The following pages of *Bridge Design Aids*, Section 8, have been reviewed in December 1989 and found to be valid and appropriate for continued use:

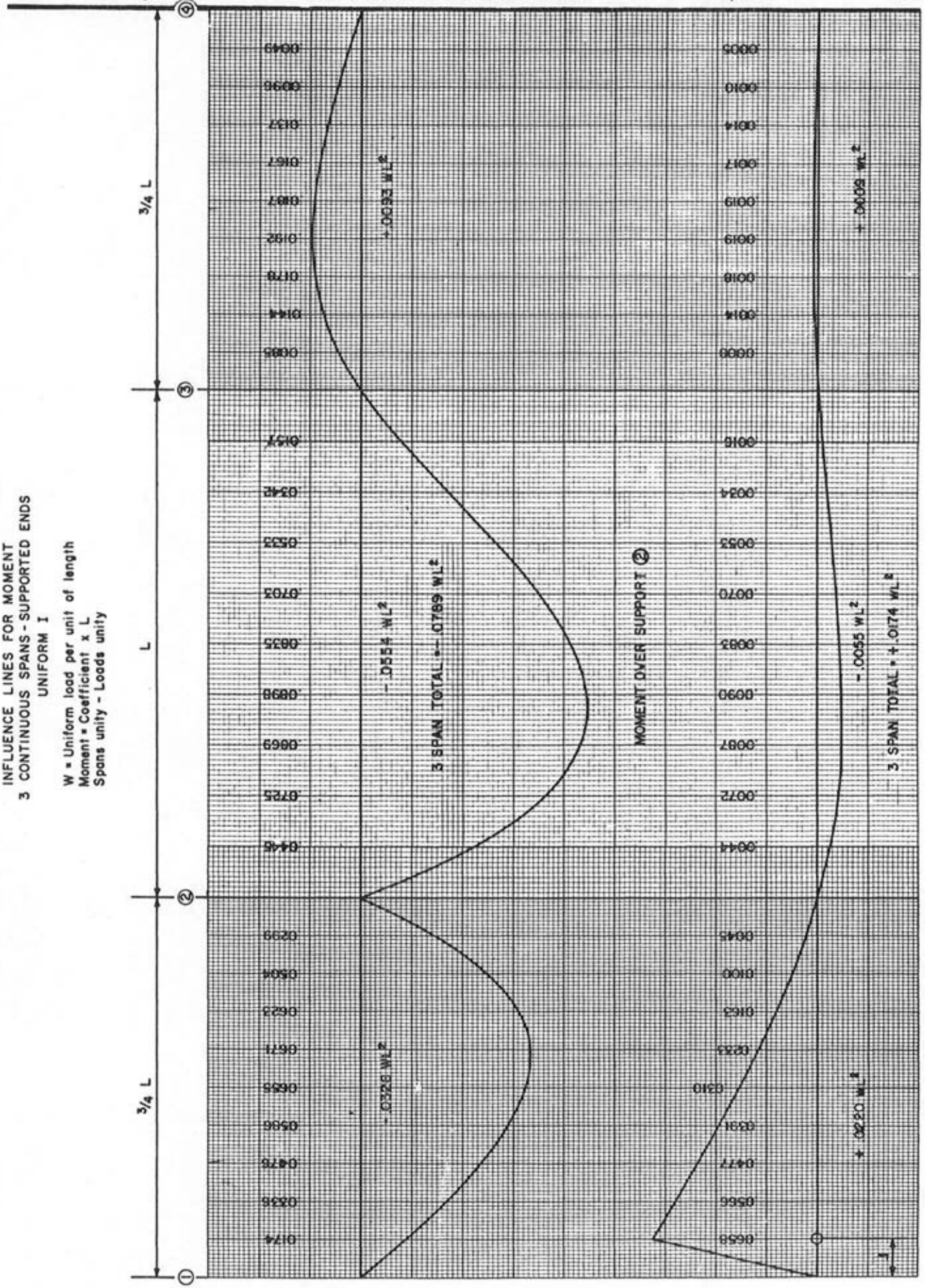
Page	*Date*	*Title*
8-1 thru 8-9	May 1962	Influence Lines for Moment (3 Span with ¾ end spans)
8-10 thru 8-20	May 1962	Influence Lines for Moment (4 Span with ¾ end spans)
8-21 thru 8-32	May 1962	Influence Lines for Moment (5 Span with ¾ end spans)
8-35 thru 8-43	Jan 1963	Influence Lines for Moment (4 equal spans)
8-45 thru 8-47	May 1963	Design Charts – Moment envelopes

These pages will be updated when appropriate.

