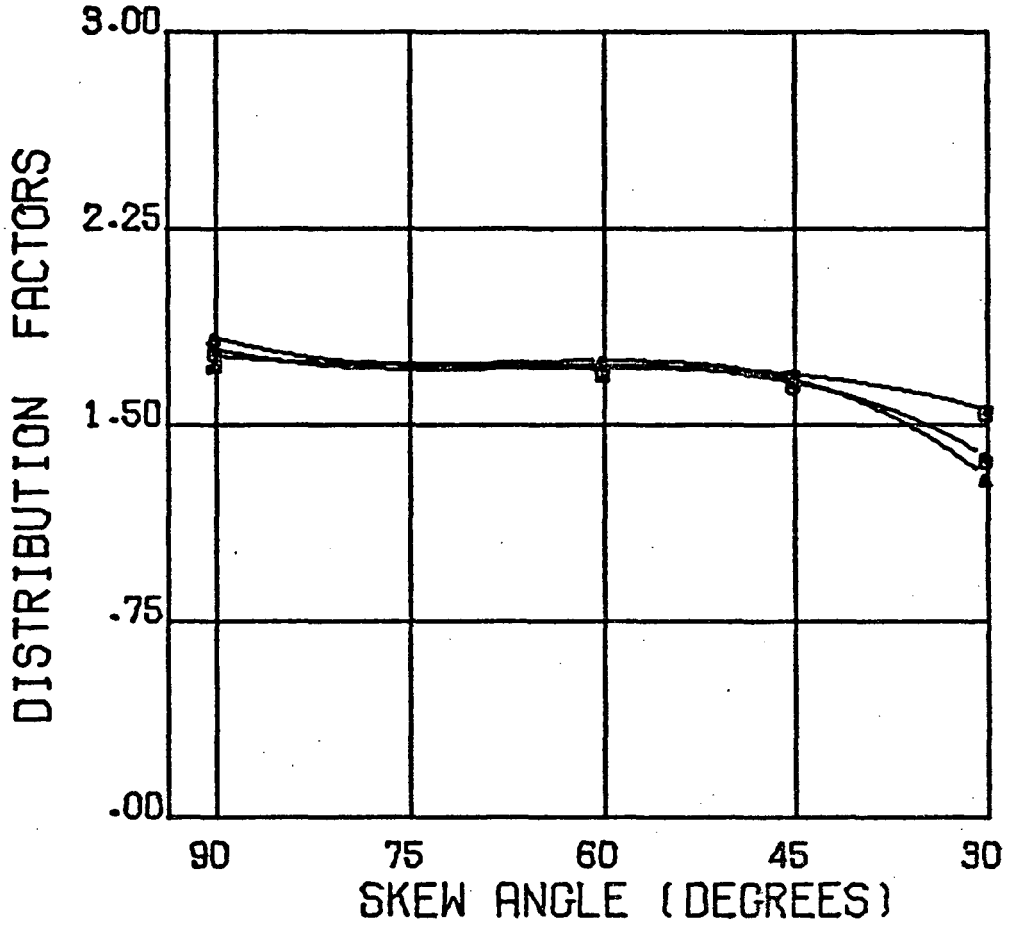
Fig. 86 Maximum Interior Beam Distribution Factors
Bridge Nos. 22, 23 and 24



72 FT. WIDE 12 BEAMS 78.50 SPACING

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
@	114.50	AASHO-6	.0571
●	66.60	24/42	.0999
▲	39.30	20/30	.1665

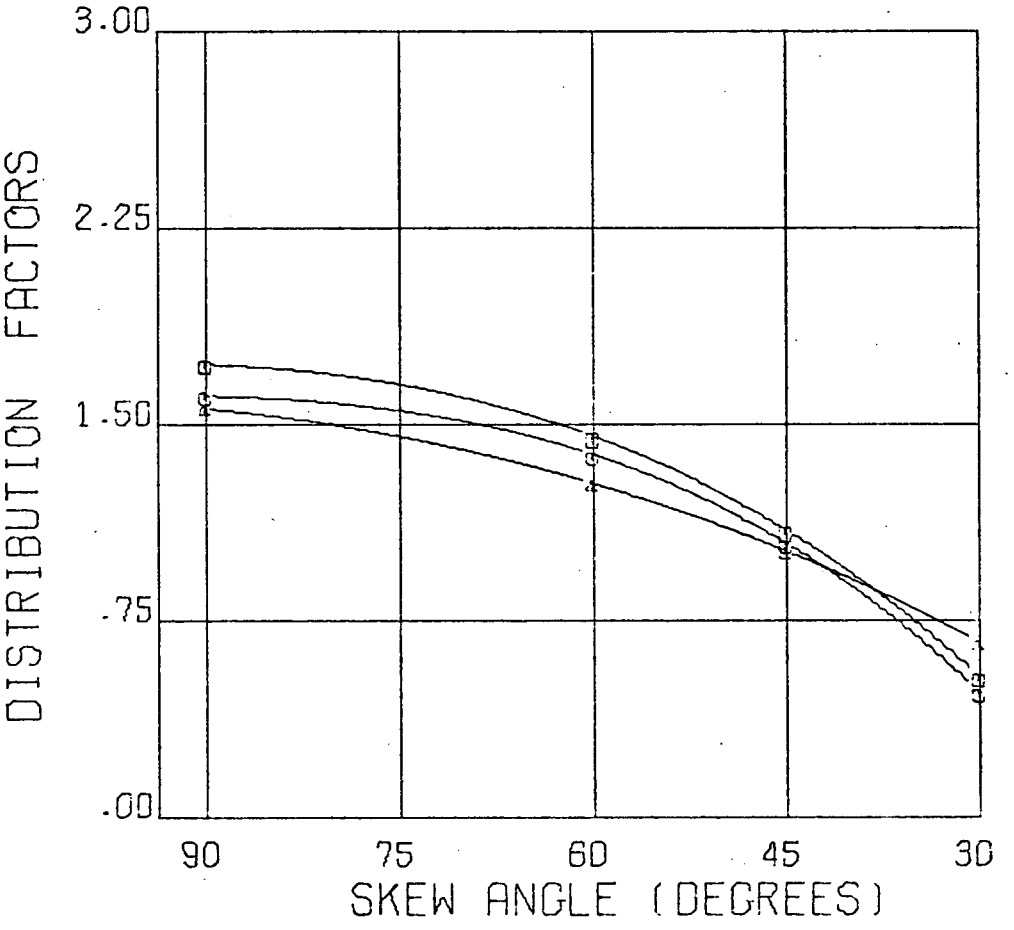
Fig. 87 Maximum Interior Beam Distribution Factors
Bridge Nos. 25, 26 and 27



72 FT. WIDE 9 BEAMS 8.00 SPACING

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
■	108.00	AASHO-6	.0833
●	64.00	24/42	.1667
▲	45.00	24/36	.2000

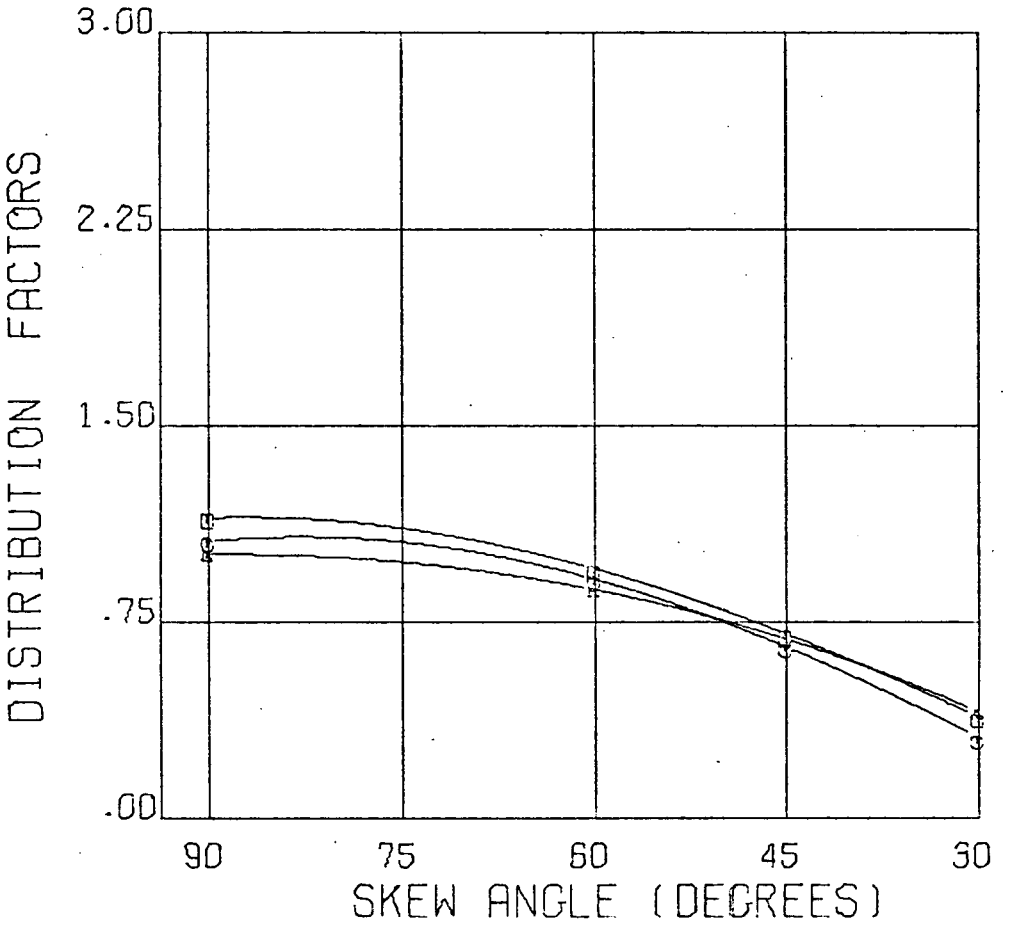
Fig. 88 Maximum Interior Beam Distribution Factors
Bridge Nos. 28, 29 and 30



24 FT. WIDE 3 BEAMS 122.50 SPACING 2 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
◻	40.83	3-48/48	.2500
○	71.46	3-48/48	.1429
△	122.50	3-48/48	.0833

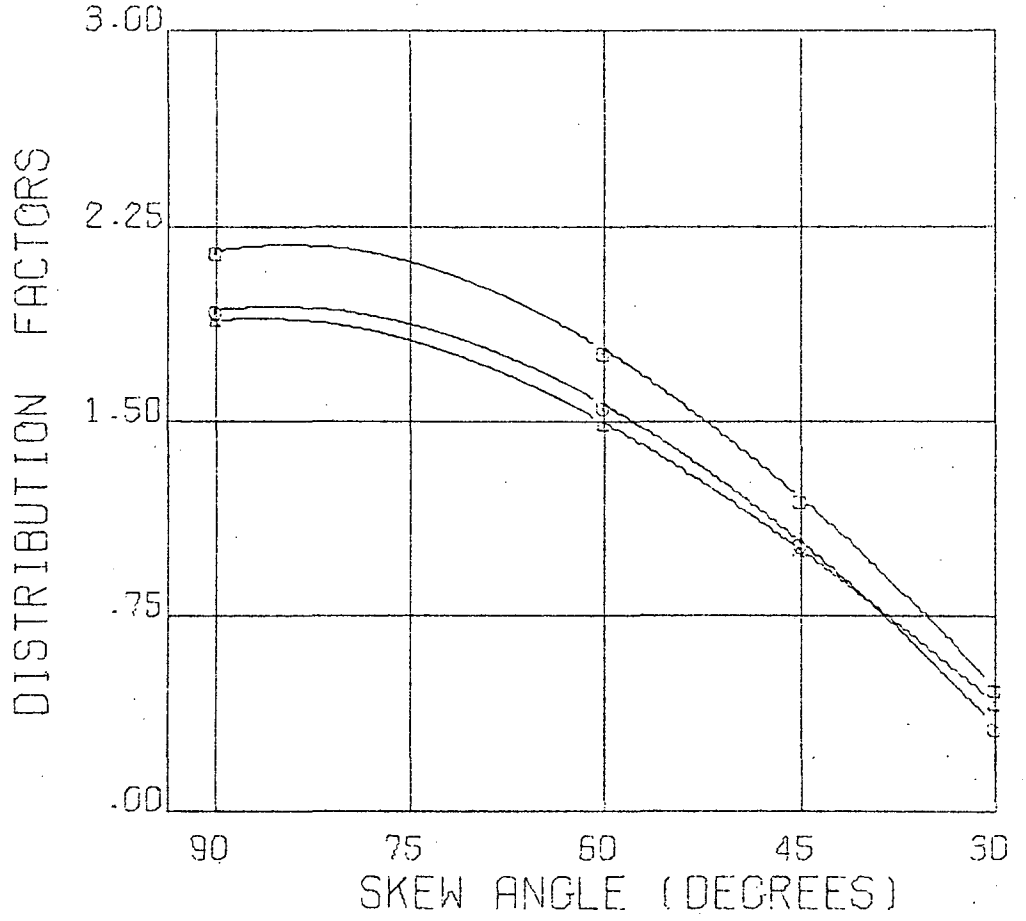
Fig. 89 Interior Box-Beam Distribution Factors
Bridge Nos. 1, 2 and 3



24 FT. WIDE 4 BEAMS 81.67 SPACING 2 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
▫	34.03	4-48/48	.2000
○	47.64	4-48/48	.1429
△	102.08	4-48/48	.0667

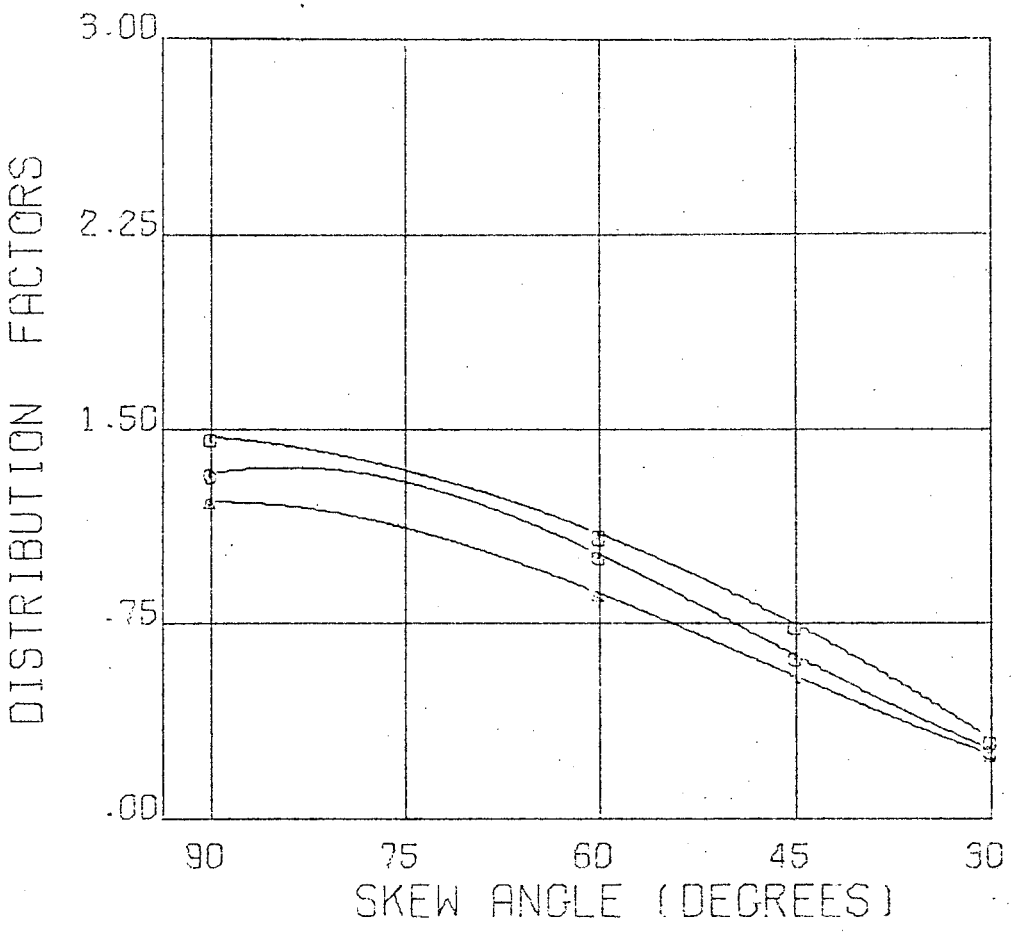
Fig. 90 Interior Box-Beam Distribution Factors
Bridge Nos. 4, 5 and 6