Floyd L. Mellon

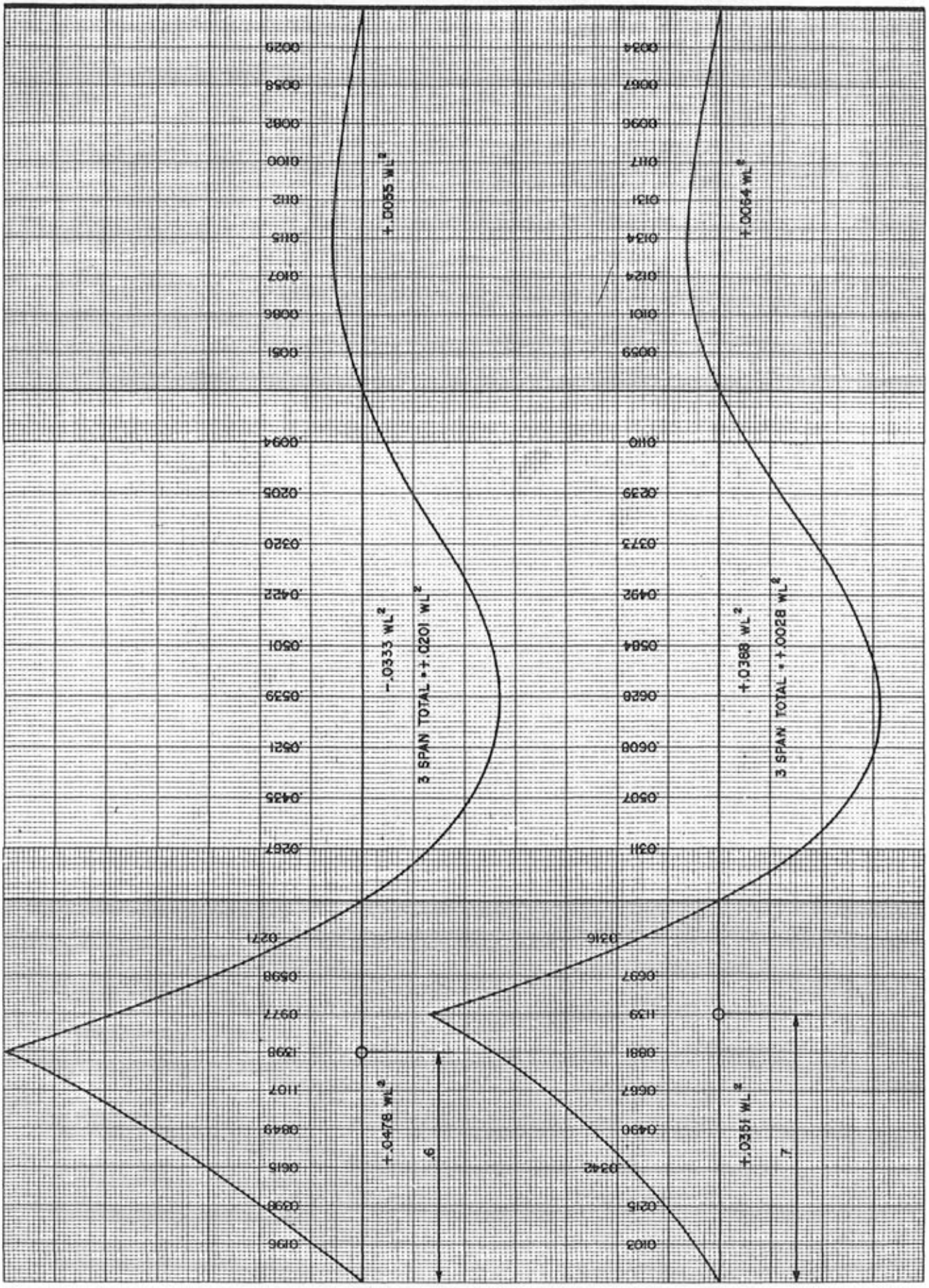
Guy D. Mancarti

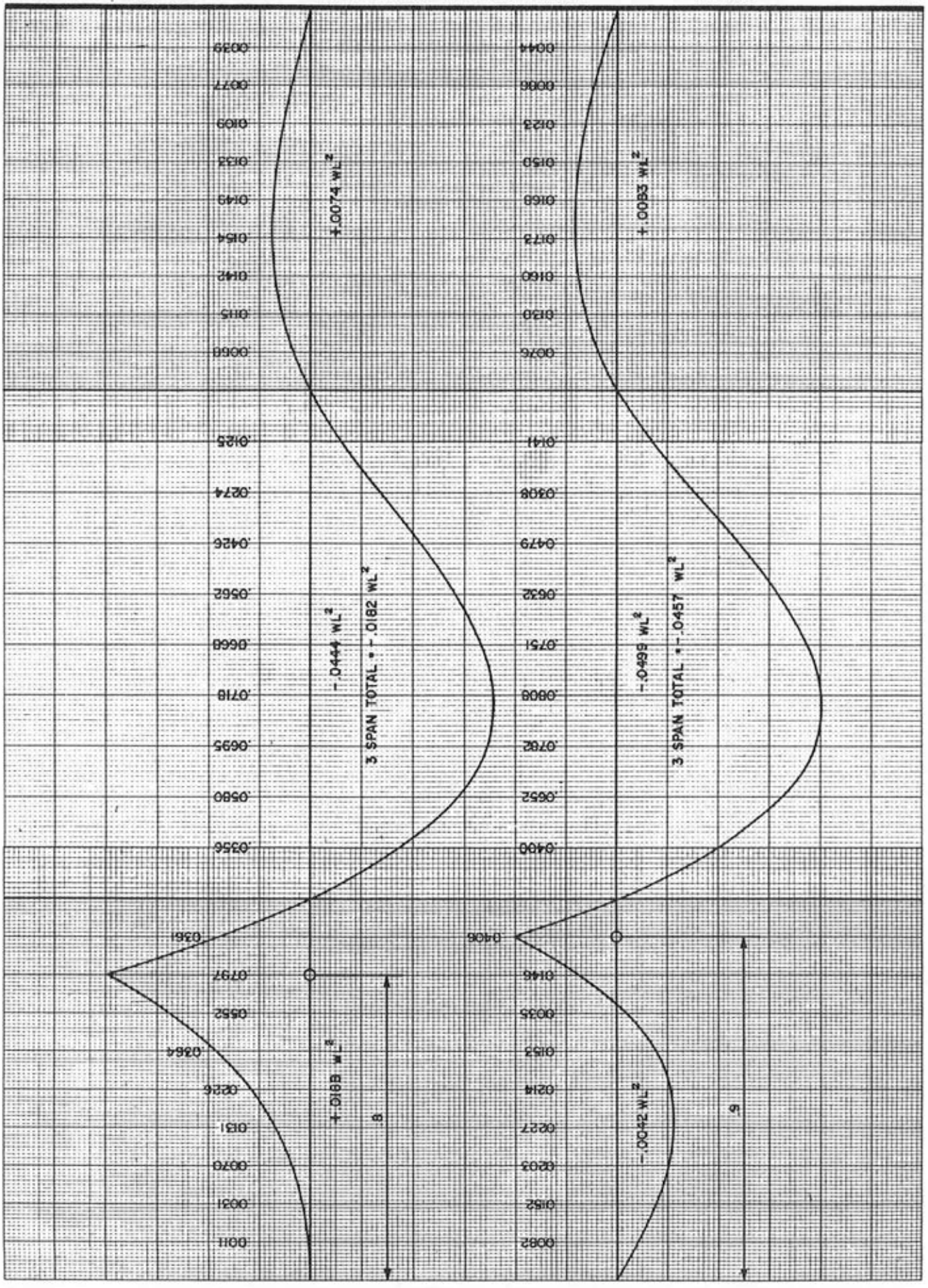
SLM:jmm

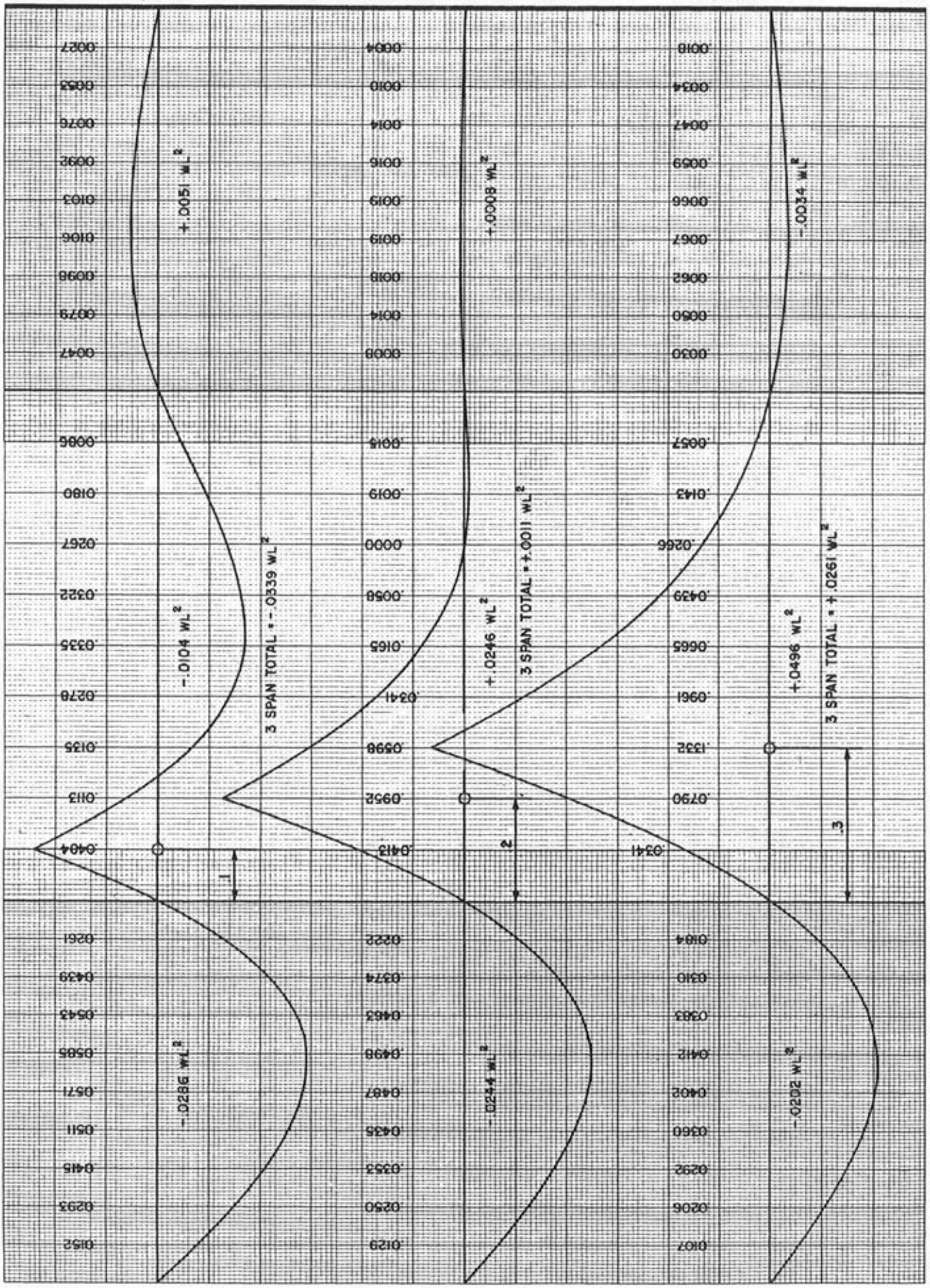

INFLUENCE LINES FOR MOMENT
3 CONTINUOUS SPANS - SUPPORTED ENDS
UNIFORM I
W = Uniform load per unit of length
Moment = Coefficient x L
Spans unity - Loads unity
3/4 L
L
3/4 L
+.0093 WL²
-.0554 WL²
3 SPAN TOTAL = -.0789 WL²
-.0328 WL²
MOMENT OVER SUPPORT ②
+.0059 WL²
-.0055 WL²
3 SPAN TOTAL = +.0174 WL²
+.0220 WL²

+.0018 WL²
+.0028 WL²
3 SPAN TOTAL = +.0292 WL²
3 SPAN TOTAL = +.0354 WL²
-.0111 WL²
-.0166 WL²
+.0384 WL²
+.0493 WL²
.8L
.8L

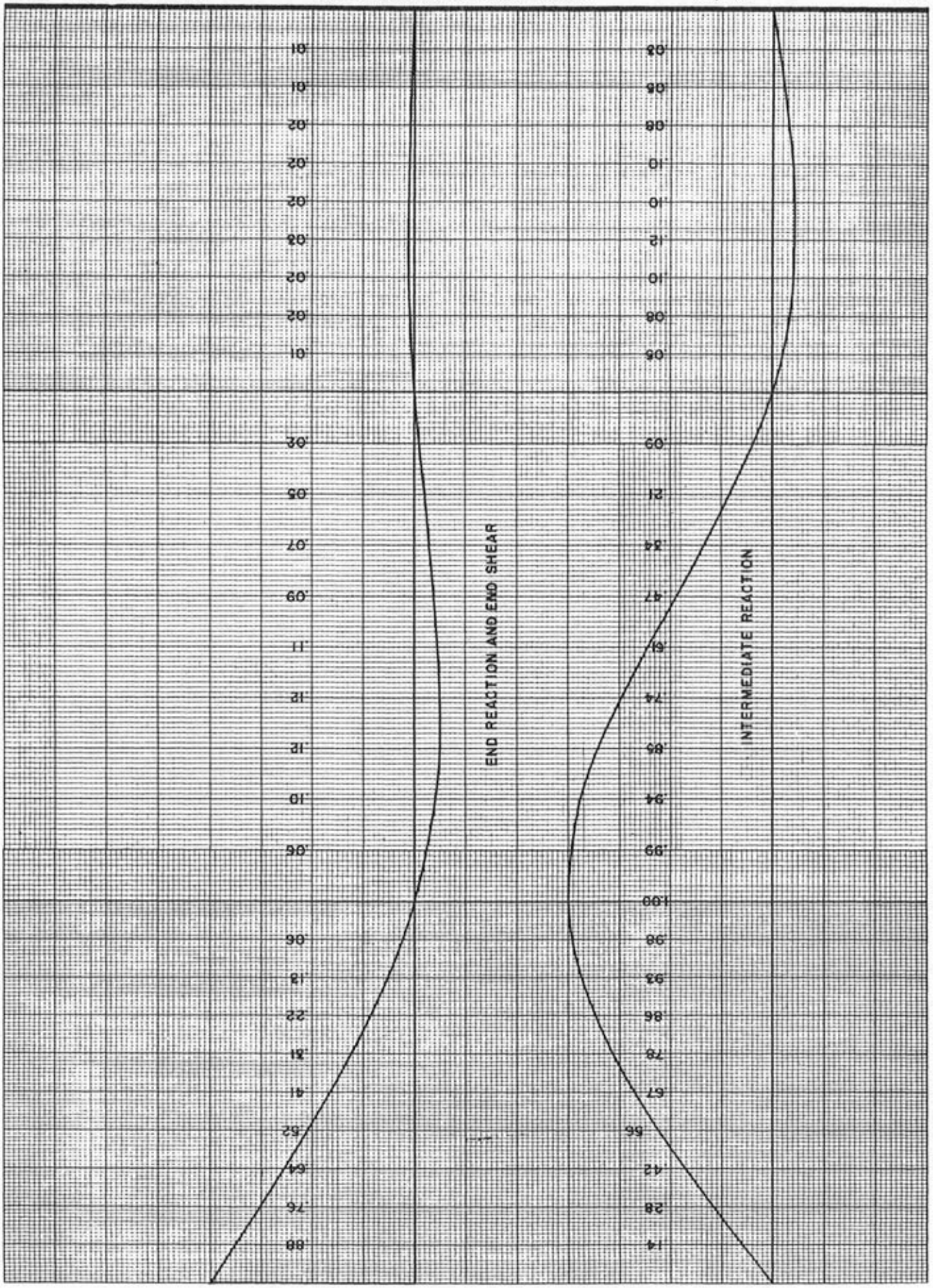
+.0037 WL²
+.0046 WL²
-.0222 WL²
-.0277 WL²
3 SPAN TOTAL = +.0359 WL²
3 SPAN TOTAL = +.0308 WL²
+.0544 WL²
+.0539 WL²
.4
.5


+.0055 WL²
+.0064 WL²
-.0333 WL²
3 SPAN TOTAL = +.0201 WL²
+.0388 WL²
3 SPAN TOTAL = +.0028 WL²
+.0478 WL²
.6
+.0351 WL²
.7


+.0074 WL²
-.0444 WL²
3 SPAN TOTAL = +-.0182 WL²
+.0183 WL²
+.0083 WL²
-.0499 WL²
3 SPAN TOTAL = +-.0457 WL²
+.0188 WL²
-.0042 WL²
B
B


+.0051 WL²
-.0104 WL²
3 SPAN TOTAL = -.0339 WL²
-.0286 WL²
+.0008 WL²
+.0246 WL²
3 SPAN TOTAL = +.0011 WL²
-.0294 WL²
-.0034 WL²
+.0496 WL²
3 SPAN TOTAL = +.0261 WL²
-.0292 WL²
1
2
3

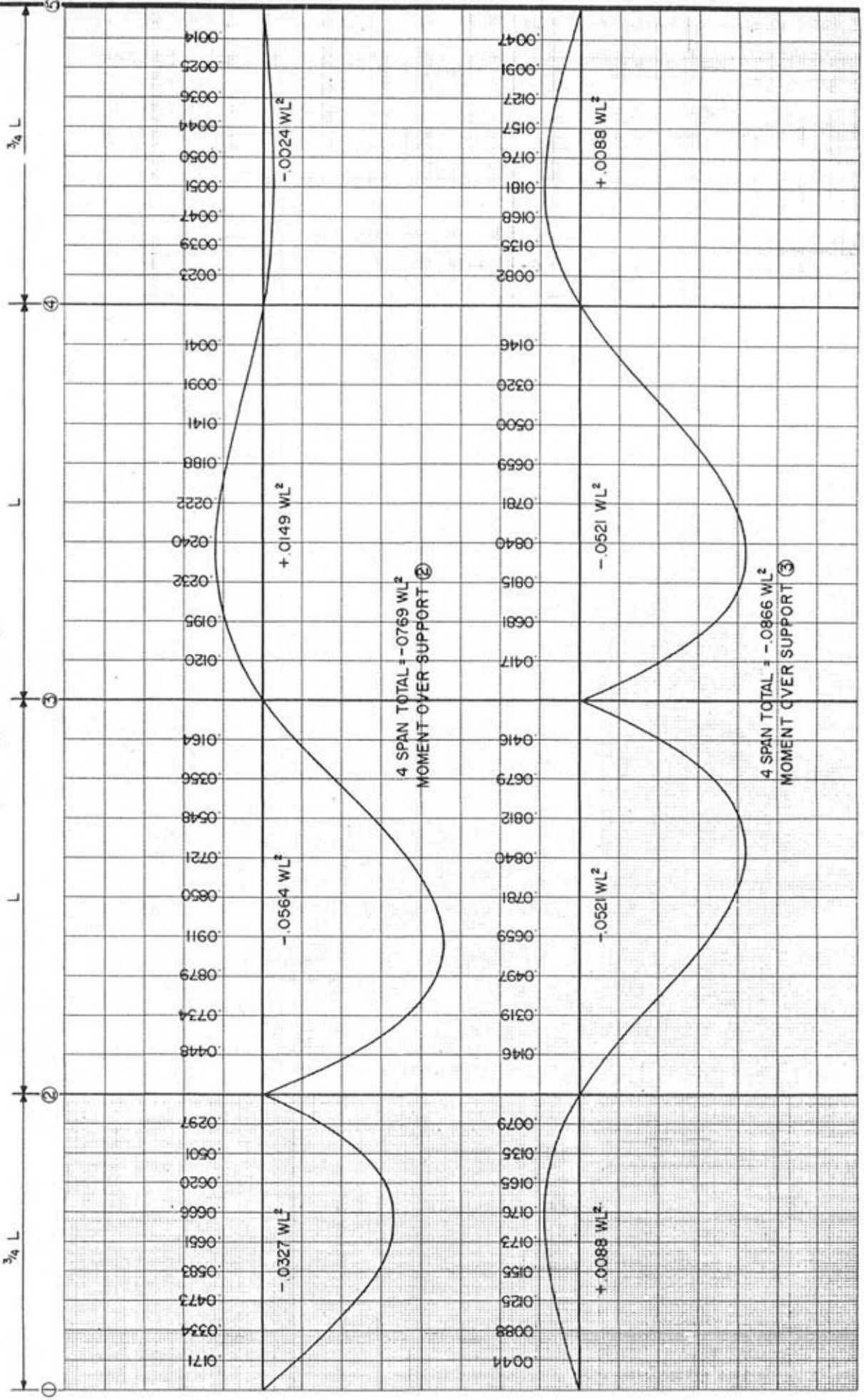
-.0076 WL²
+.0646 WL²
3 SPAN TOTAL = +.0411 WL²
-.0118 WL²
+.0696 WL²
3 SPAN TOTAL = +.0461 WL²
-.0160 WL²
-.0118 WL²
.4
.5

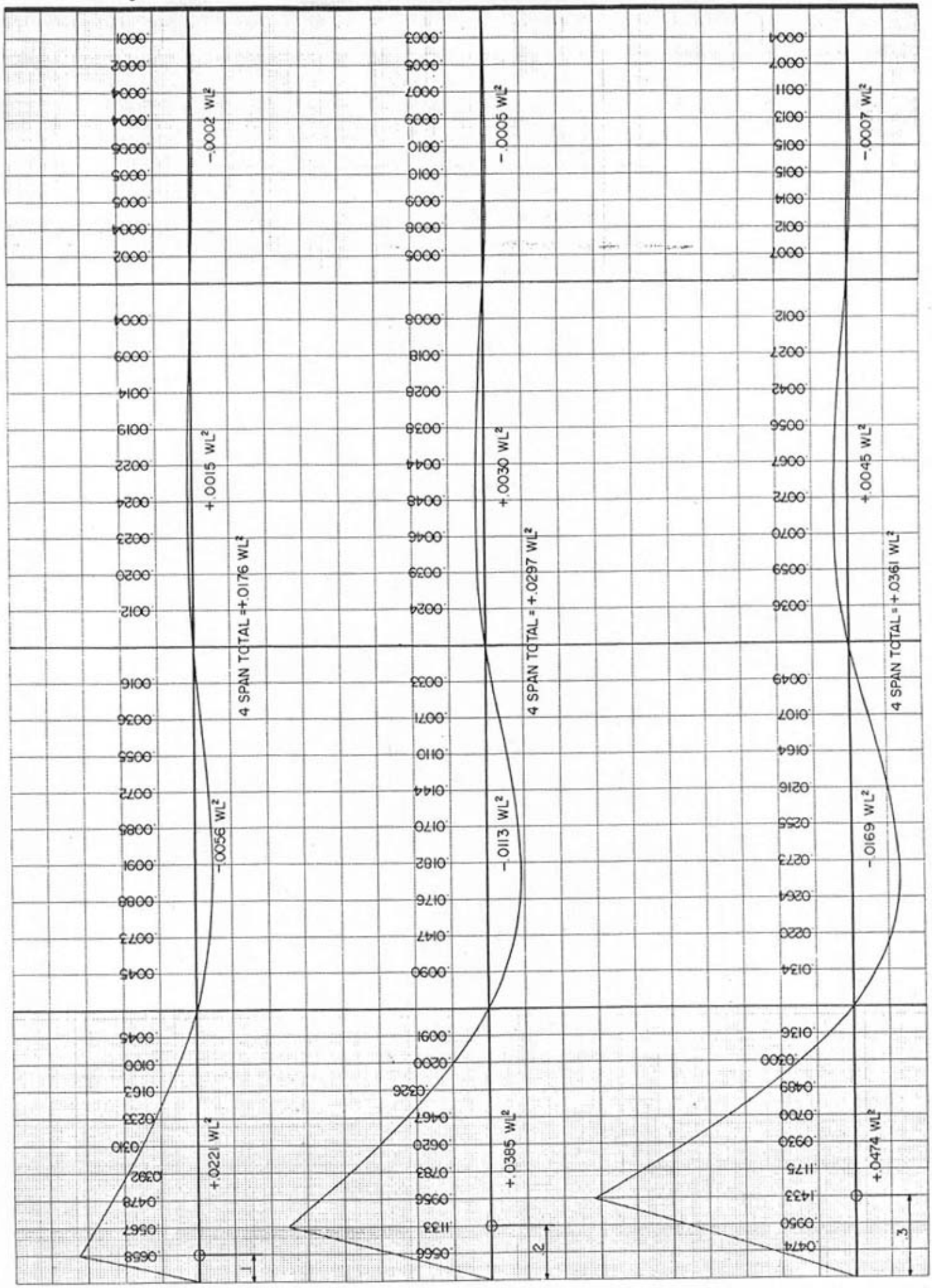

END REACTION AND END SHEAR
INTERMEDIATE REACTION

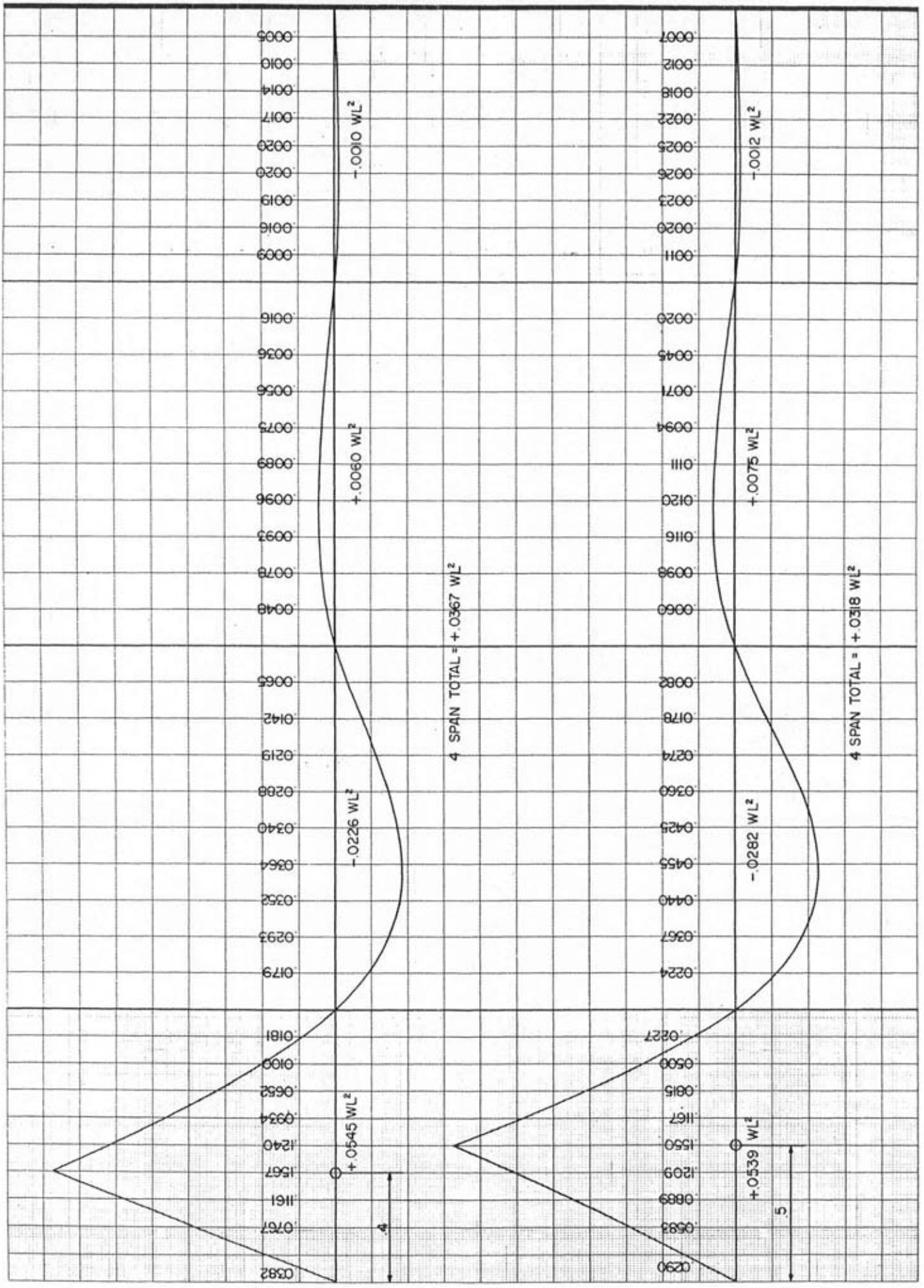
SHEAR IN END SPAN
AT INTERMEDIATE SUPPORT
SHEAR IN CENTER SPAN
AT INTERMEDIATE SUPPORT