48 FT. WIDE 5 BEAMS 133.25 SPACING 4 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
©	44.42	5-48/48	.2500
©	88.83	5-48/48	.1250
▲	111.04	5-48/48	.1000

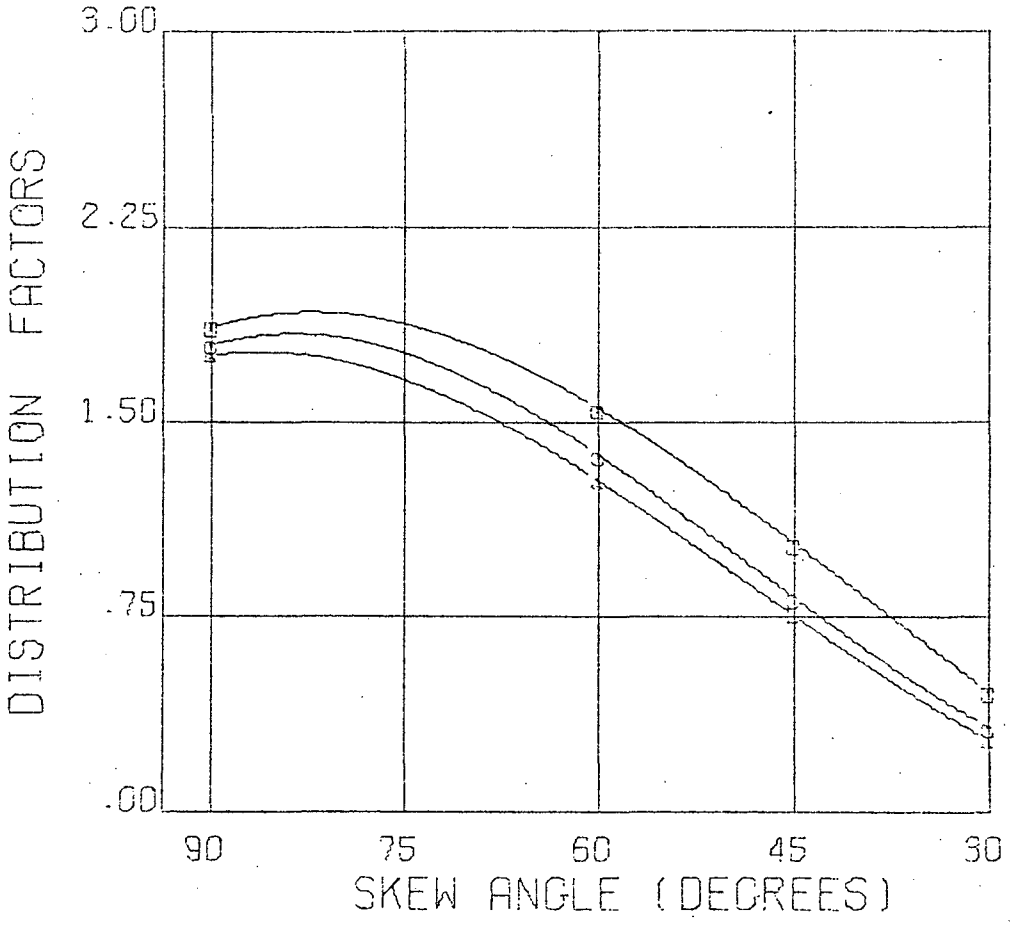
Fig. 91 Interior Box-Beam Distribution Factors
Bridge Nos. 7, 8 and 9



48 FT. WIDE 7 BEAMS 88.83 SPACING 4 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
⊙	37.01	7-48/48	.2000
⊙	59.22	7-48/48	.1250
△	111.03	7-48/48	.0667

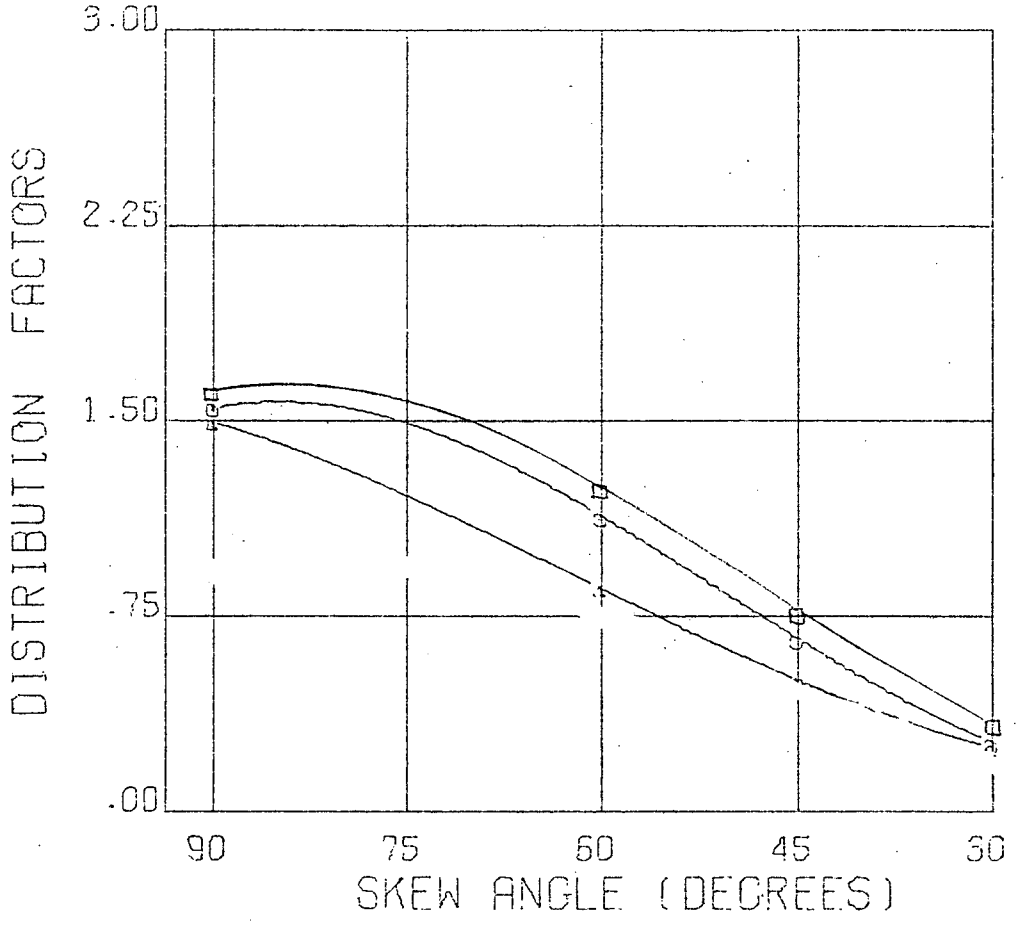
Fig. 92 Interior Box-Beam Distribution Factors
Bridge Nos. 10, 11 and 12



72 FT. WIDE 8 BEAMS 117.29 SPACING 6 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
⊙	39.10	8-48/48	.2500
⊙	78.19	8-48/48	.1250
△	97.74	8-48/48	.1000

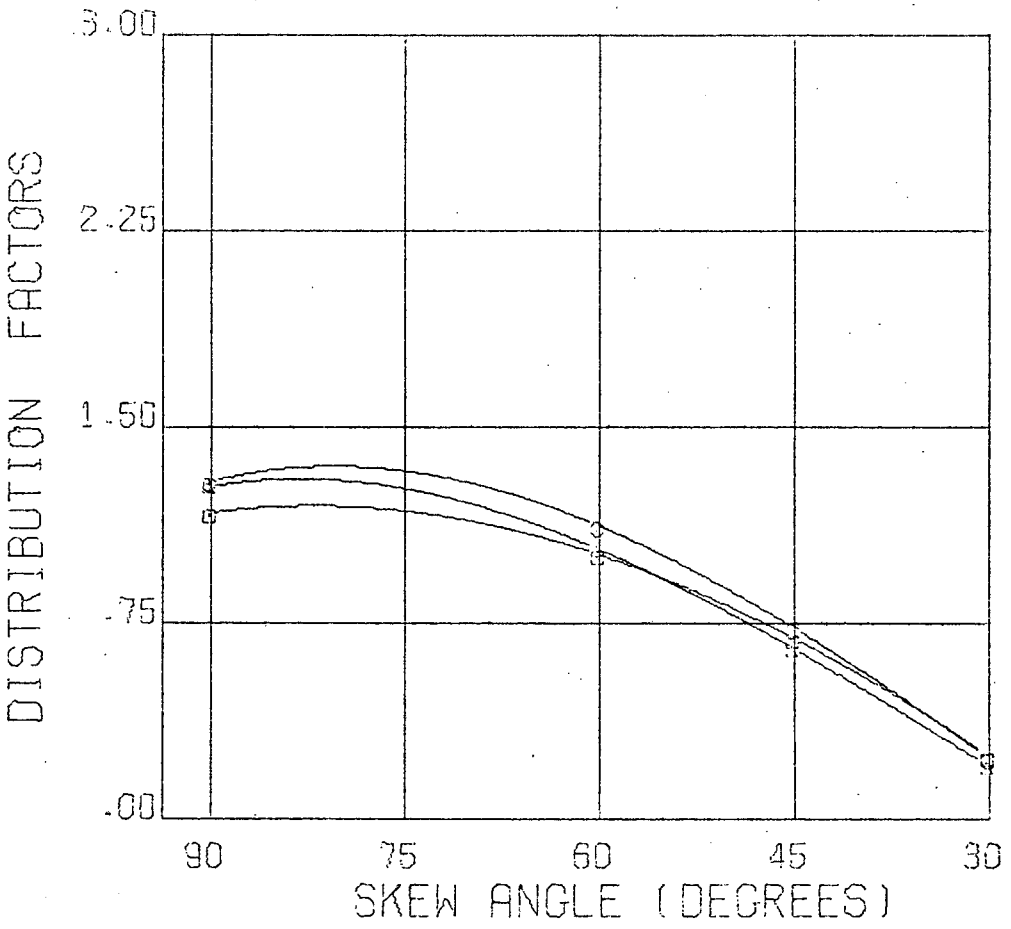
Fig. 93 Interior Box-Beam Distribution Factors
Bridge Nos. 13, 14 and 15



72 FT. WIDE 9 BEAMS 102.62 SPACING 6 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
ⓒ	42.75	9-48/48	.2000
ⓑ	69.42	9-48/48	.1250
ⓐ	123.25	9-48/48	.0667

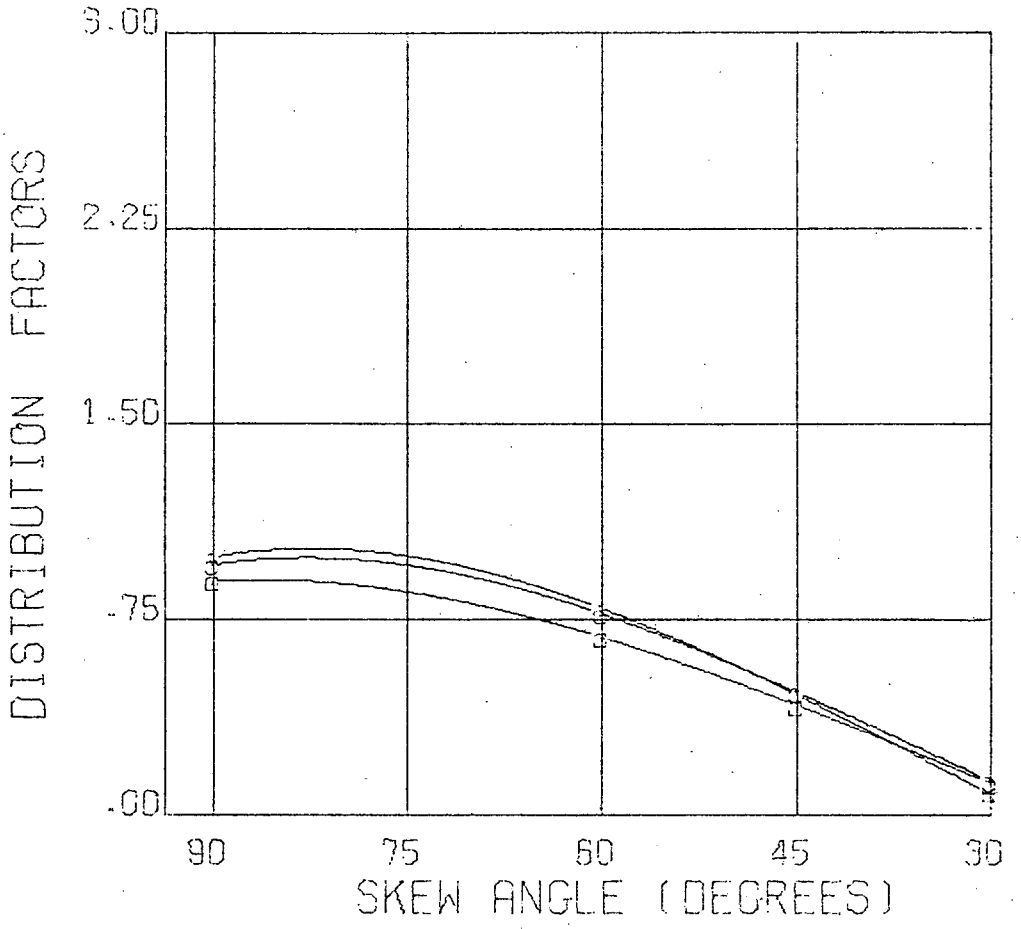
Fig. 94 Interior Box-Beam Distribution Factors
Bridge Nos. 16, 17 and 18



24 FT. WIDE 3 BEAMS 122.50 SPACING 2 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
□	40.83	3-48/48	.2500
○	71.46	3-48/48	.1429
△	122.50	3-48/48	.0833

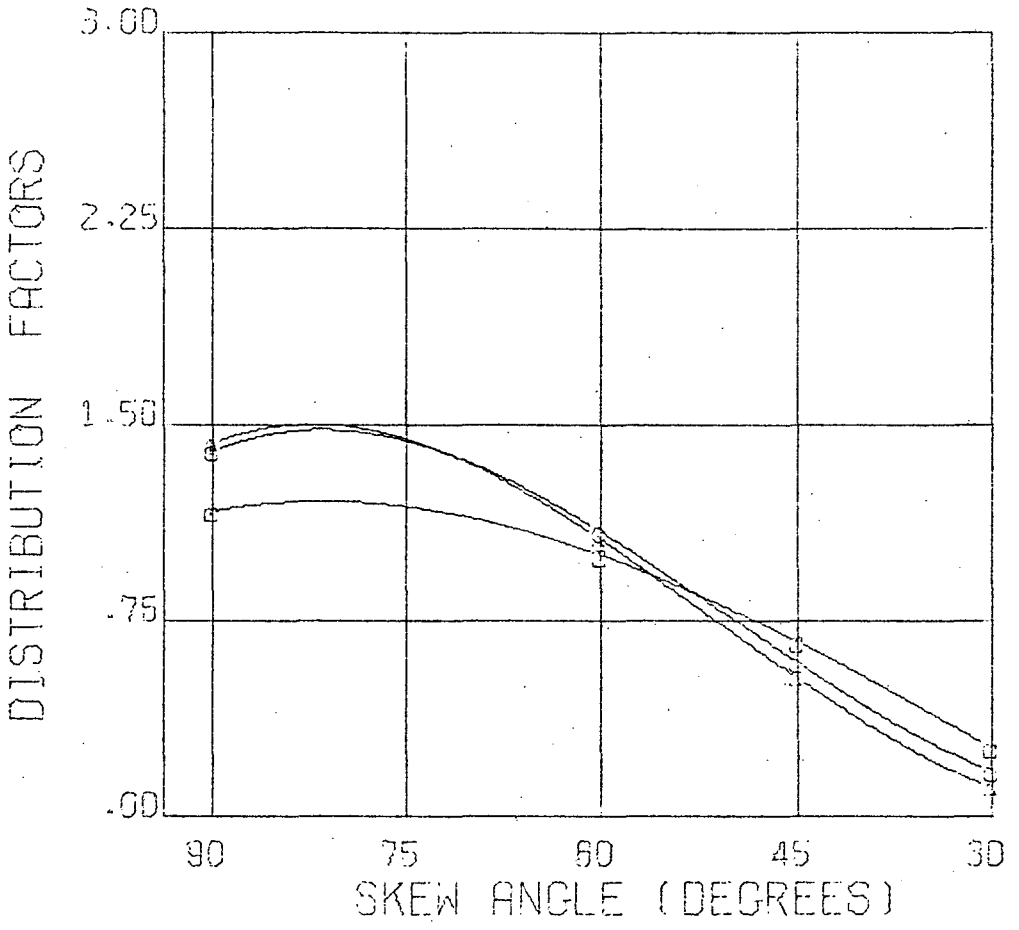
Fig. 95 Exterior Box-Beam Distribution Factors
Bridge Nos. 1, 2 and 3