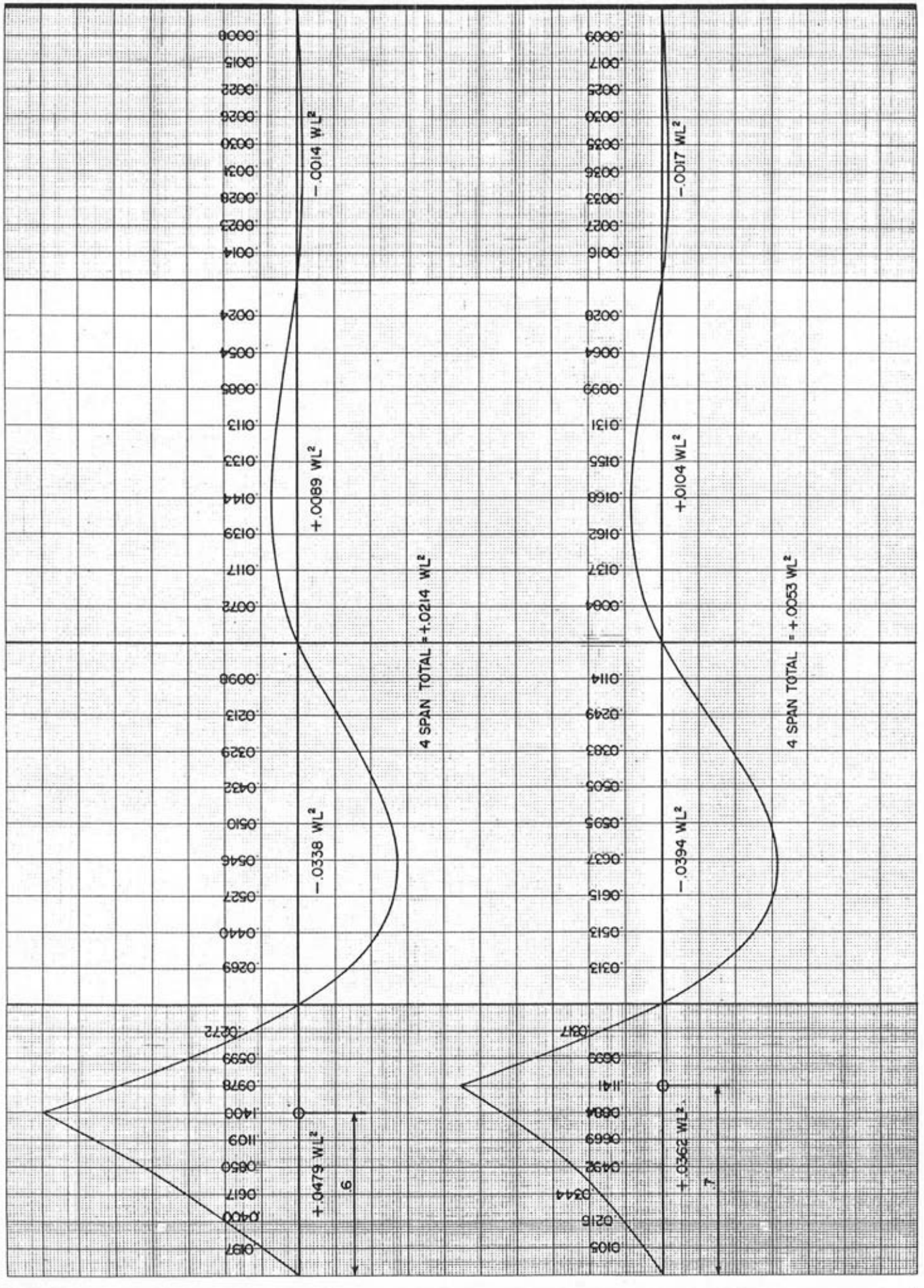
INFLUENCE LINES FOR MOMENT
4 CONTINUOUS SPANS - SUPPORTED ENDS
UNIFORM l

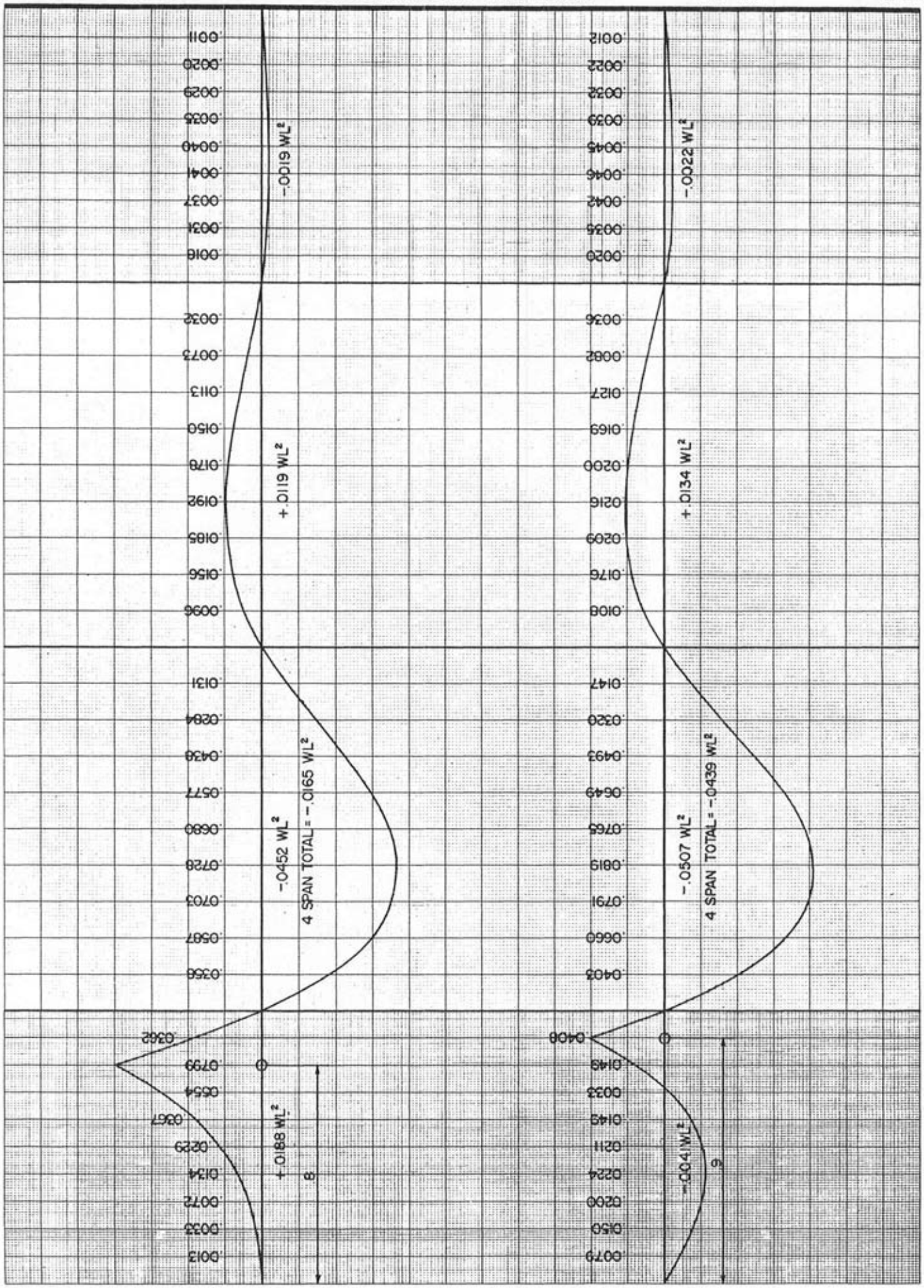
W = Uniform load per unit of length
Moment = Coefficient x l
Spans unity - Loads unity




-.0002 WL²
+.0015 WL²
4 SPAN TOTAL =+.0176 WL²
-.0056 WL²
+.0221 WL²
-.0005 WL²
+.0030 WL²
4 SPAN TOTAL = +.0297 WL²
-.0113 WL²
+.0385 WL²
-.0007 WL²
+.0045 WL²
4 SPAN TOTAL = +.0361 WL²
-.0169 WL²
+.0474 WL²
1
2
3

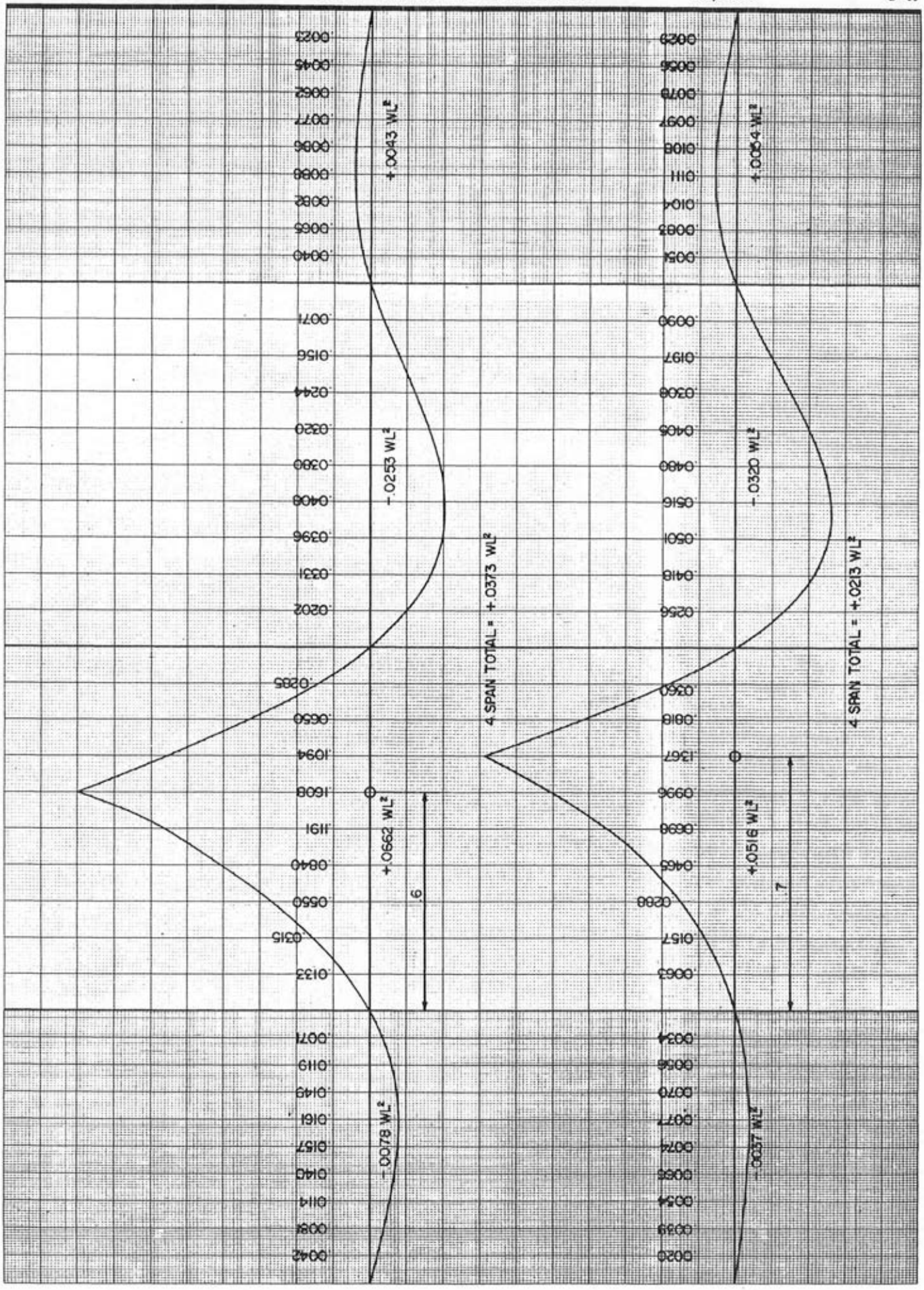

-.0010 WL²
+.0060 WL²
-.0226 WL²
+.0545 WL²
4 SPAN TOTAL = +.0367 WL²
-.0012 WL²
+.0075 WL²
-.0282 WL²
+.0539 WL²
4 SPAN TOTAL = +.0318 WL²
4
5