24 FT. WIDE 4 BEAMS 81.67 SPACING 2 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
⊏	34.03	4-48/48	.2000
⊏	47.54	4-48/48	.1429
△	102.08	4-48/48	.0667

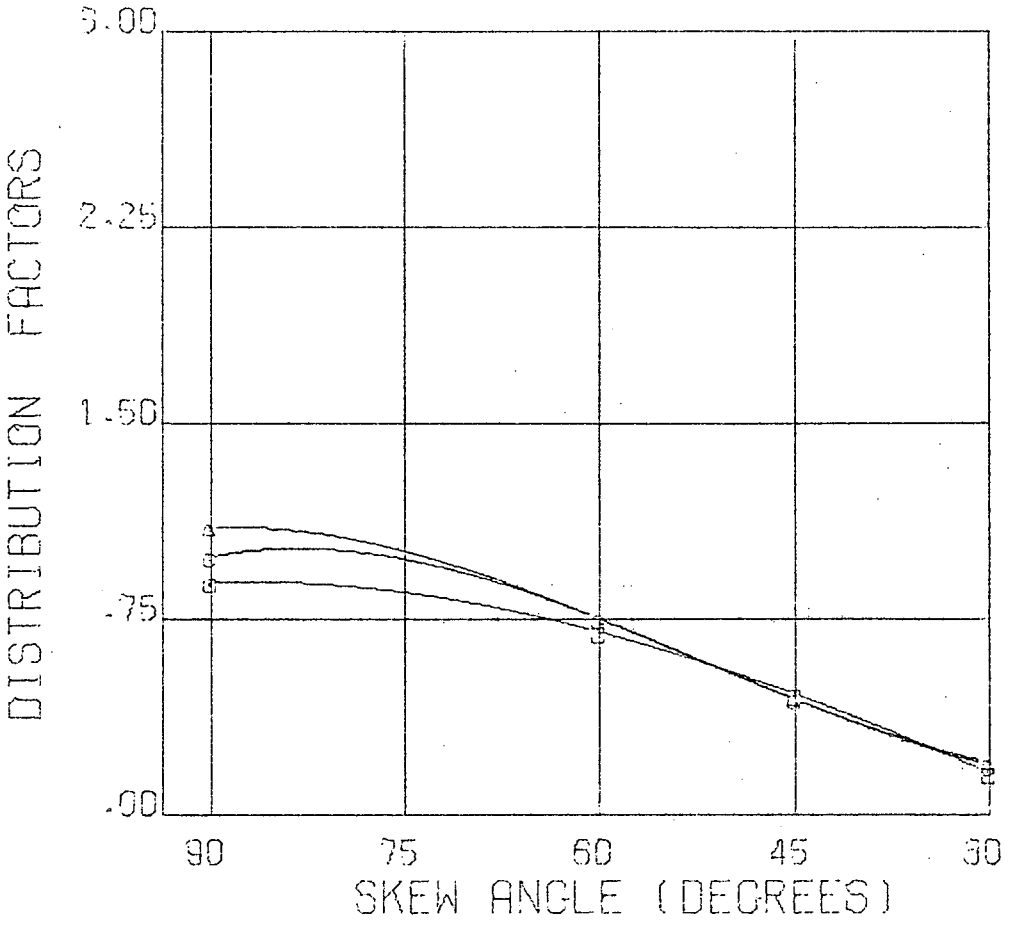
Fig. 96 Exterior Box-Beam Distribution Factors
Bridge Nos. 4, 5 and 6



48 FT. WIDE 5 BEAMS 133.25 SPACING 4 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
⊏	44.42	5--48/48	.2500
⊏	88.83	5--48/48	.1250
△	111.04	5--48/48	.1000

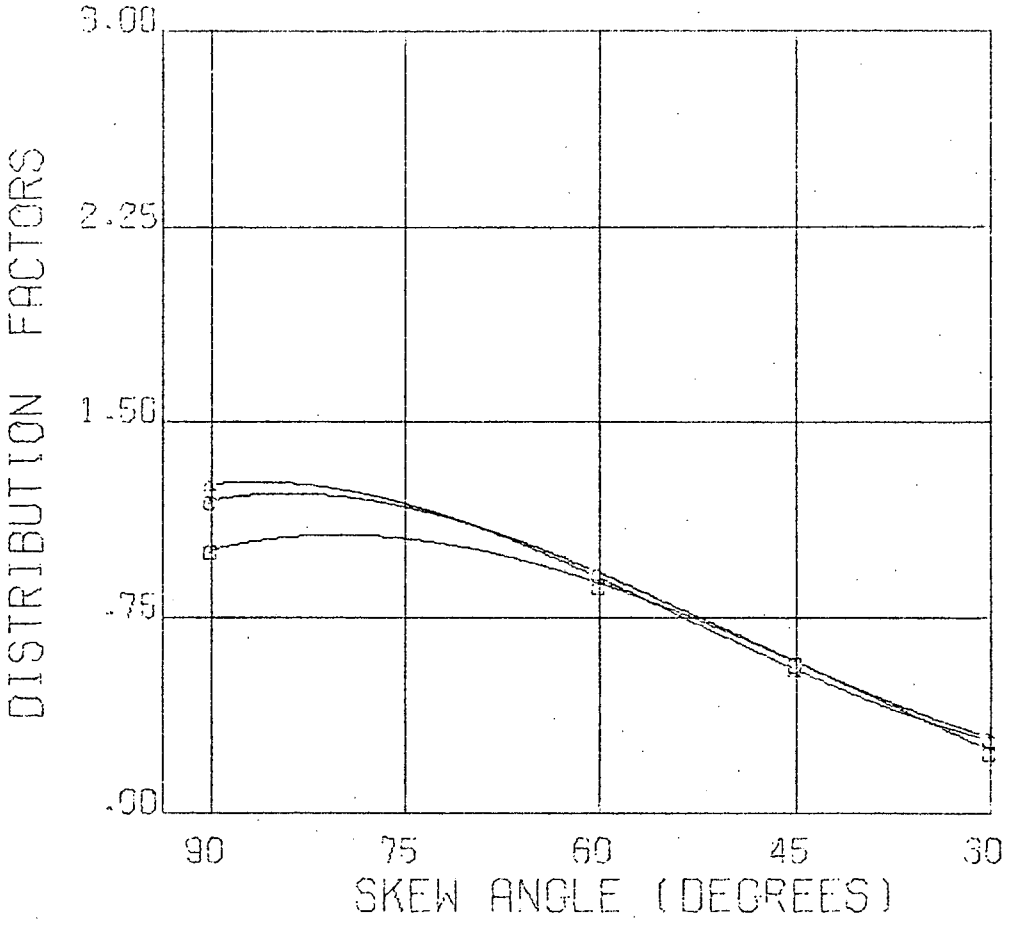
Fig. 97 Exterior Box-Beam Distribution Factors
Bridge Nos. 7, 8 and 9



48 FT. WIDE 7 BEAMS 98.83 SPACING 4 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
□	37.01	7-48/48	.2000
○	59.22	7-48/48	.1250
△	111.03	7-48/48	.0667

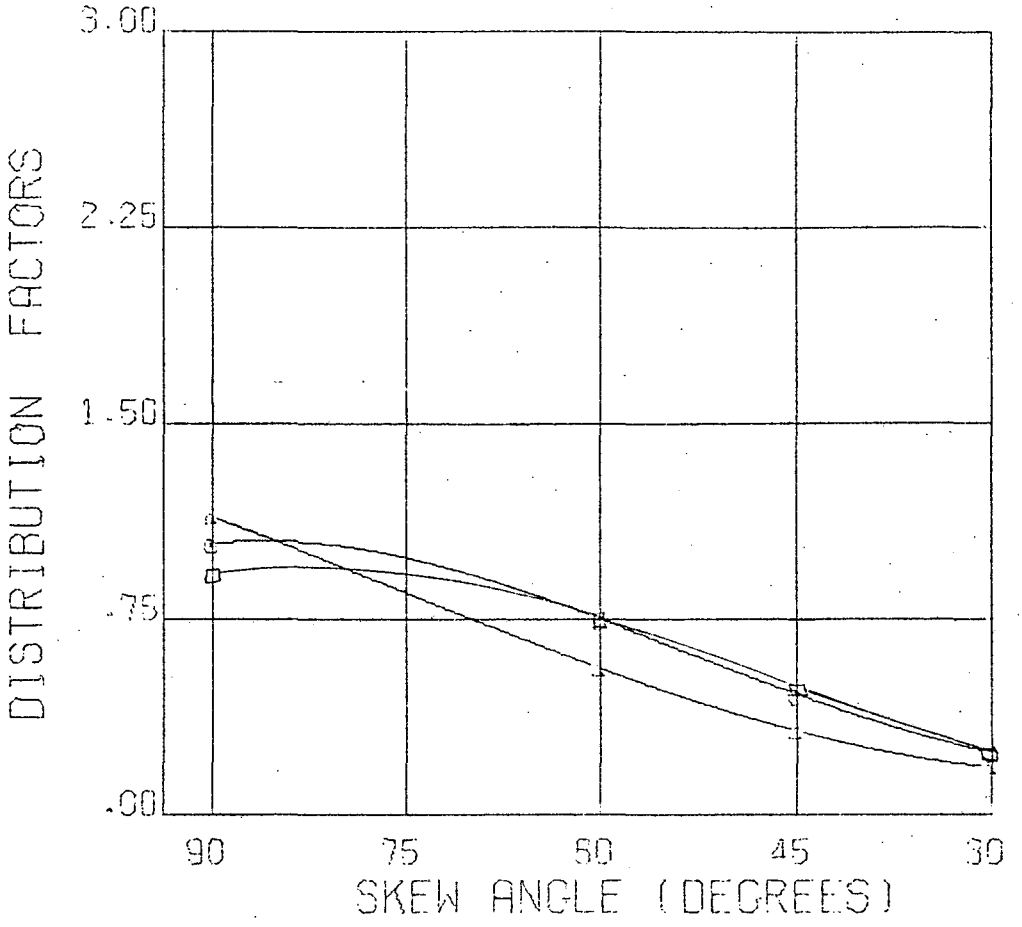
Fig. 98 Exterior Box-Beam Distribution Factors
Bridge Nos. 10, 11 and 12



72 FT. WIDE 9 BEAMS 117.29 SPACING 6 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
⊏	39.10	B-48/48	.2500
⊏	78.19	B-48/48	.1250
△	97.74	B-48/48	.1000

Fig. 99 Exterior Box-Beam Distribution Factors
Bridge Nos. 13, 14 and 15



72 FT. WIDE 9 BEAMS 102.62 SPACING 6 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
E	42.75	9-48/48	.2000
C	68.42	9-48/48	.1250
A	128.25	9-48/48	.0667

Fig. 100 Exterior Box-Beam Distribution Factors
Bridge Nos. 16, 17 and 18

TABLE 1

LIST OF BRIDGES

NO	WIDTH	NB	SPACING	LENGTH	BEAM SIZE	S/L
1	24.00	6	57.60	120.00	AASHO-6	.0400
2	24.00	6	57.60	72.00	24/42	.0667
3	24.00	6	57.60	38.40	20/30	.1250
4	24.00	5	72.00	120.00	AASHO-6	.0500
5	24.00	5	72.00	60.00	20/39	.1000
6	24.00	5	72.00	42.00	20/30	.1429
7	24.00	4	96.00	120.00	AASHO-6	.0667
8	24.00	4	96.00	64.00	24/45	.1250
9	24.00	4	96.00	40.00	20/30	.2000
10	48.00	11	57.60	120.00	AASHO-6	.0400
11	48.00	11	57.60	84.00	24/48	.0571
12	48.00	11	57.60	48.00	20/30	.1000
13	48.00	9	72.00	105.00	28/63	.0571
14	48.00	9	72.00	60.00	20/39	.1000
15	48.00	9	72.00	42.00	20/30	.1429
16	48.00	6	115.20	96.00	AASHO-6	.1000
17	48.00	6	115.20	57.60	24/45	.1667
18	48.00	6	115.20	48.00	20/33	.2000
19	72.00	16	57.60	120.00	AASHO-6	.0400
20	72.00	16	57.60	57.60	20/36	.0833
21	72.00	16	57.60	38.40	AASHO-1	.1250
22	72.00	14	66.50	110.80	AASHO-6	.0500
23	72.00	14	66.50	66.50	24/42	.0833
24	72.00	14	66.50	38.80	AASHO-1	.1429
25	72.00	12	78.50	114.50	AASHO-6	.0571
26	72.00	12	78.50	65.50	24/42	.1000
27	72.00	12	78.50	39.30	20/30	.1667
28	72.00	9	108.00	108.00	AASHO-6	.0833
29	72.00	9	108.00	54.00	24/42	.1667
30	72.00	9	108.00	45.00	24/36	.2000

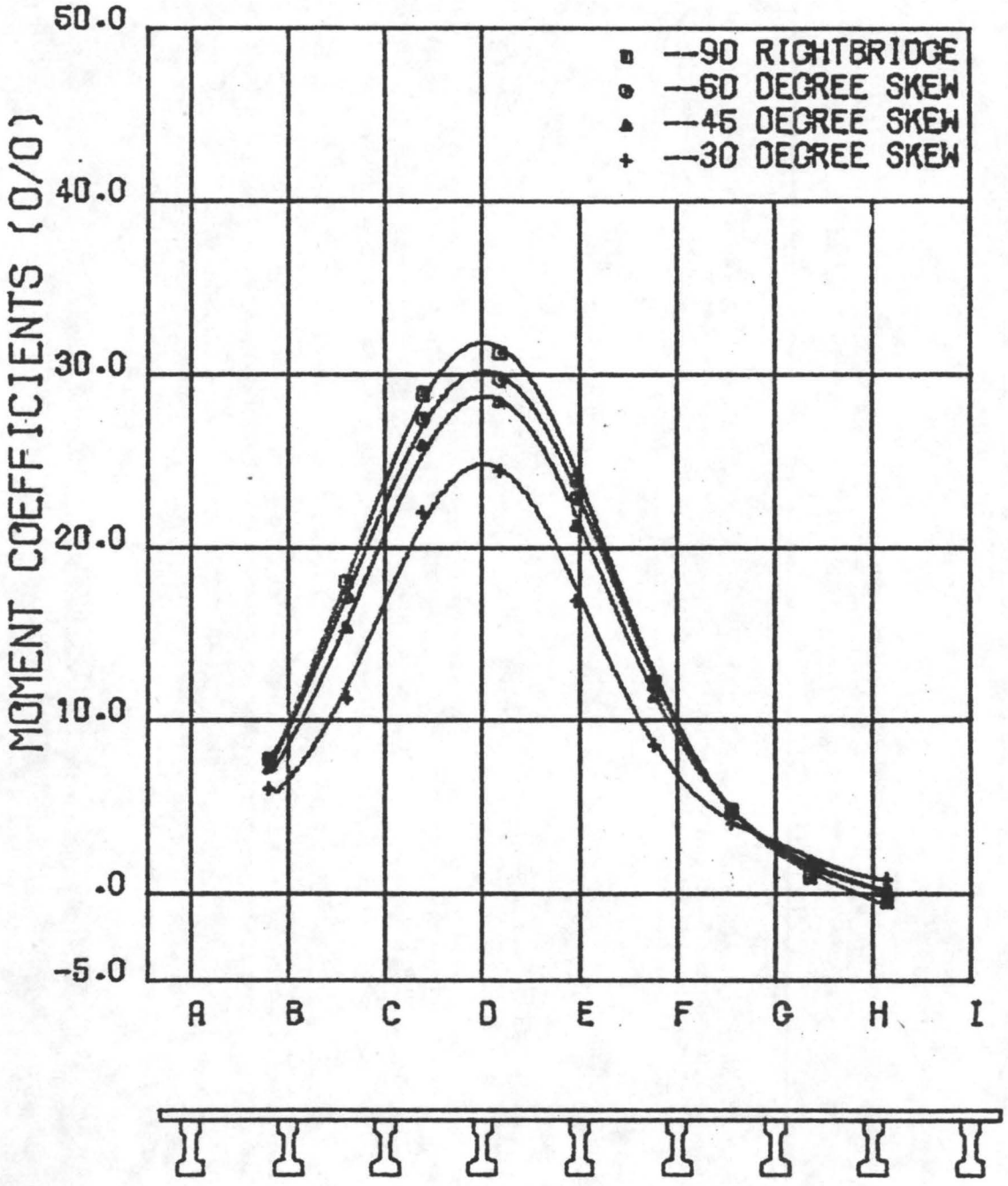


Fig. 20 Influence Lines for Moment - Beam D
(Bridge No. 14)

TABLE 10 (CONT.)