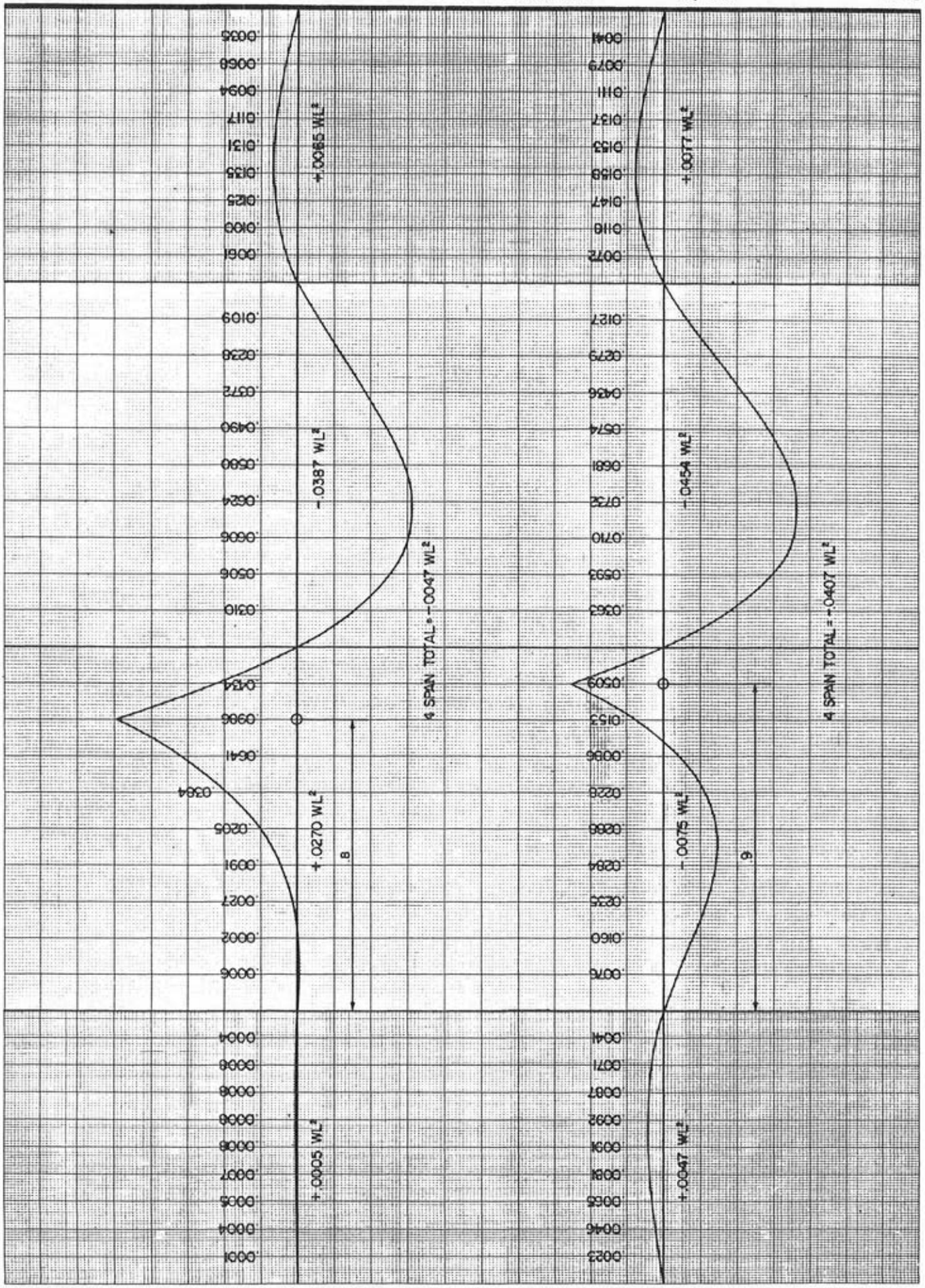

-.0014 WL²
+.0089 WL²
-.0338 WL²
+.0479 WL²
9
4 SPAN TOTAL = +.0214 WL²
-.0017 WL²
+.0104 WL²
-.0394 WL²
+.0362 WL²
7
4 SPAN TOTAL = +.0053 WL²

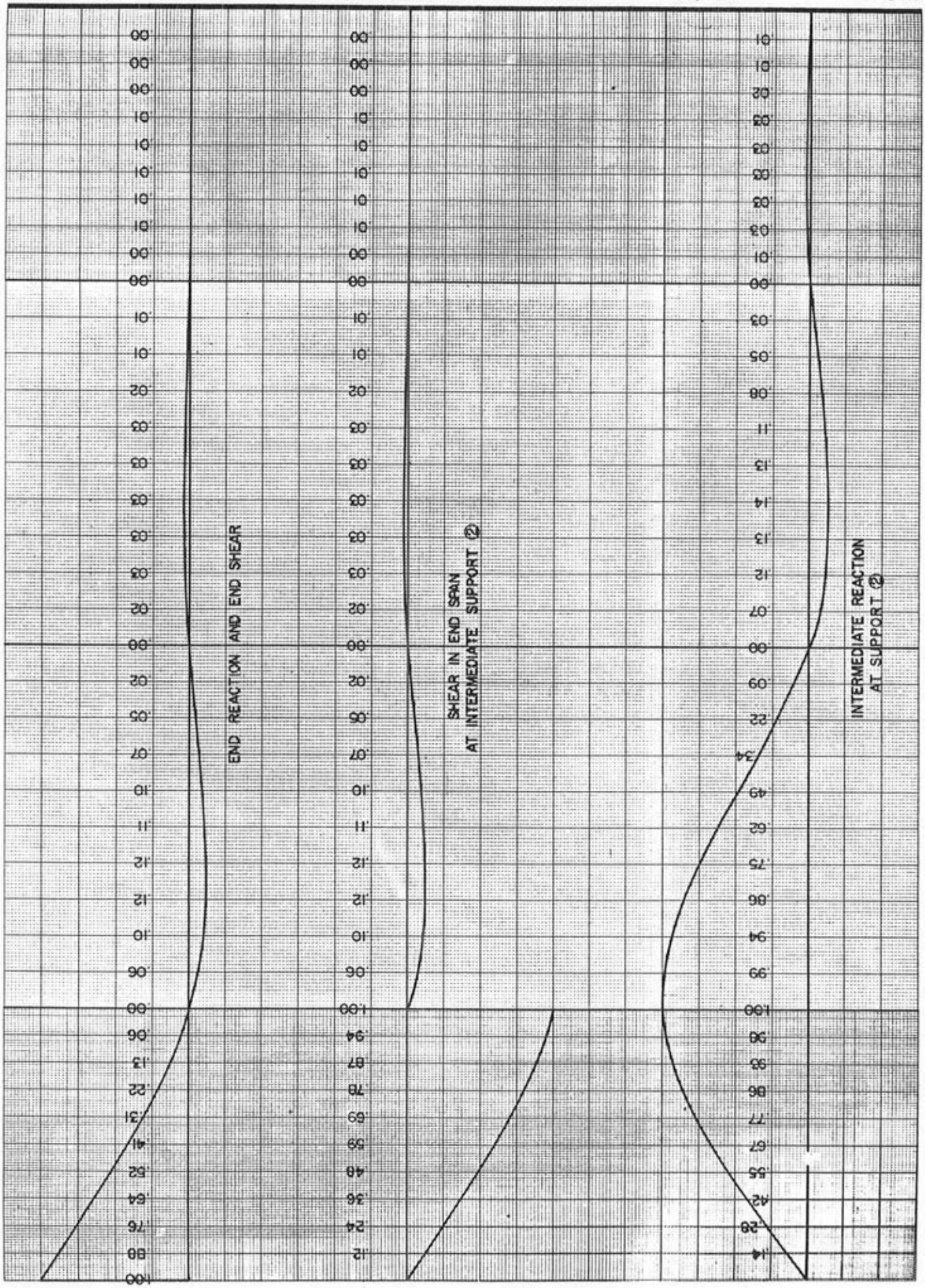

-.0019 WL²
+.0119 WL²
-.0452 WL²
4 SPAN TOTAL = -.0165 WL²
+.0188 WL²
-.0022 WL²
+.0134 WL²
-.0507 WL²
4 SPAN TOTAL = -.0439 WL²
-.0411 WL²