BRIDGE NO. 14

Distribution Factors

SKEW ANGLE	LANES LOADED	EQUATION	MEASURED (F.E Analysis & Influence Coords)		ERROR	O/O REDUCTION
90	1	.69	.69		-.00	.00
60	1	.68	.67	2.90%	.01	2.03
45	1	.65	.63	8.70%	.02	6.10
30	1	.57	.53	23.19%	.03	18.30
90	2	1.06	1.06		.00	.00
60	2	1.04	.99	4.72	.05	2.03
45	2	1.00	.93	12.26%	.07	6.10
30	2	.87	.79	25.47%	.08	18.30
90	3	1.15	1.15		-.00	.00
60	3	1.12	1.12	2.61	.00	2.03
45	3	1.08	1.06	7.83%	.02	6.10
30	3	.94	.86	25.22%	.08	18.30
90	4	1.20	1.20		-.00	.00
60	4	1.18	1.14	5%	.04	2.03
45	4	1.13	1.08	10.0%	.05	6.10
30	4	.98	.89	25.83%	.10	18.30

From PCTR Formula

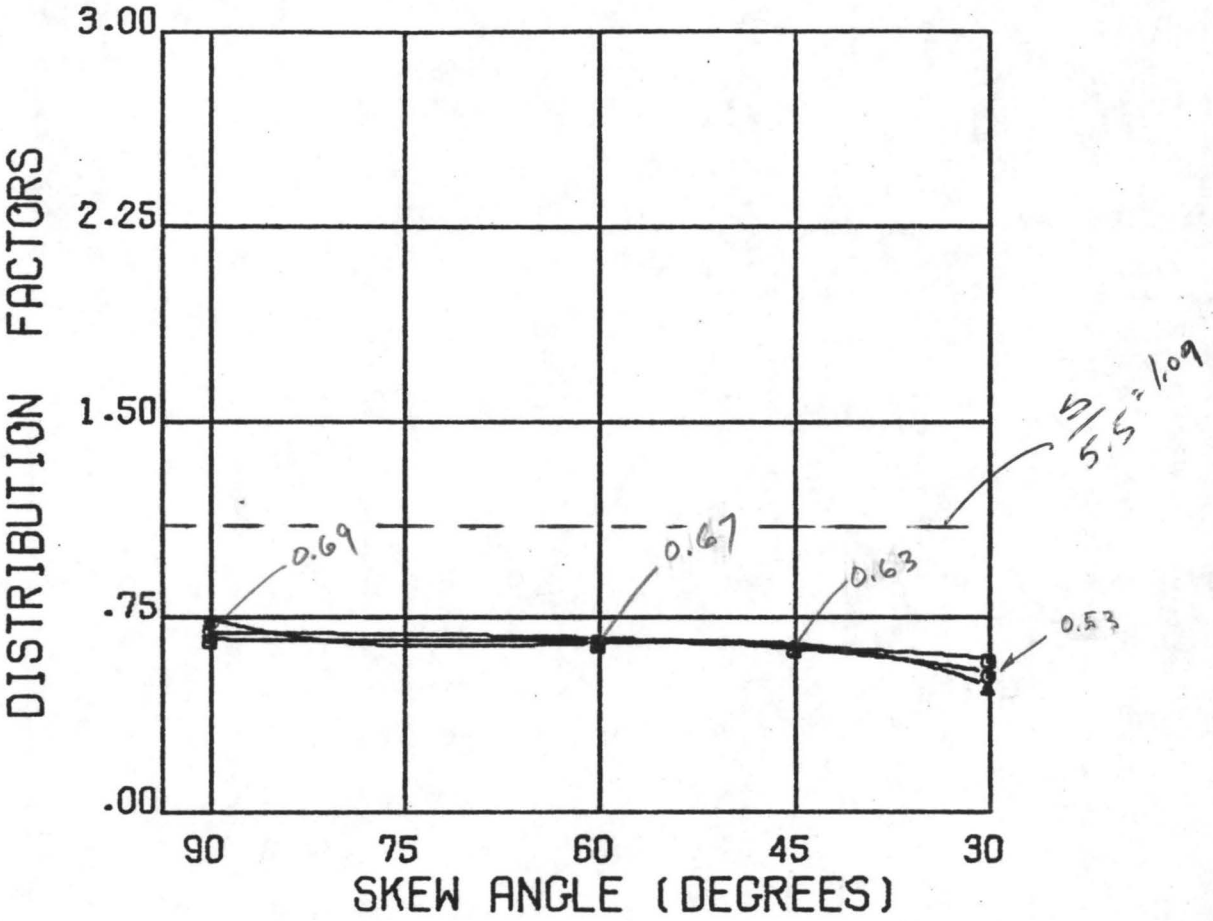
AVG % Reduction Based on Measured #'s

0.0	
3.81	(87.7%)
9.70	(51.0)
24.93	(36.2)

Wheel loads AVG

BRIDGE NO. 15

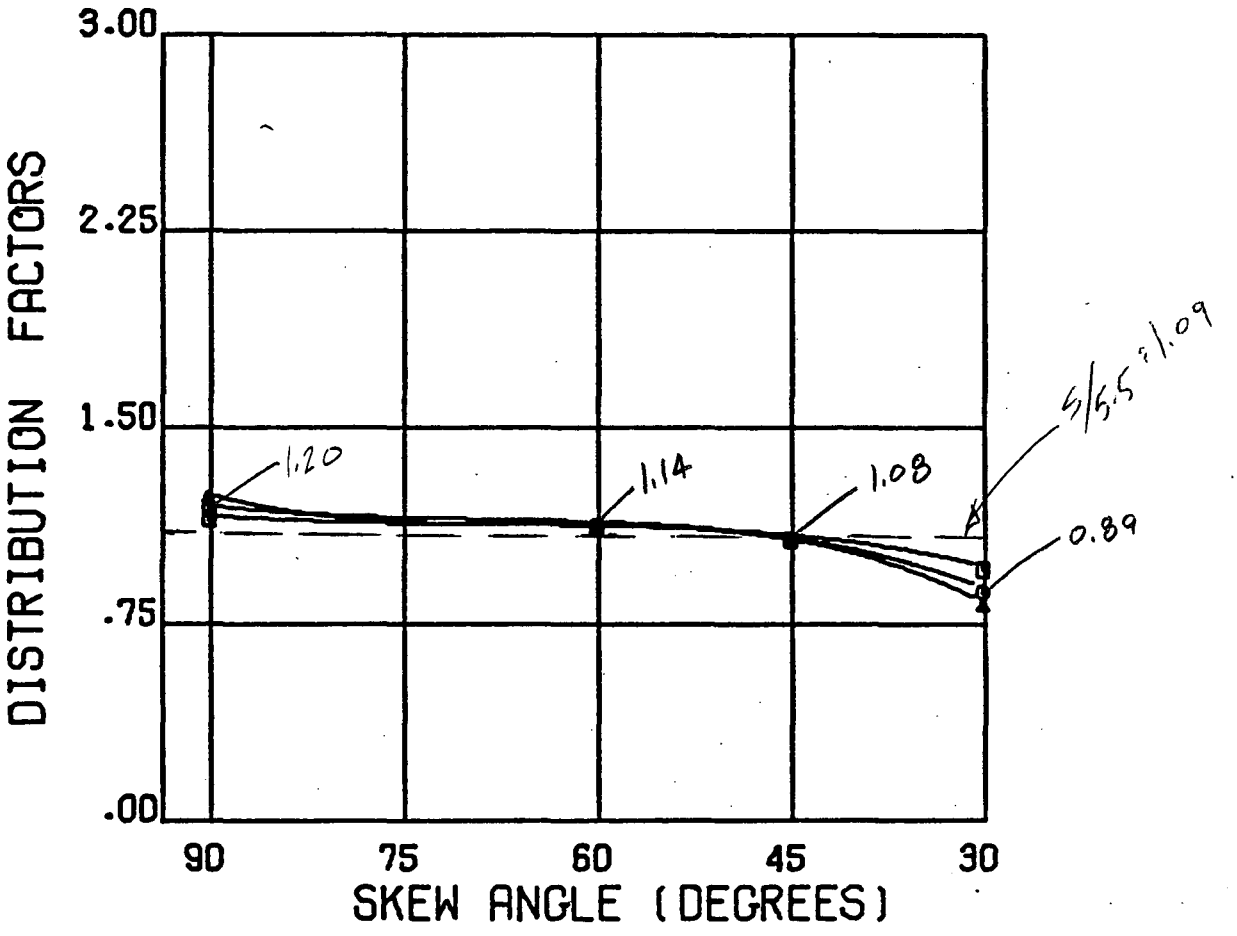
SKEW ANGLE	LANES LOADED	EQUATION	MEASURED	ERROR	O/O REDUCTION
90	1	.74	.74	-.00	.00
60	1	.72	.65	.07	2.91
45	1	.68	.64	.03	8.72
30	1	.55	.48	.07	26.15
90	2	1.16	1.16	-.00	.00
60	2	1.13	1.00	.13	2.91
45	2	1.06	.96	.10	8.72
30	2	.86	.78	.07	26.15
90	3	1.20	1.20	-.00	.00
60	3	1.17	1.13	.04	2.91
45	3	1.10	1.07	.03	8.72
30	3	.89	.83	.06	26.15
90	4	1.24	1.24	-.00	.00
60	4	1.21	1.13	.08	2.91
45	4	1.13	1.07	.06	8.72
30	4	.92	.83	.09	26.15



48 FT. WIDE 9 BEAMS 72.00 SPACING 1 LANE LOADS

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
■	105.00	28/63	.0571
●	60.00	20/39	.1000
▲	42.00	20/30	.1429

Fig. 47 Distribution Factors
Bridge Nos. 13, 14 and 15



48 FT. WIDE 9 BEAMS 72.00 SPACING

SYMBOL	LENGTH(FT)	BEAM SIZE	S/L
■	105.00	28/63	.0571
●	60.00	20/39	.1000
▲	42.00	20/30	.1429

Fig. 83 Maximum Interior Beam Distribution Factors
Bridge Nos. 13, 14 and 15

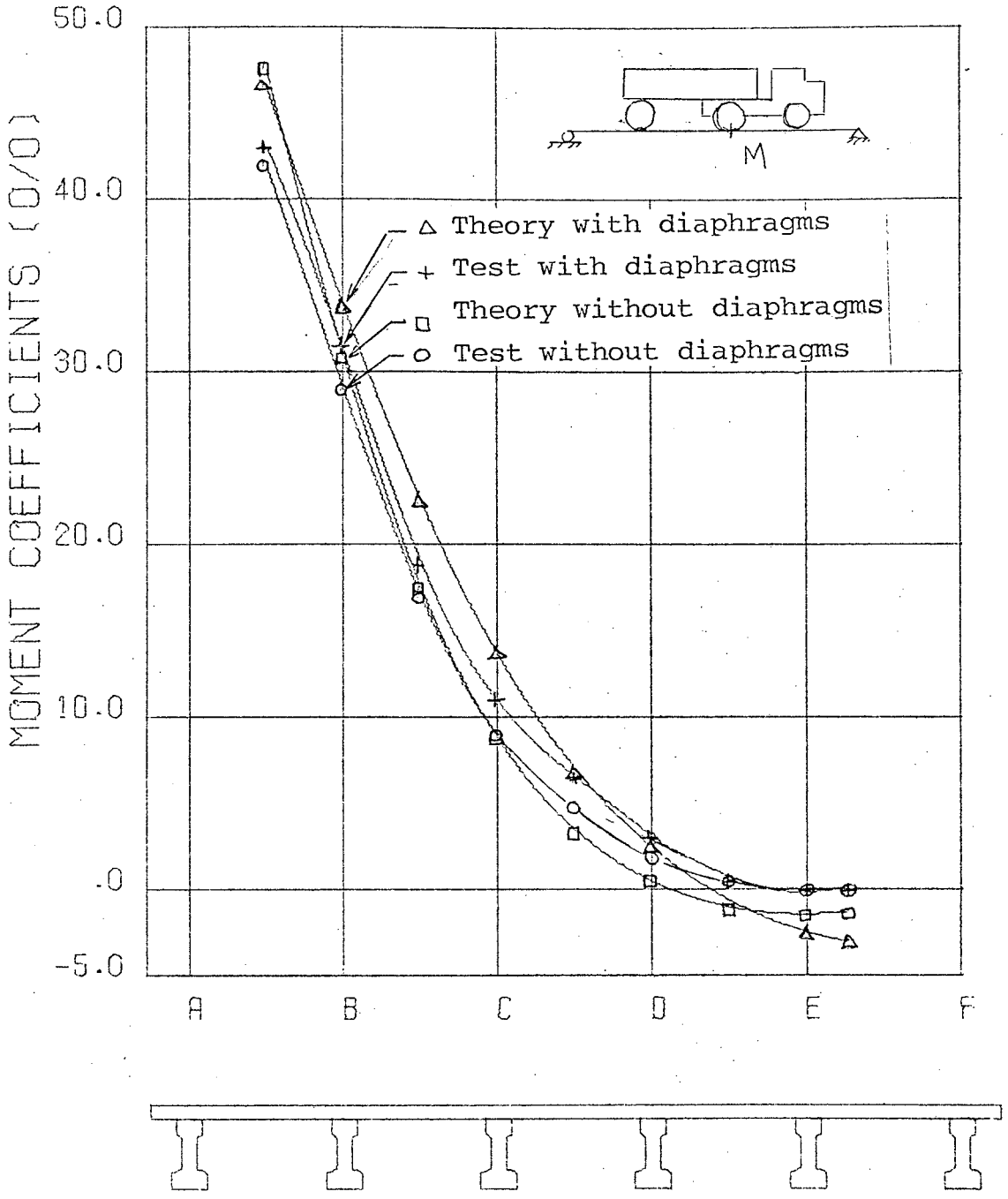


Fig. 101 Influence Lines for Moment with and without Diaphragms - Lehighton Bridge, Beam A

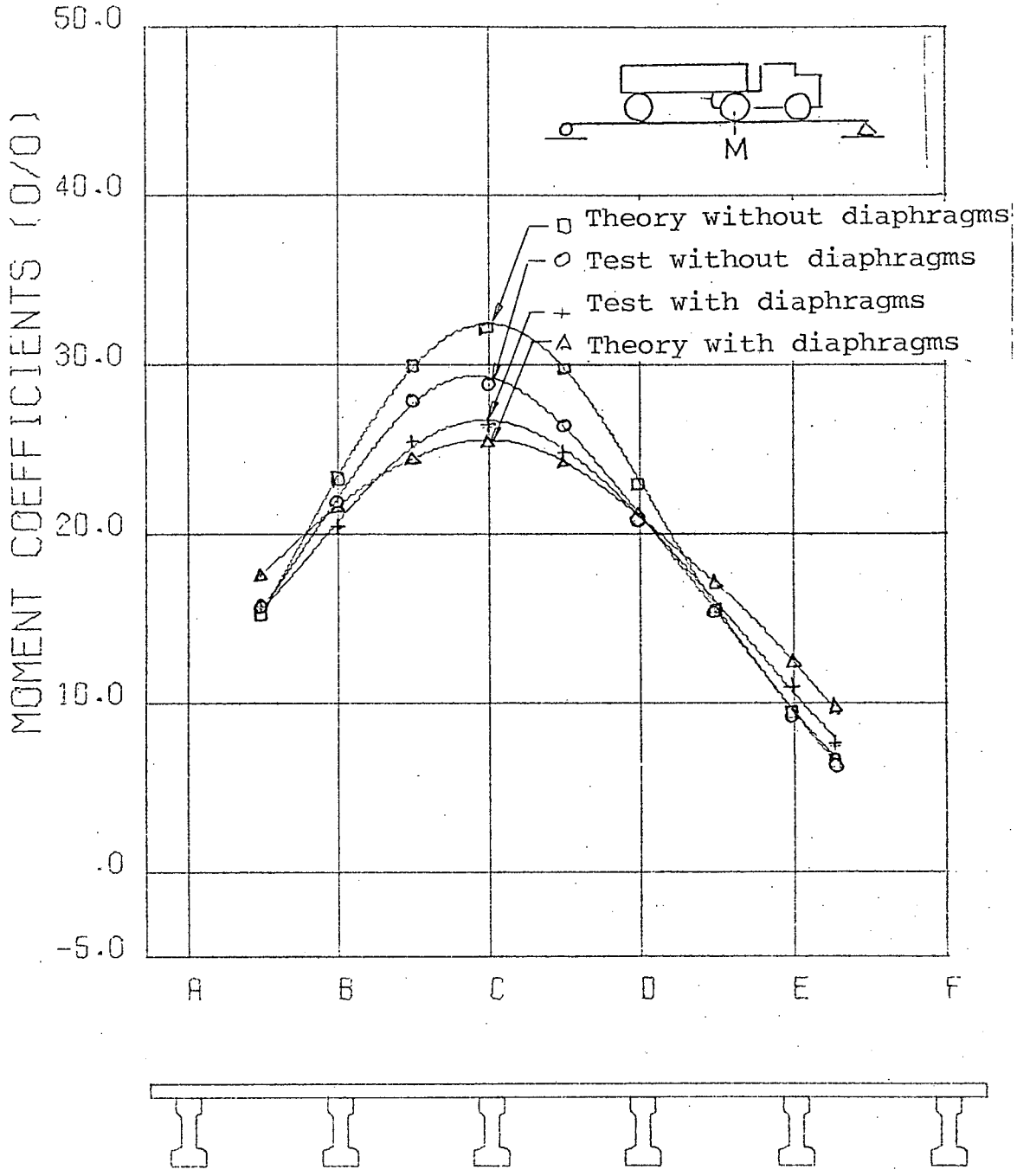


Fig. 102 Influence Lines for Moment with and without Diaphragms - Lehighton Bridge, Beam C

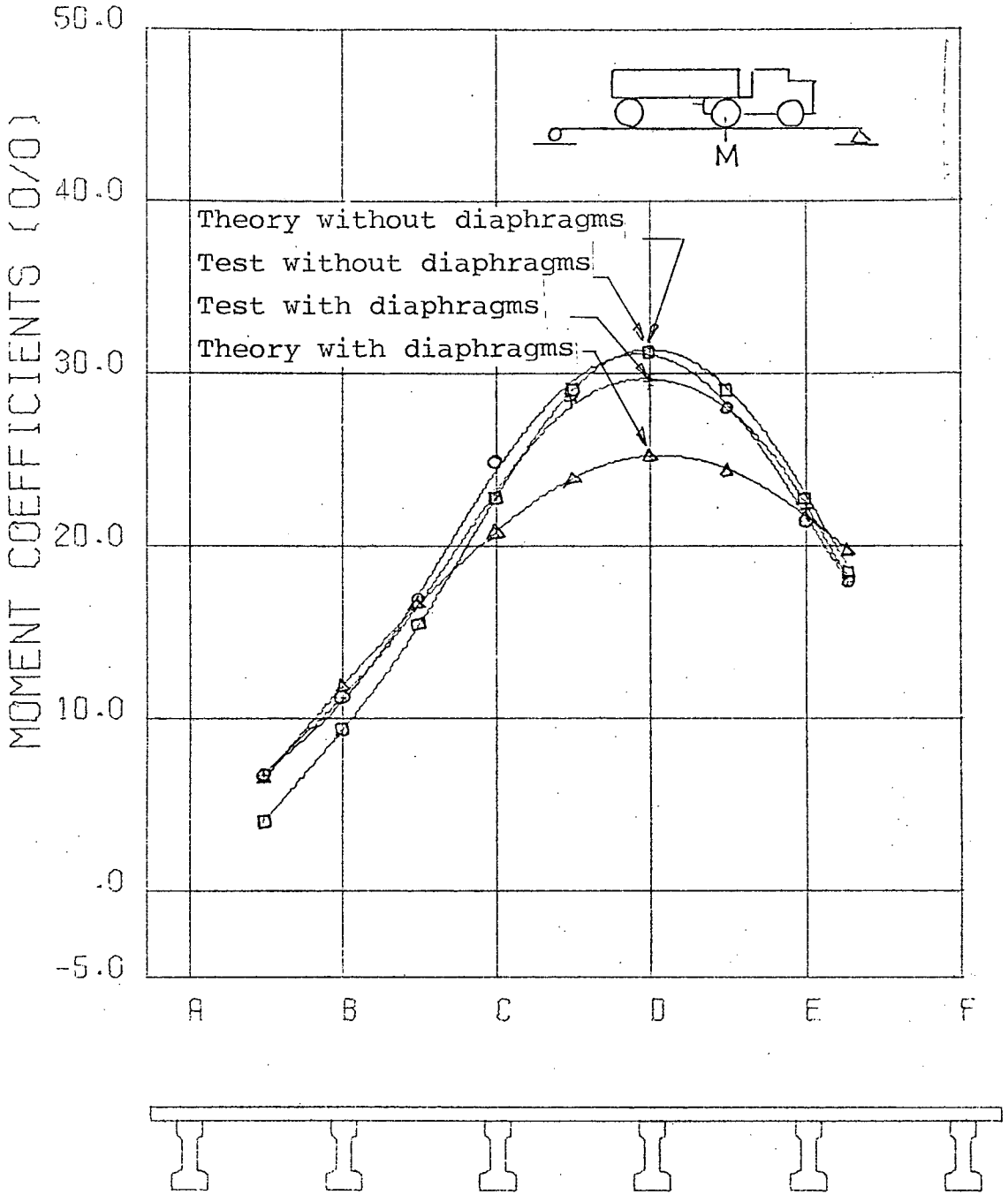
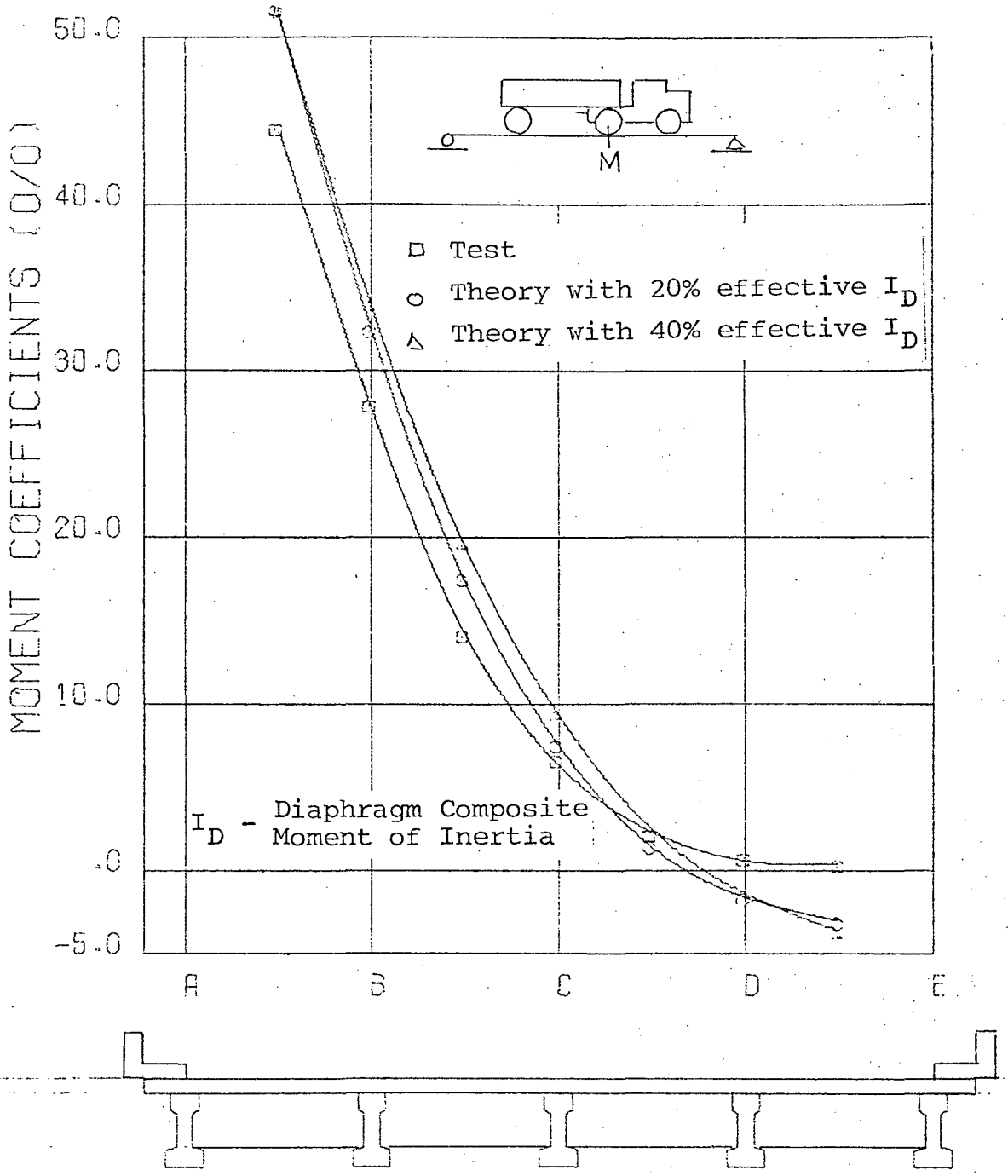


Fig. 103 Influence Lines for Moment with and without Diaphragms - Lehighton Bridge, Beam D



ASSHO-2 SP= 8 FT 0 INS L= 68 FT 5 INS S/L= 1/9

INFLUENCE MOMENT FOR BEAM A

Fig. 104 Influence Lines for Moment with Partially Effective Diaphragms Bartonsville Bridge, Beam A

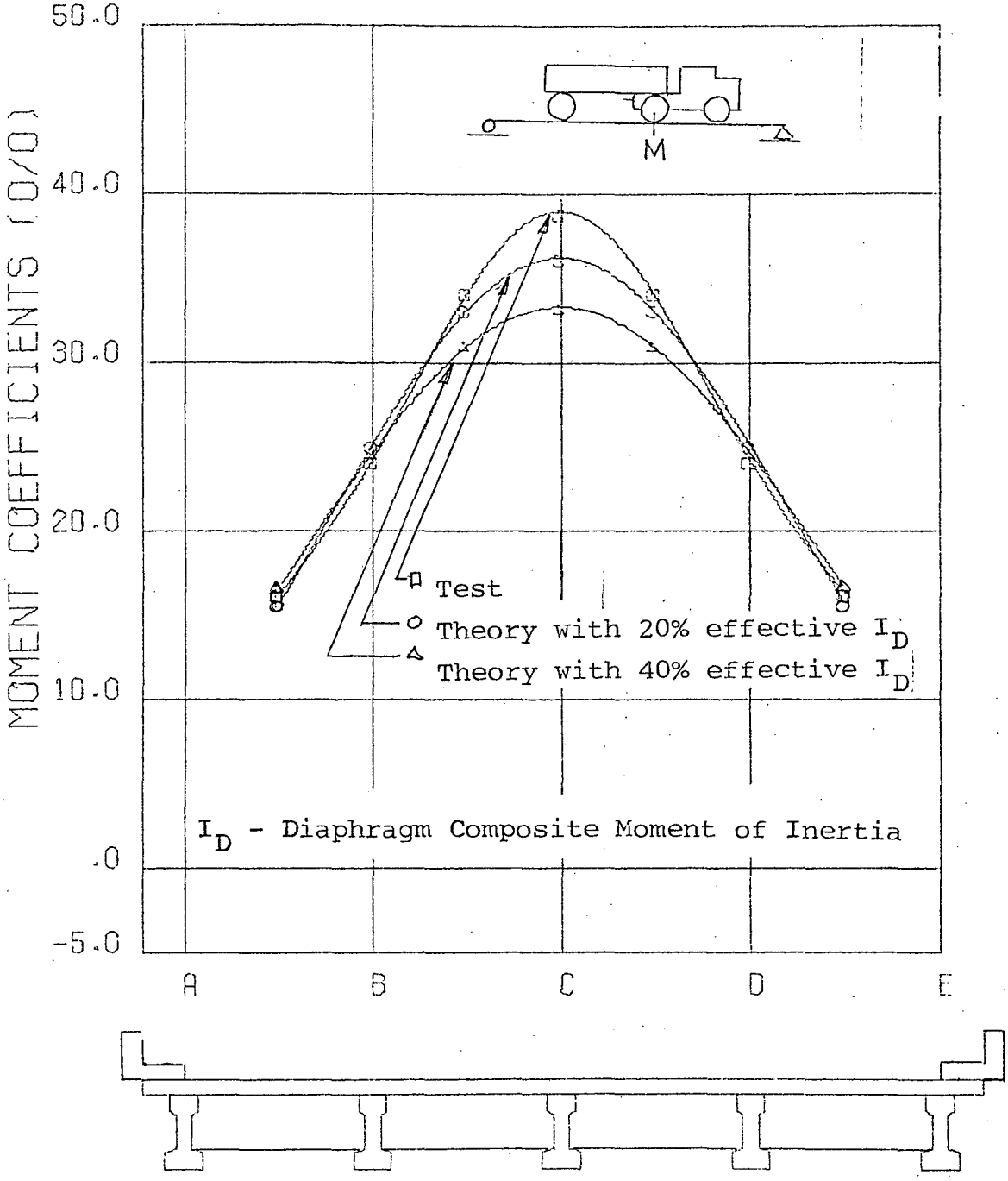


Fig. 105 Influence Lines for Moment with Partially and Fully Effective Diaphragms - Bartonsville Bridge, Beam C

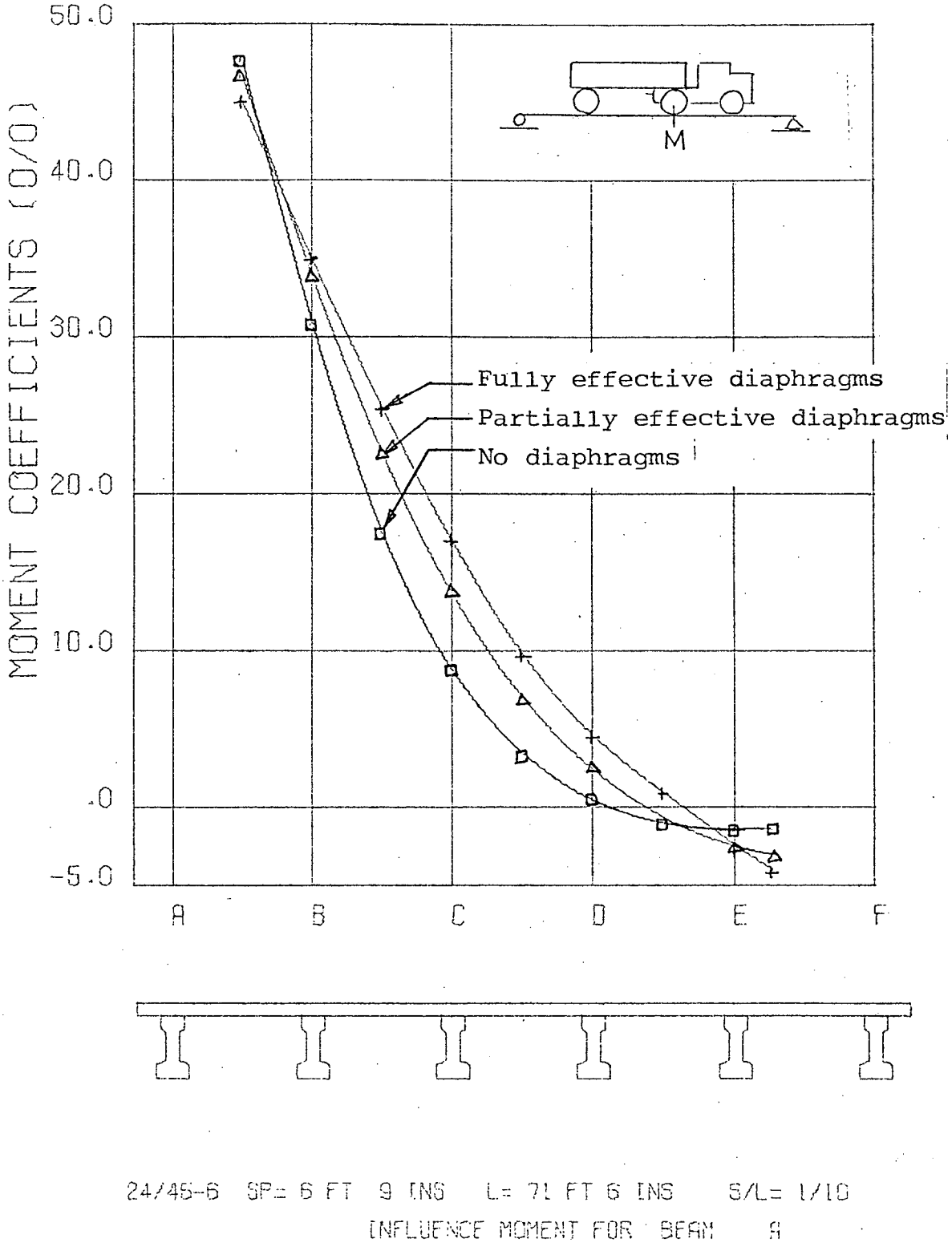


Fig. 106 Influence Lines for Moment with Partially and Fully Effective Diaphragms - Lehighton Bridge, Beam A