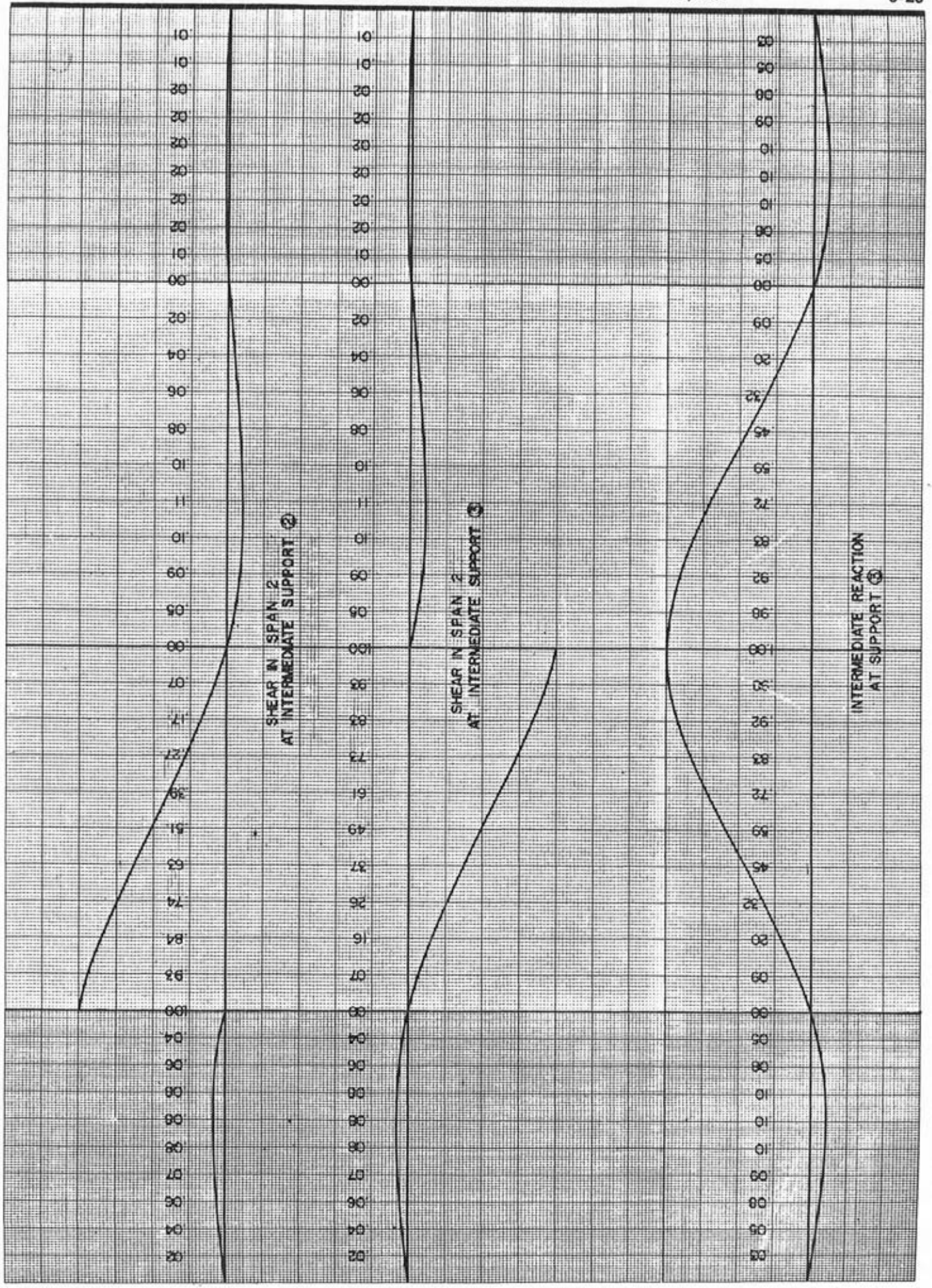
-.0013 WL²
+.0082 WL²
-.0110 WL²
-.0286 WL²
4 SPAN TOTAL = -.0329 WL²
-.0002 WL²
+.0015 WL²
+.0245 WL²
-.0244 WL²
4 SPAN TOTAL = +.0012 WL²
+.0009 WL²
-.0053 WL²
+.0499 WL²
-.0203 WL²
4 SPAN TOTAL = +.0252 WL²
1
2
3

+.0020 WL²
-.0119 WL²
4 SPAN TOTAL = +.0392 WL²
+.0653 WL²
.4
-.0160 WL²
+.0031 WL²
-.0186 WL²
4 SPAN TOTAL = +.0432 WL²
+.0708 WL²
.5
-.0119 WL²


+.0043 WL²
-.0253 WL²
4 SPAN TOTAL = +.0373 WL²
+.0662 WL²
.6
-.0078 WL²
+.0054 WL²
-.0320 WL²
4 SPAN TOTAL = +.023 WL²
+.0516 WL²
.7
-.0037 WL²

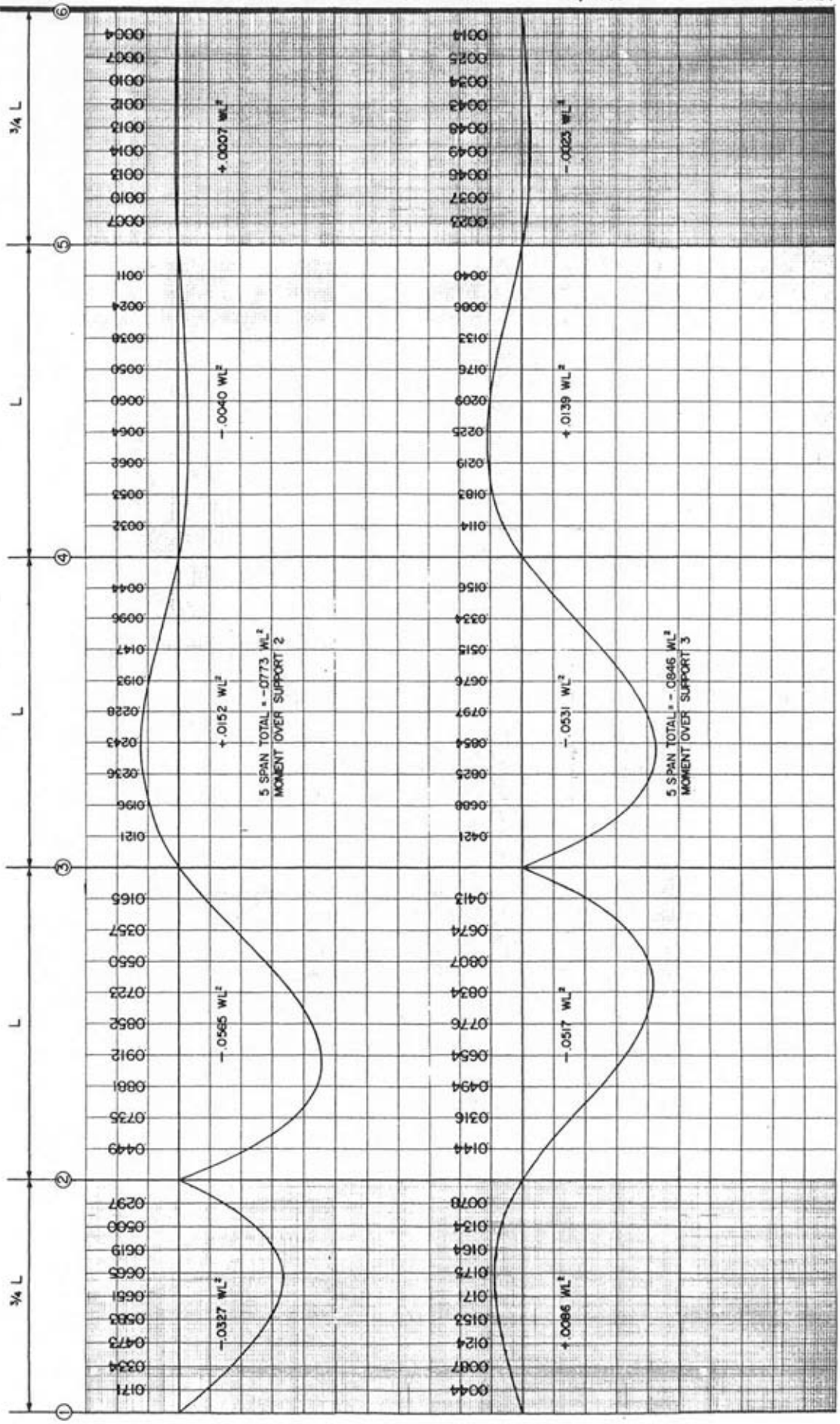

+.0385 WL²
-.0387 WL²
4 SPAN TOTAL = -.0047 WL²
+.0270 WL²
.8
+.0005 WL²
+.0177 WL²
+.0454 WL²
4 SPAN TOTAL = +.0407 WL²
-.0075 WL²
.9
+.0047 WL²


END REACTION AND END SHEAR
SHEAR IN END SPAN AT INTERMEDIATE SUPPORT ②
INTERMEDIATE REACTION AT SUPPORT ②


SHEAR IN SPAN 2
AT INTERMEDIATE SUPPORT ②
SHEAR IN SPAN 2
AT INTERMEDIATE SUPPORT ③
INTERMEDIATE REACTION
AT SUPPORT ③

INFLUENCE LINES FOR MOMENT
5 CONTINUOUS SPANS - SUPPORTED ENDS
UNIFORM I

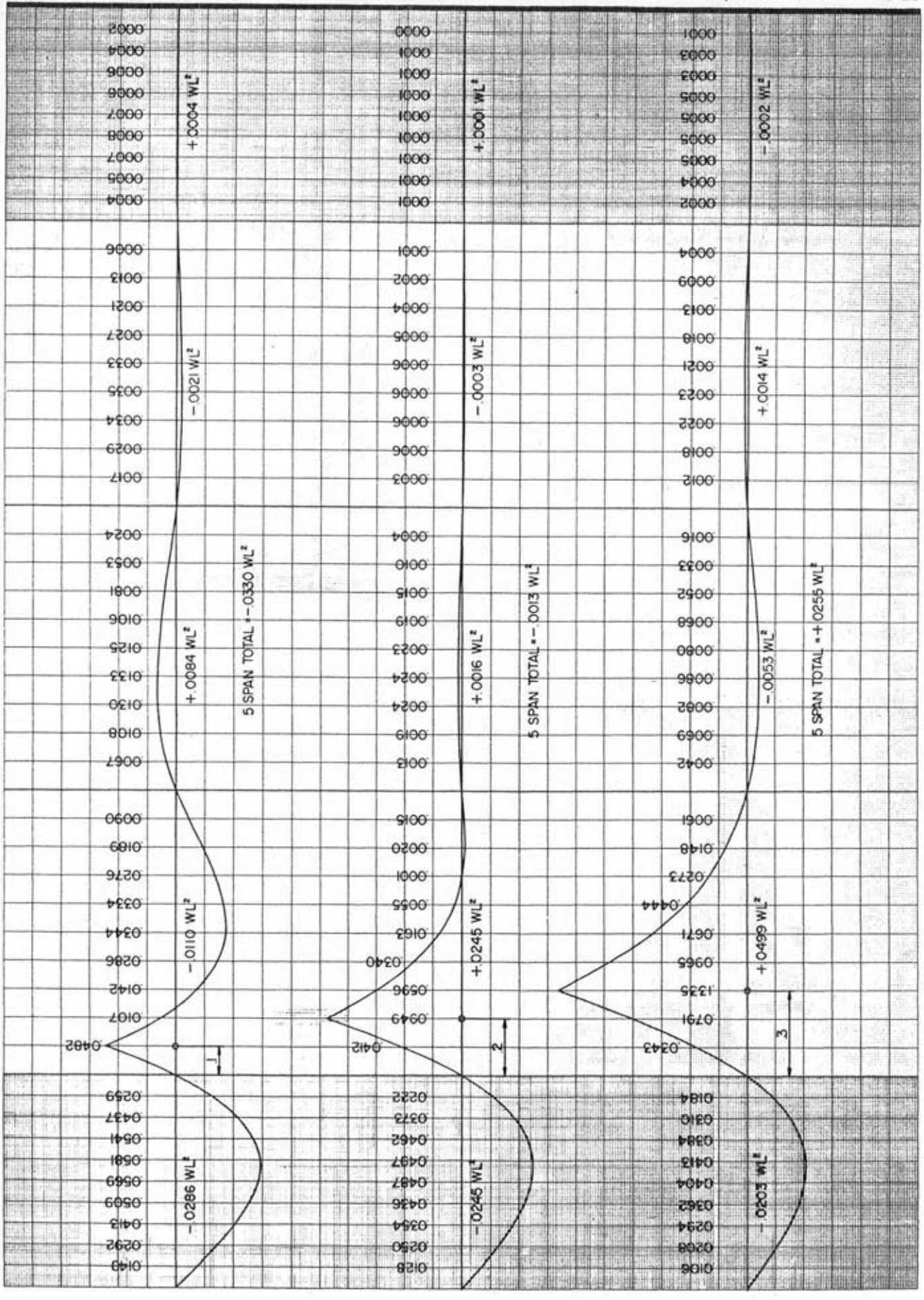
W = Uniform load per unit of length
Moment = Coefficient x L
Spans unity - Loads unity