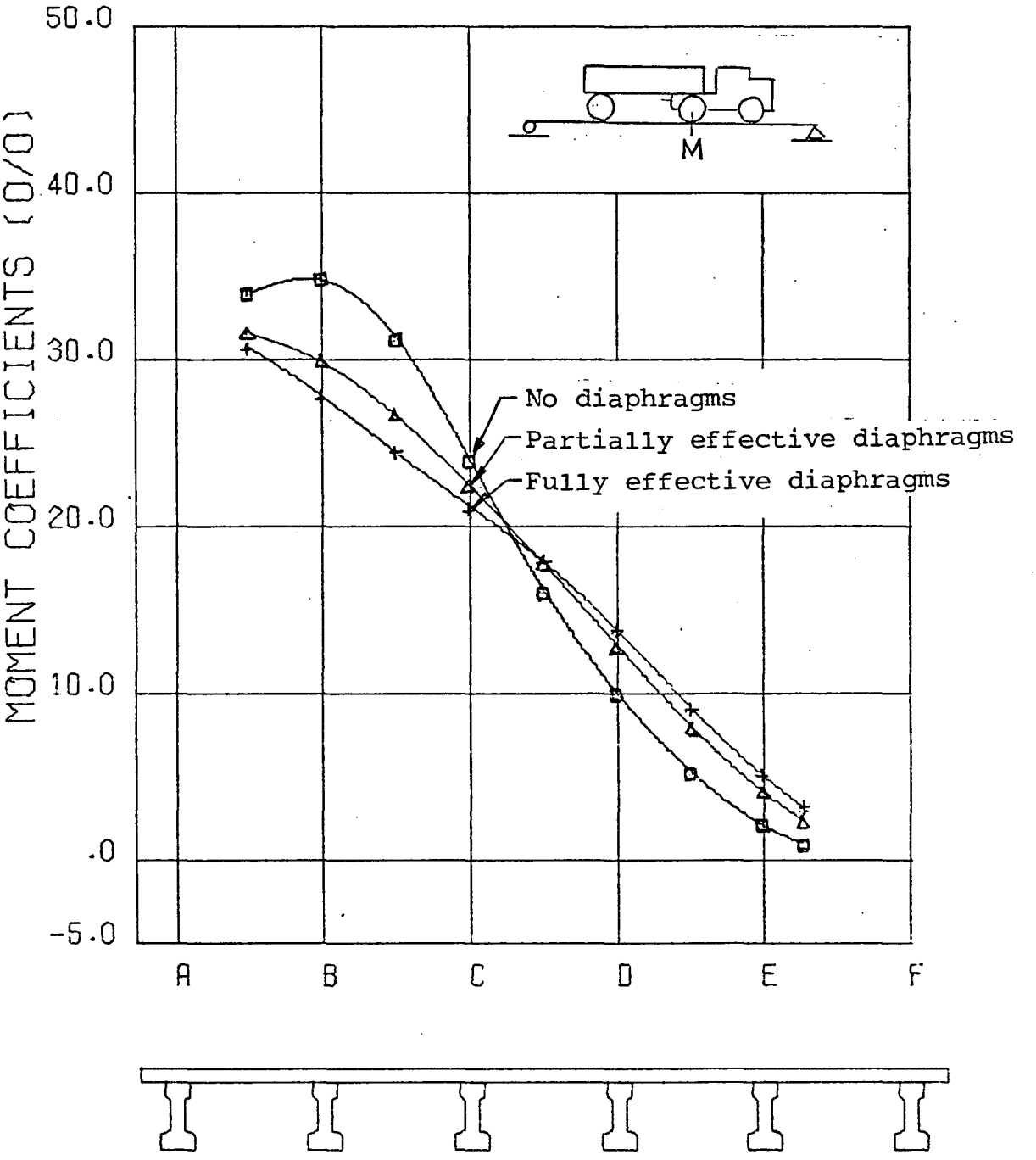


Fig. 107 Influence Lines for Moment with Partially and Fully Effective Diaphragms - Lehighton Bridge, Beam B

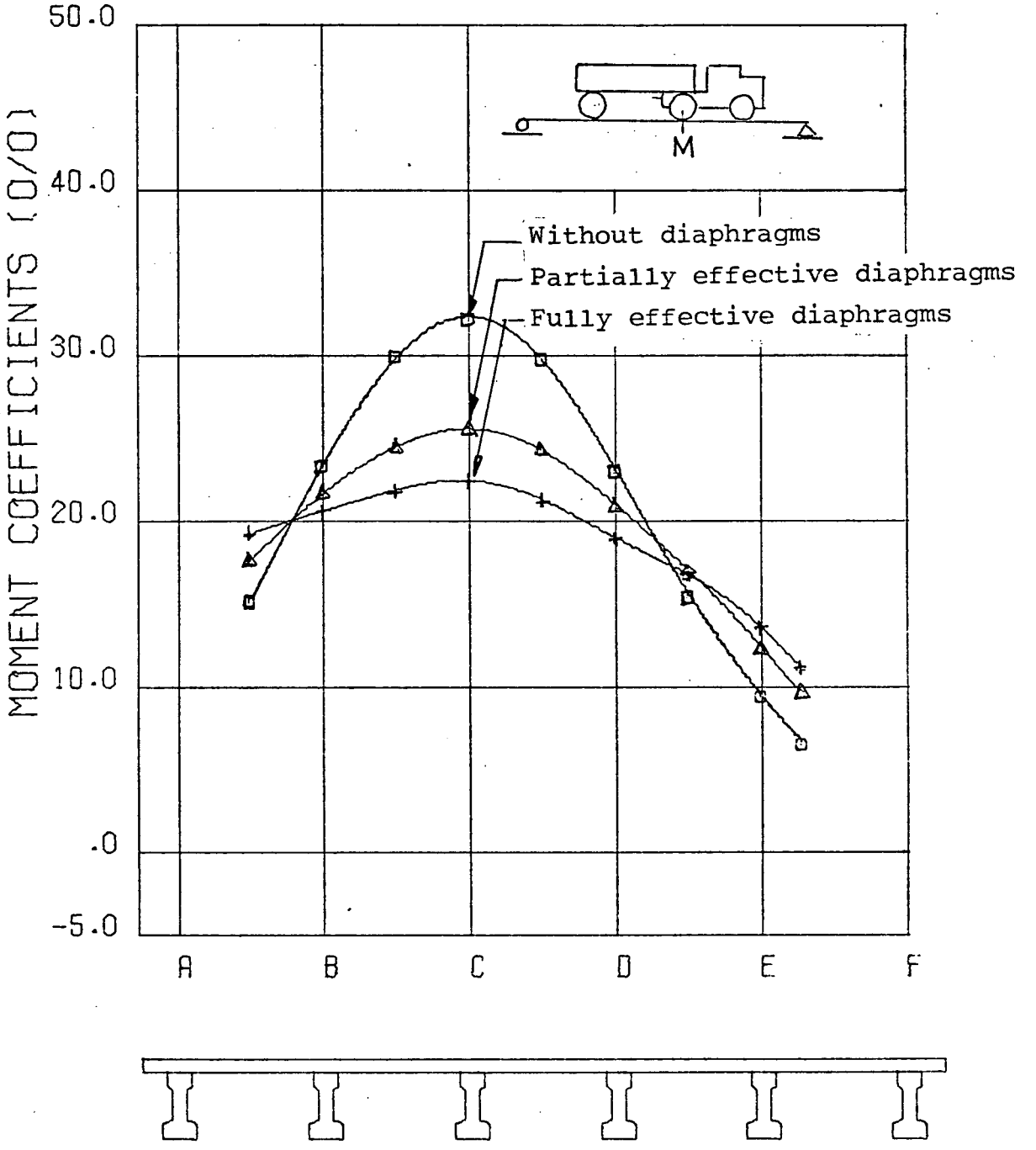


Fig. 108 Influence Lines for Moment with Partially and Fully Effective Diaphragms - Lehighton Bridge, Beam C

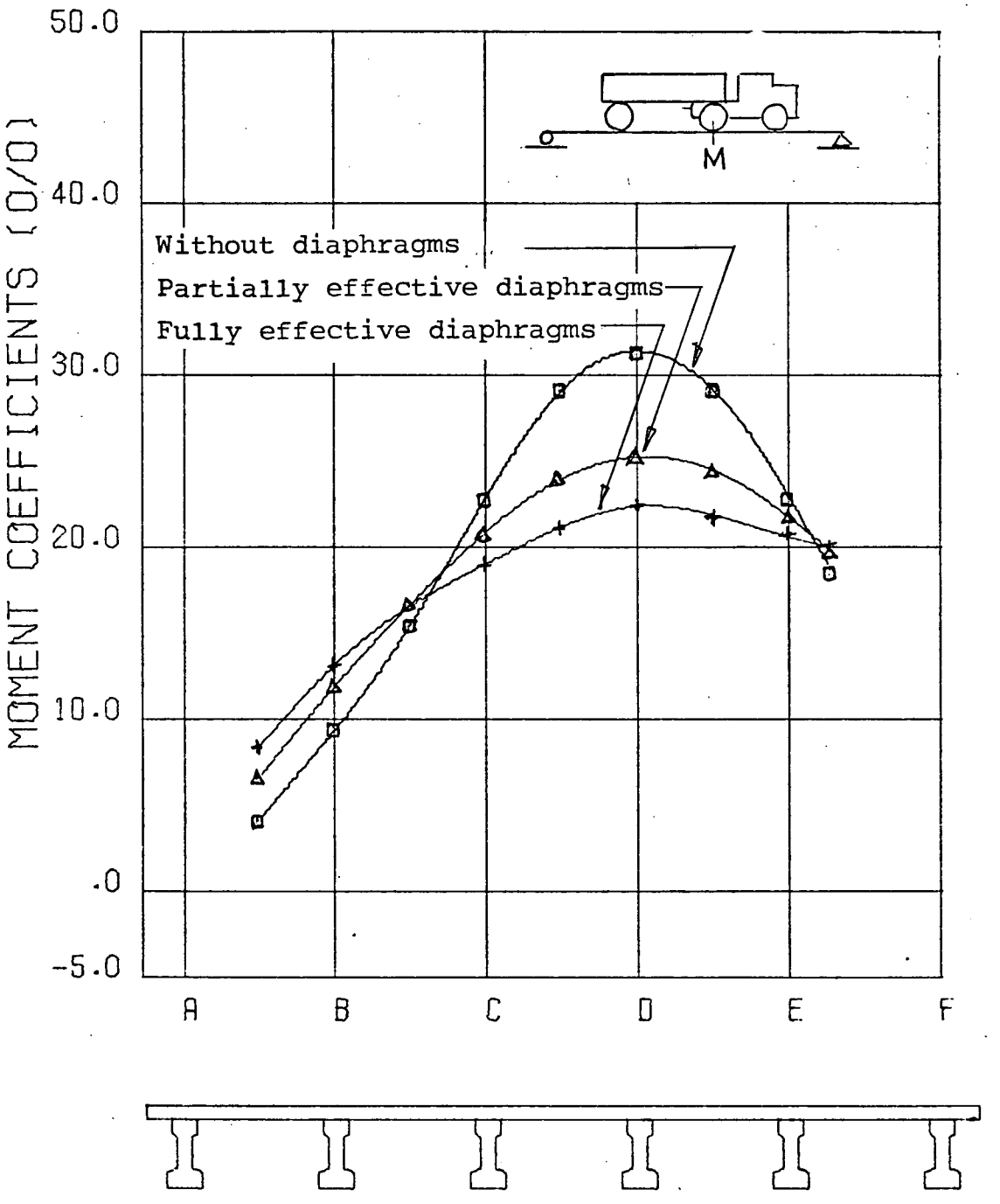
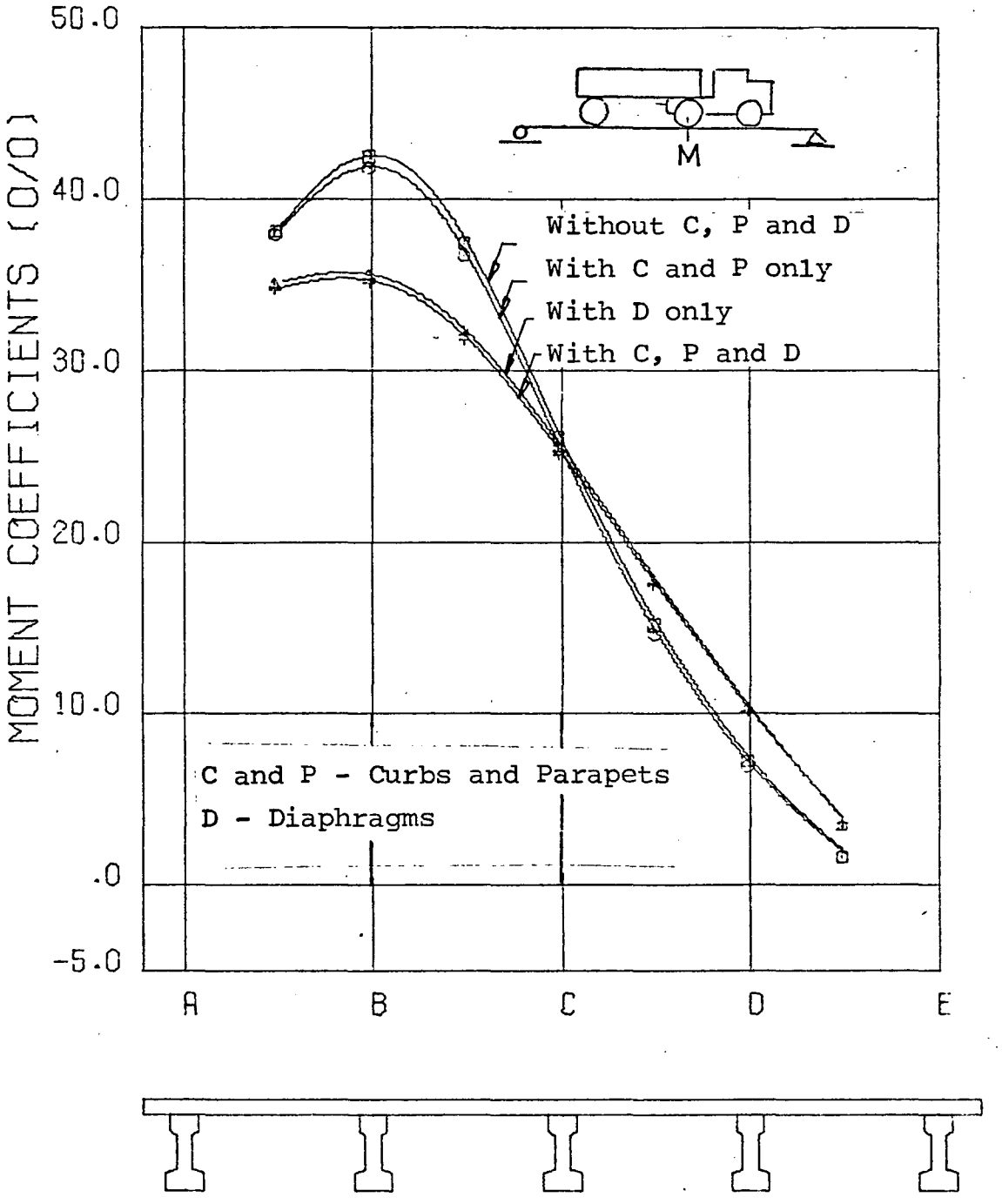