+.0001 WL²
-.0004 WL²
+.0015 WL²
-.0057 WL²
+.0221 WL²
5 SPAN TOTAL = +.0176 WL²
+.0001 WL²
-.0008 WL²
+.0030 WL²
-.013 WL²
+.0385 WL²
5 SPAN TOTAL = +.0296 WL²
+.0002 WL²
-.0012 WL²
+.0046 WL²
-.070 WL²
+.0494 WL²
5 SPAN TOTAL = +.0359 WL²
1
2
3

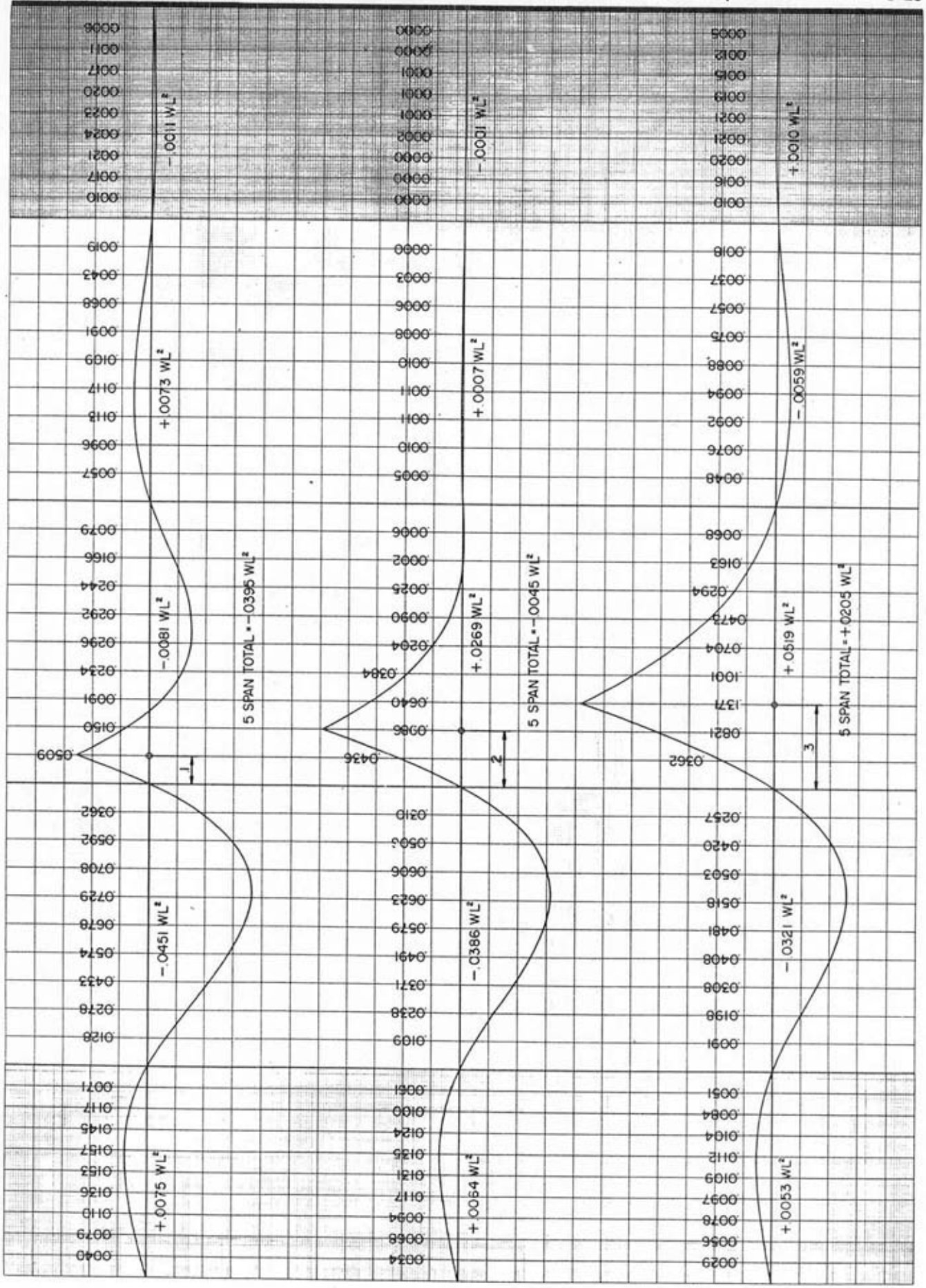
+.0002 WL²
−.0016 WL²
+.0061 WL²
−.0226 WL²
+.0545 WL²
5 SPAN TOTAL = +.0366 WL²
+.0003 WL²
−.0020 WL²
+.0076 WL²
−.0282 WL²
+.0539 WL²
5 SPAN TOTAL = +.0316 WL²
+.0004 WL²
−.0023 WL²
+.0091 WL²
−.0339 WL²
+.0479 WL²
5 SPAN TOTAL = +.0211 WL²
4
5
6

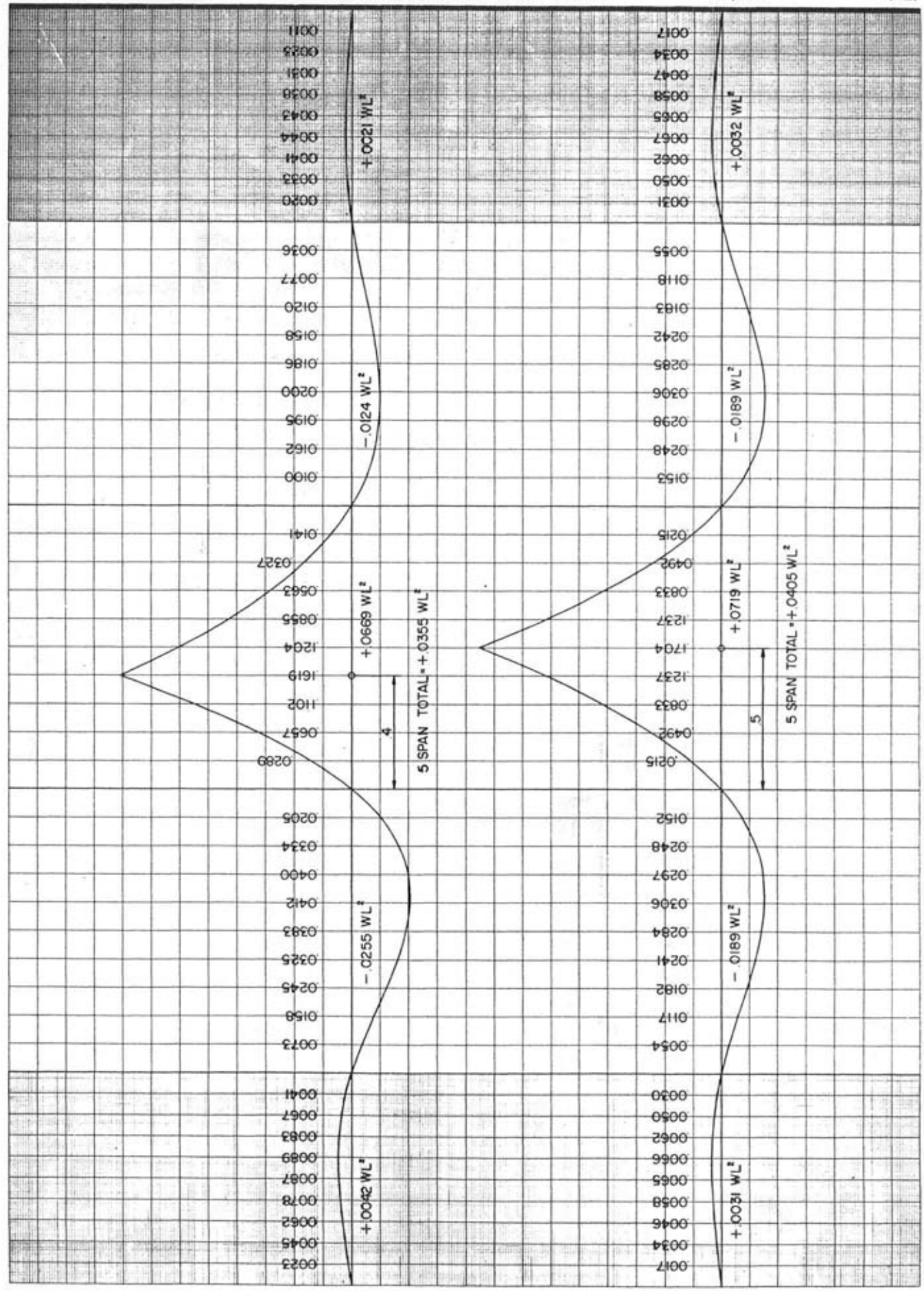
+.0005 WL²
-.0027 WL²
+.0106 WL²
5 SPAN TOTAL = +.0049 WL²
-.0396 WL²
+.0362 WL²
.7
+.0005 WL²
-.0031 WL²
+.0122 WL²
5 SPAN TOTAL = -.0168 WL²
-.0452 WL²
+.0188 WL²
.8
+.0006 WL²
-.0035 WL²
+.0137 WL²
5 SPAN TOTAL = -.0443 WL²
-.0508 WL²
-.0041 WL²
.9