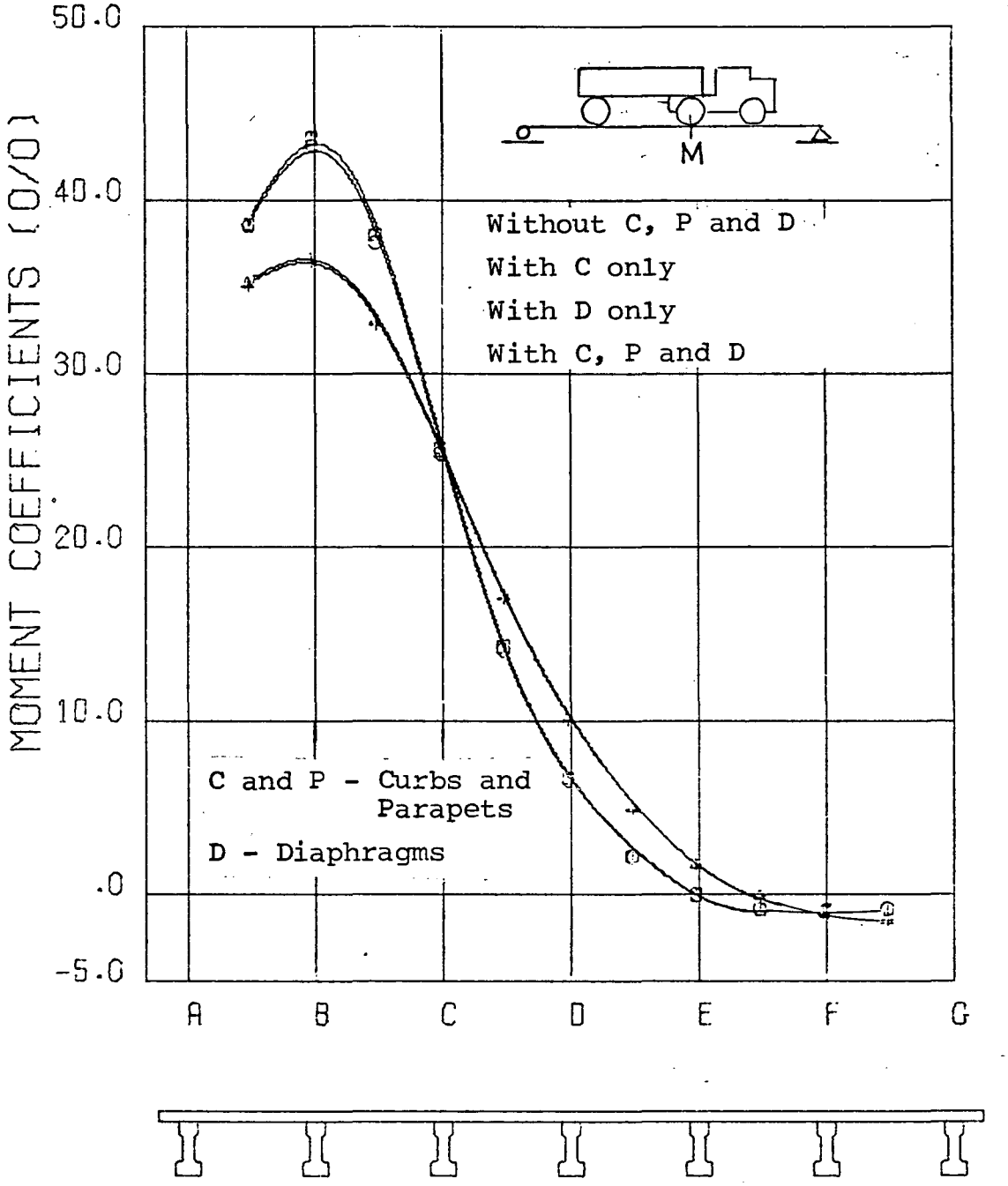
Fig. 109 Influence Lines for Moment with Partially and Fully Effective Diaphragms - Lehighton Bridge, Beam D



ASSHO-2 SP= 8 FT 0 INS L= 68 FT 6 INS S/L= 1/9

E SKEW INFLUENCE MOMENT FOR BEAM B

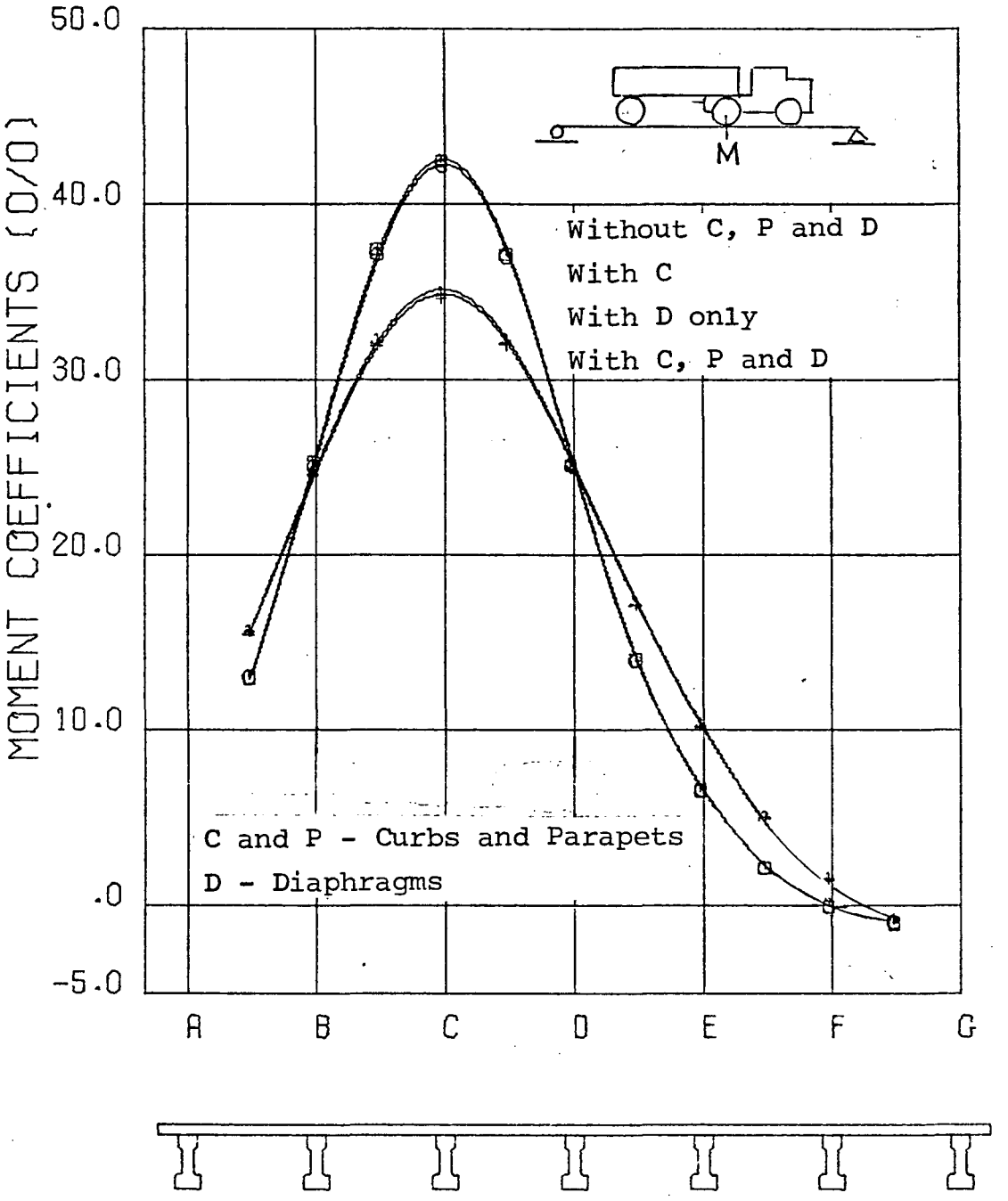
Fig. 110 Influence Lines for Moment With and Without Curbs, Parapets and Diaphragms - 5 Beam Bridge, Beam B



24/45 SP= 8 FT 0 INS L= 64 FT 0 INS S/L= 1/8

48 FT WIDE INFLUENCE MOMENT FOR BEAM B

Fig. 111 Influence Lines for Moment With and Without Curbs, Parapets and Diaphragms - 7 Beam Bridge, Beam B



24/45 SP= 8 FT 0 INS L= 64 FT 0 INS S/L= 1/8

48 FT WIDE INFLUENCE MOMENT FOR BEAM C

Fig. 112 Influence Lines for Moment With and Without Curbs, Parapets and Diaphragms - 7 Beam Bridge, Beam C

Span L	64'-0"
Beam Spacing	8'-0"
Design Lane	1 - 12' Wide

a - Without Curbs, Parapets or Diaphragms
b - With Curbs and Parapets Only
c - With Diaphragms Only
d - With Curbs, Parapets and Diaphragms

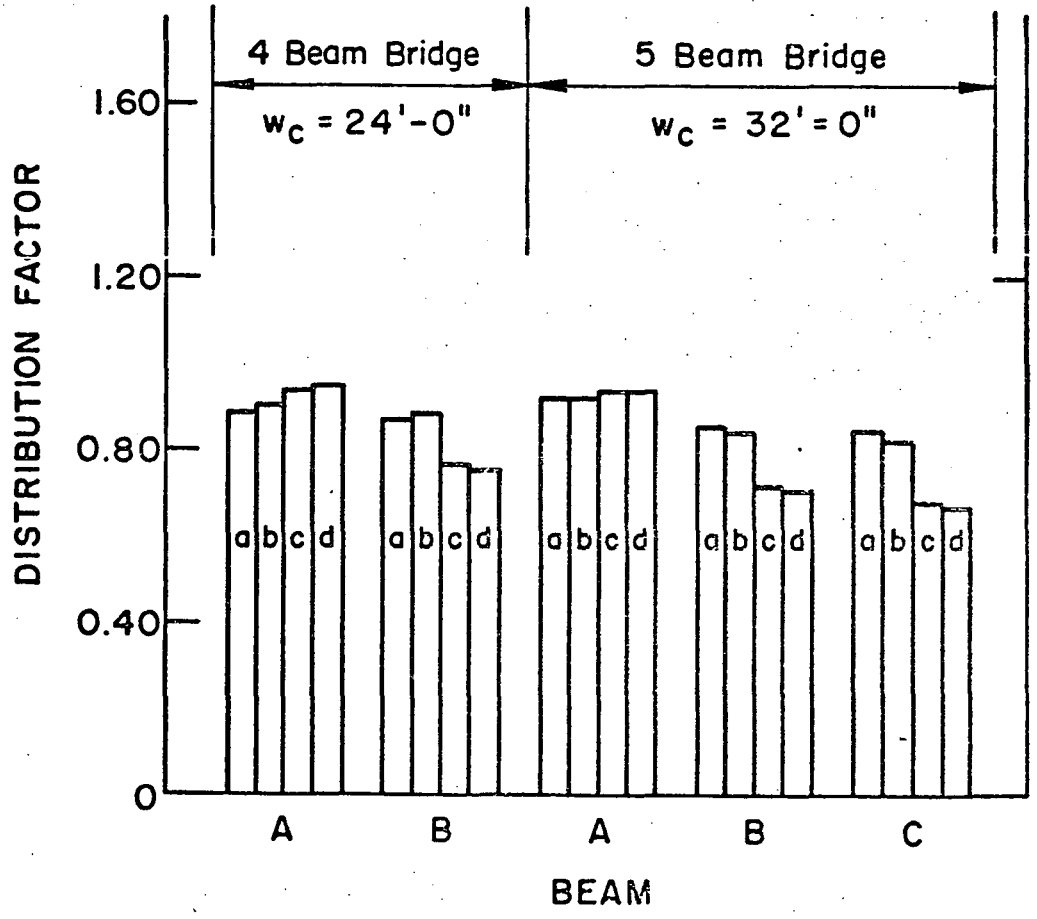


Fig. 113 Distribution Factors in a 4 and 5 Beam Bridge, 64 Ft. Span, 8 Ft. Spacing - 1 Design Lane

Span L	64'-0"
Spacing S	8'-0"
Roadway Width W_C	48'-0"
No. of Beams NB	7

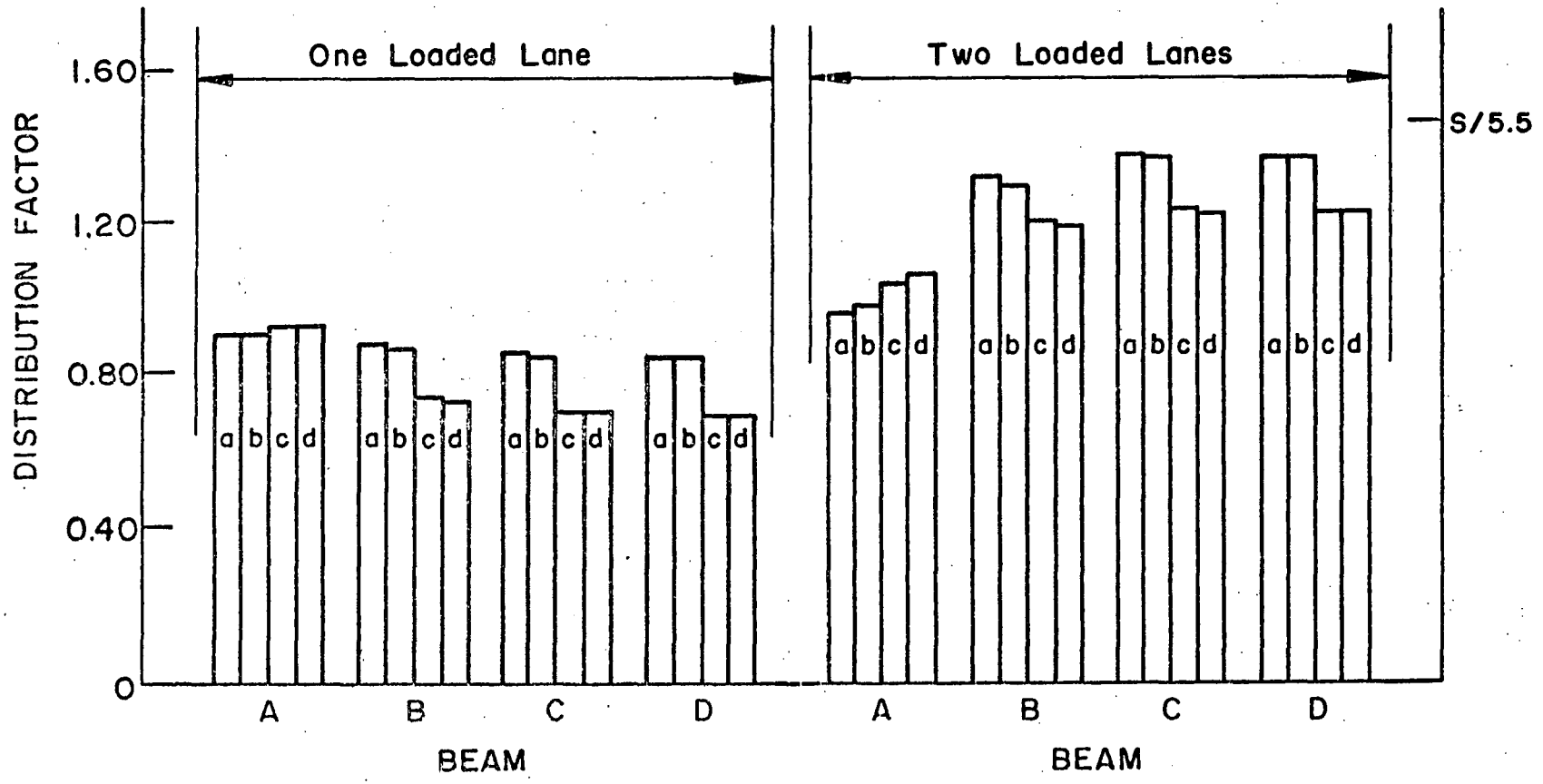


Fig. 114 Distribution Factors in a 7 Beam Bridge, 64 Ft. Span, 8 Ft. Spacing - 1 and 2 Design Lanes

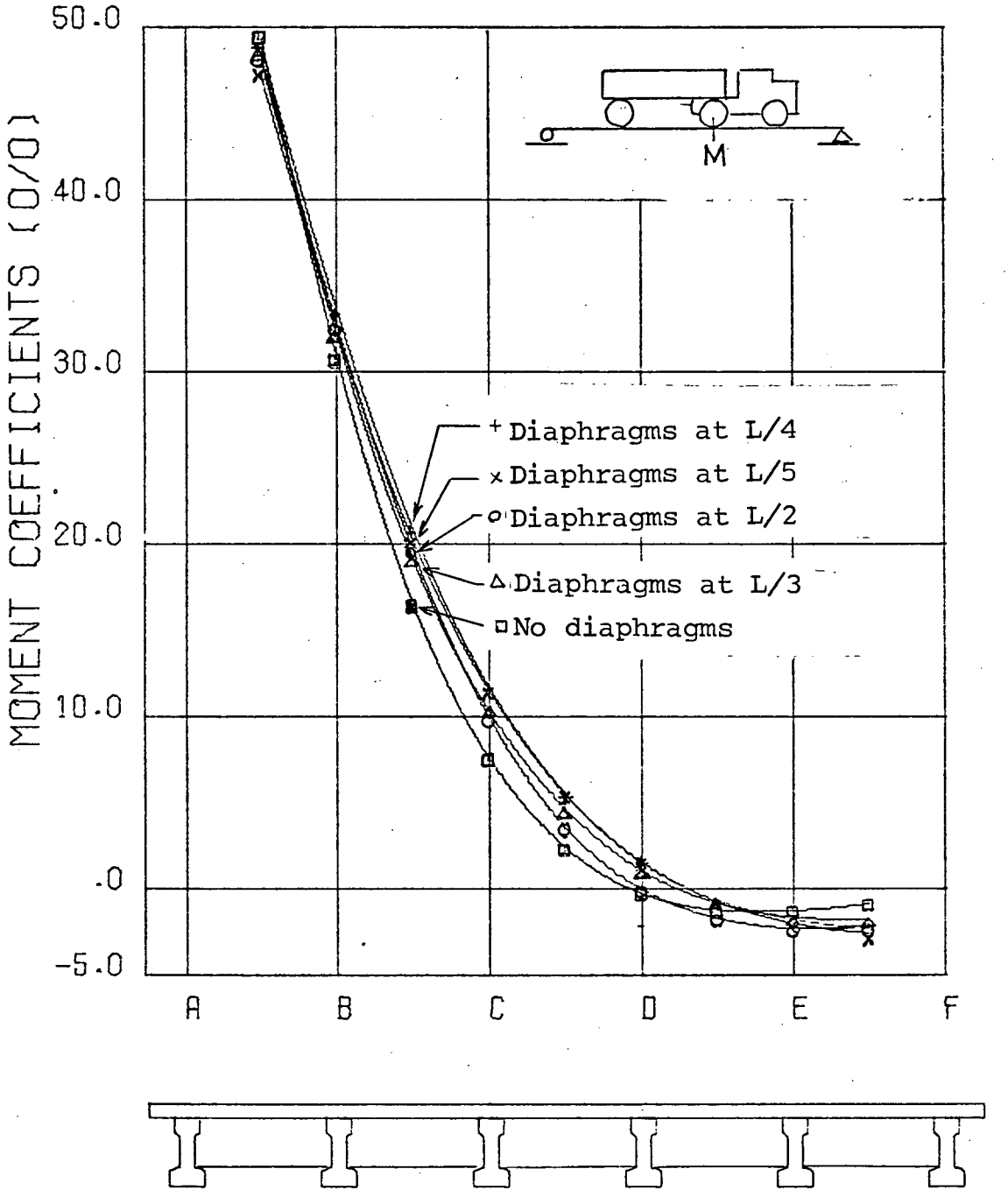
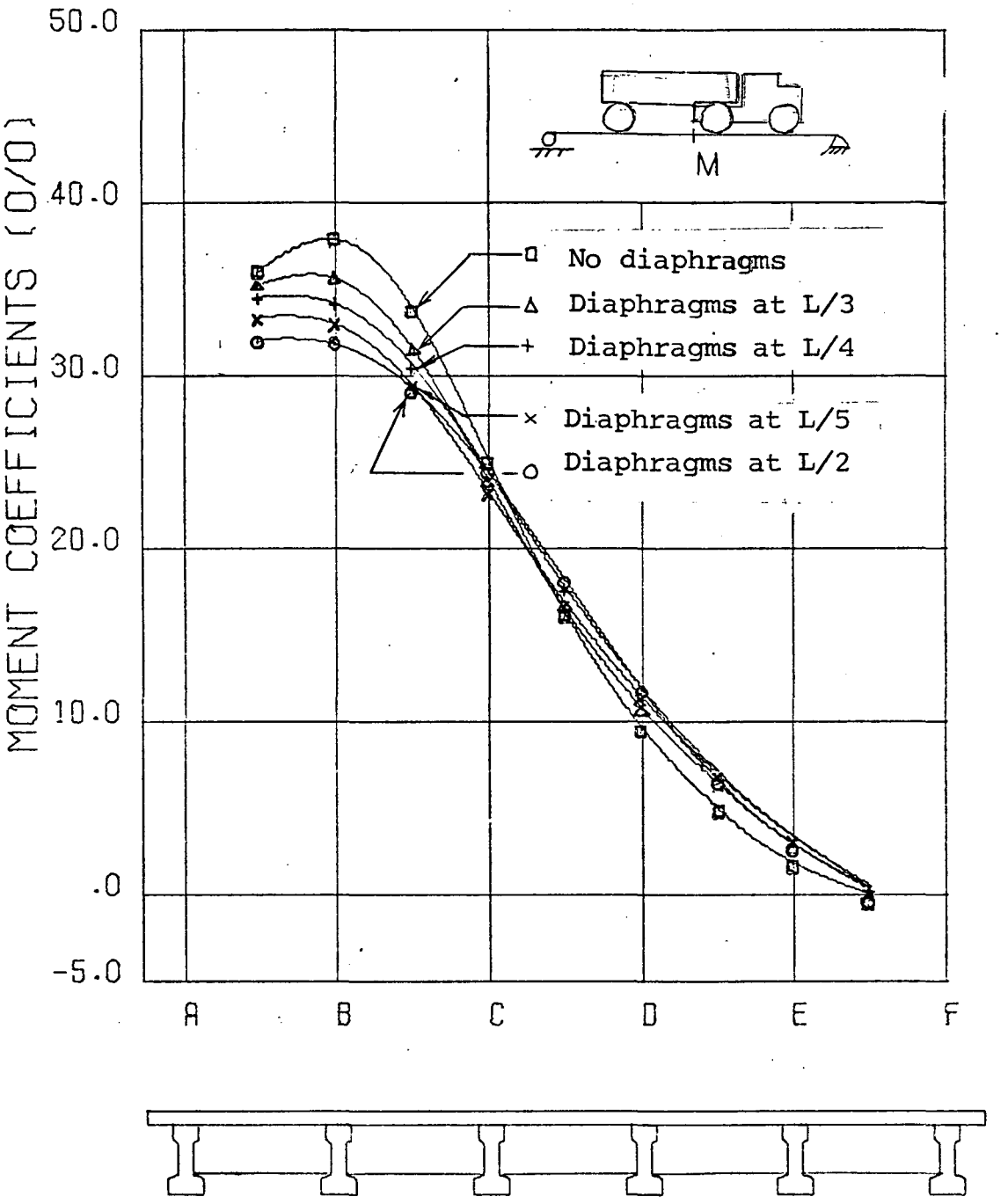


Fig. 115 Influence Lines for Moments, 6 Beam Bridge with Diaphragms at L/2, L/3, L/4 or L/5 - Beam A



6/24/45 SP=7 FT 2 INS L=71 FT 0 INS S/L=1/10

INFLUENCE MOMENT FOR BEAM B

Fig. 116 Influence Lines for Moments, 6 Beam Bridge with Diaphragms at L/2, L/3, L/4 or L/5 - Beam B

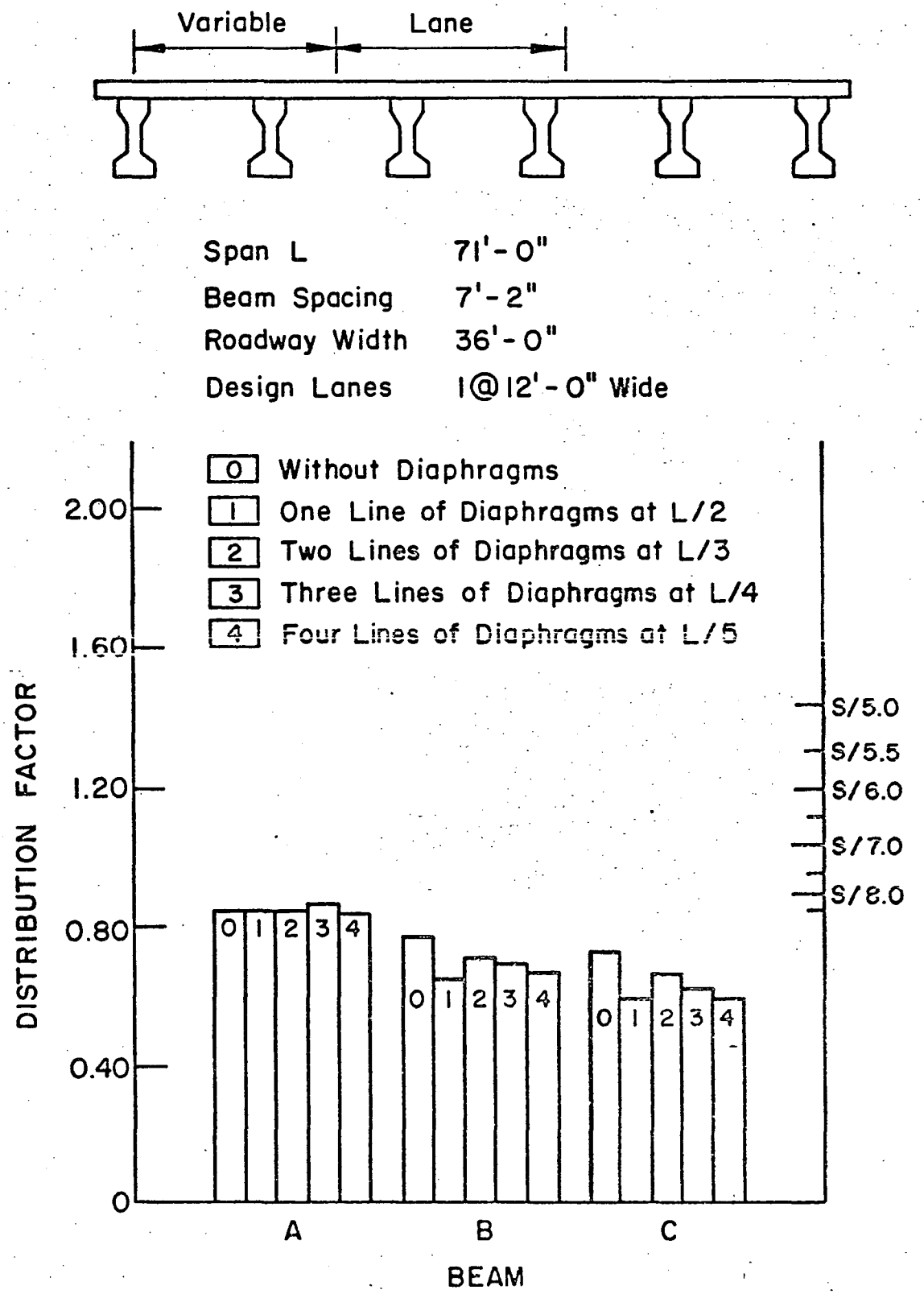
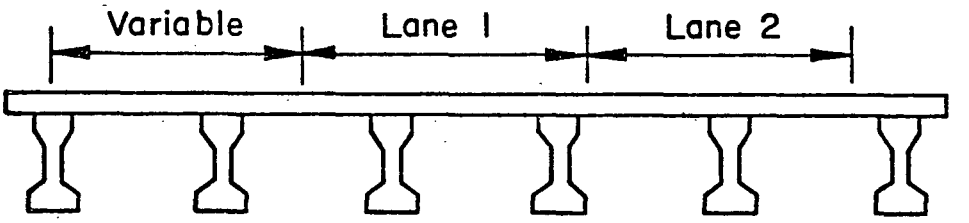


Fig. 117 Distribution Factors in a 6 Beam Bridge with Diaphragms at L/2, L/3, L/4 or L/5 - 1 Design Lane



Span L	71'-0"
Beam Spacing	7'-2"
Roadway Width	36'-0"
Design Lanes	1@12'-0" Wide

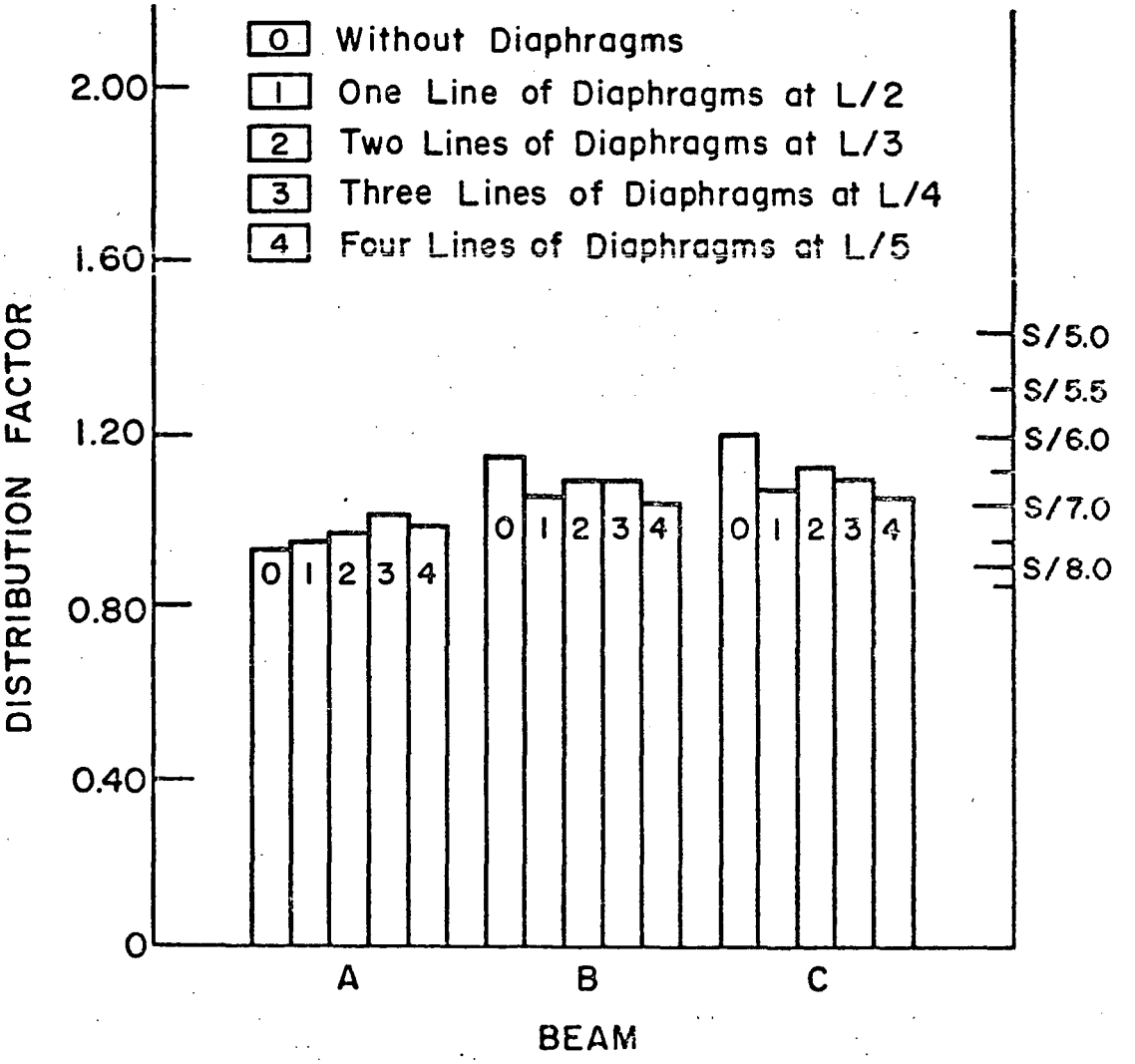


Fig. 118 Distribution Factors in a 6 Beam Bridge with Diaphragms at L/2, L/3, L/4 or L/5 - 2 Design Lanes