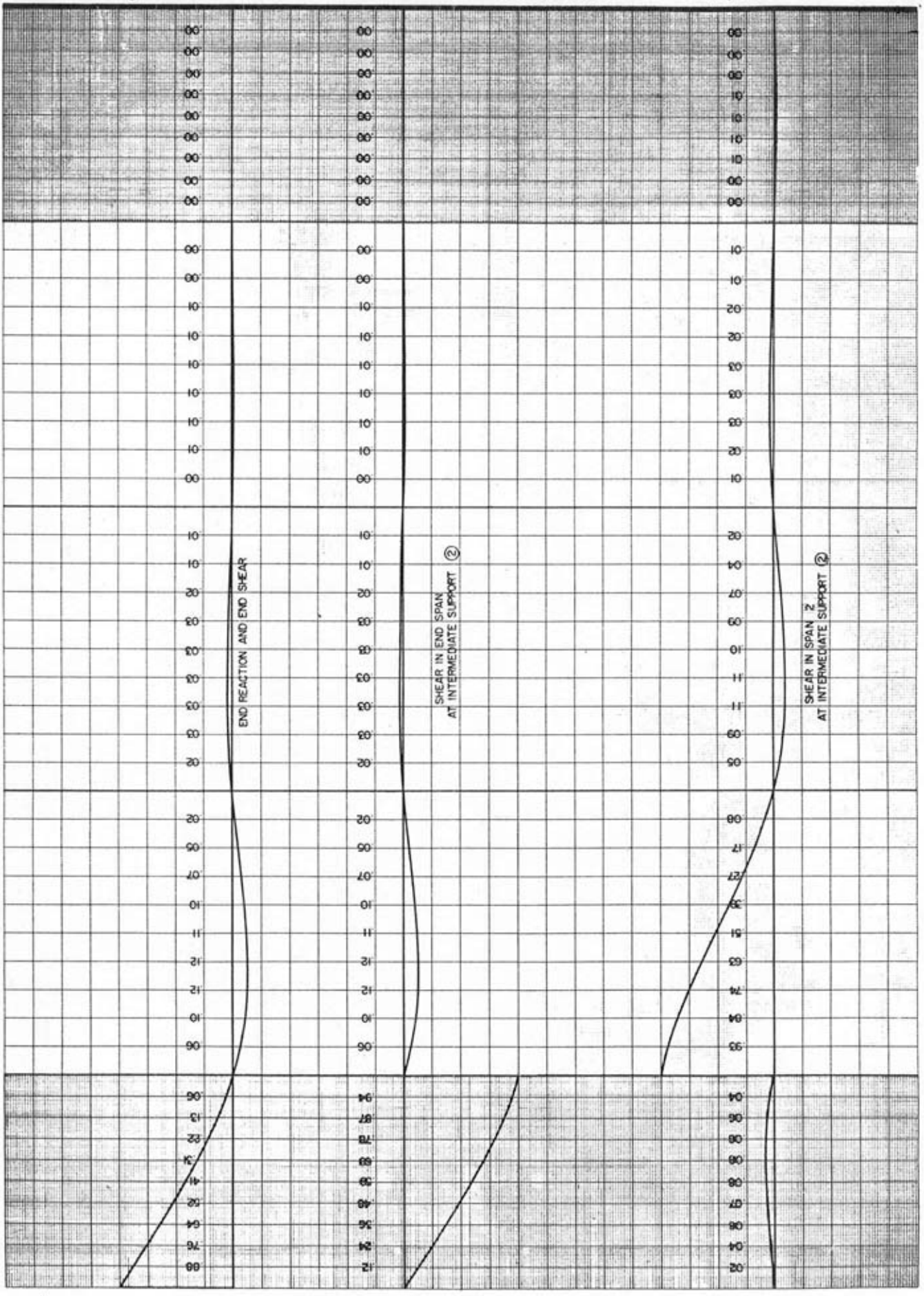

+.0004 WL²
+.0001 WL²
-.0002 WL²
-.0021 WL²
-.0003 WL²
+.0014 WL²
+.0084 WL²
5 SPAN TOTAL = -.0330 WL²
+.0016 WL²
5 SPAN TOTAL = -.0013 WL²
-.0053 WL²
5 SPAN TOTAL = +.0255 WL²
-.0110 WL²
+.0245 WL²
+.0499 WL²
-.0286 WL²
-.0245 WL²
-.0203 WL²
1
2
3

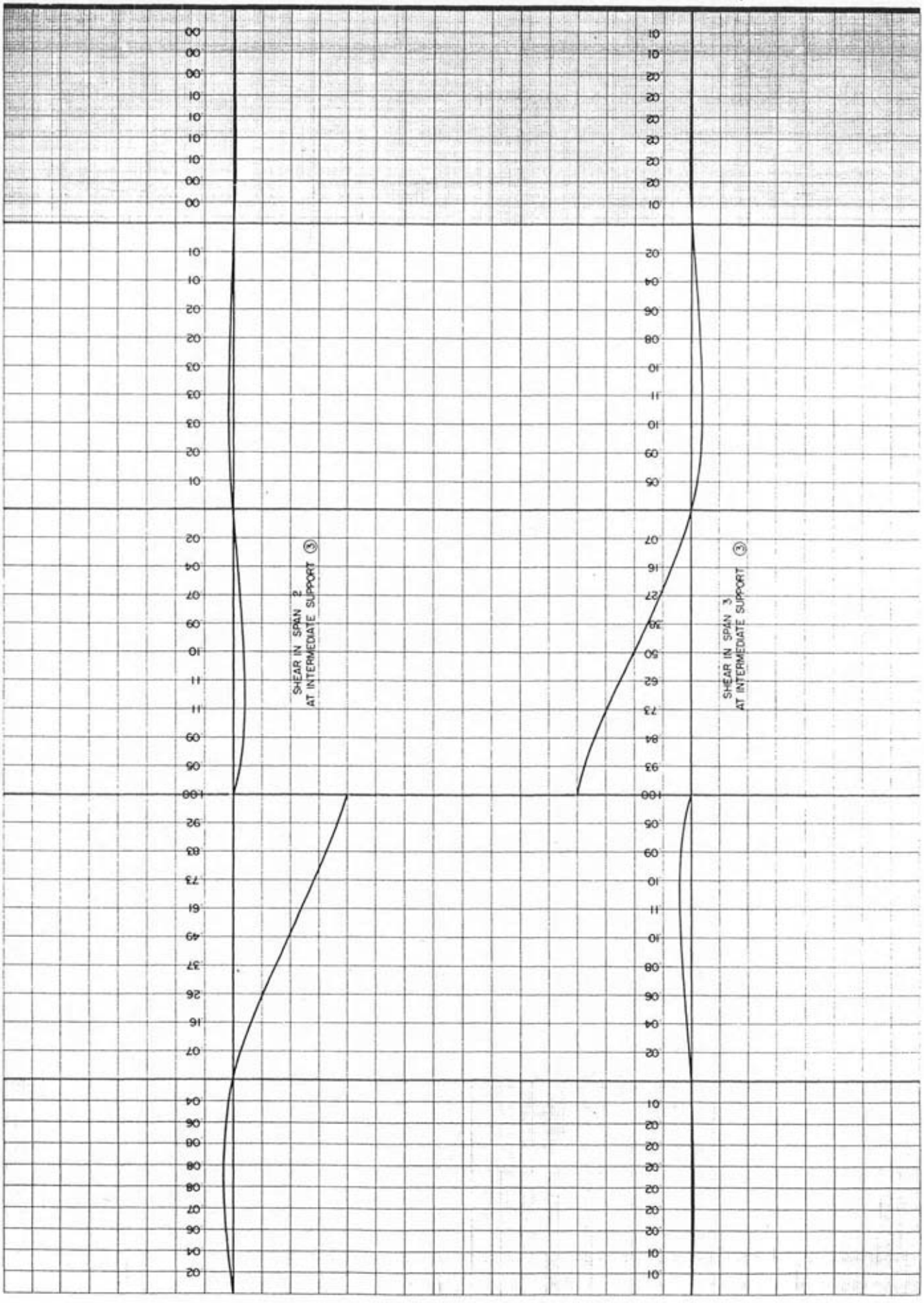
-.0005 WL²
+.0032 WL²
-.0121 WL²
+.0654 WL²
-.0162 WL²
5 SPAN TOTAL = +.0398 WL²
-.0008 WL²
+.0050 WL²
-.0189 WL²
+.0709 WL²
-.0121 WL²
5 SPAN TOTAL = +.0441 WL²
-.0009 WL²
+.0068 WL²
-.0257 WL²
+.0664 WL²
-.0090 WL²
5 SPAN TOTAL = +.0384 WL²
4
5
6

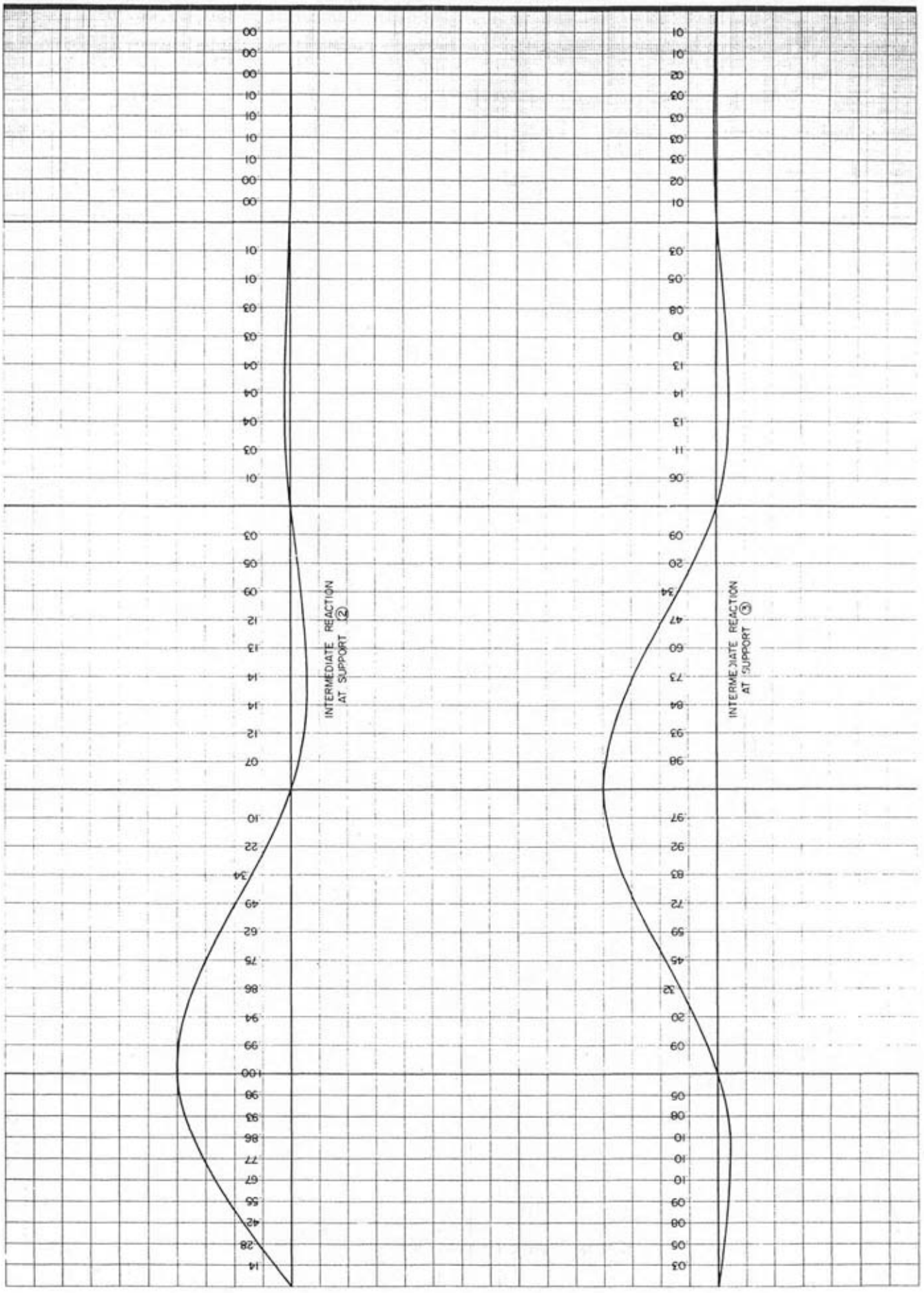
-.0013 WL²
+.0086 WL²
-.0326 WL²
5 SPAN TOTAL = +.0227 WL²
+.0519 WL²
.7
-.0039 WL²
-.0016 WL²
+.0103 WL²
-.0394 WL²
5 SPAN TOTAL = -.0031 WL²
+.0273 WL²
.8
+.0003 WL²
-.0019 WL²
+.0121 WL²
-.0463 WL²
5 SPAN TOTAL = -.0388 WL²
-.0072 WL²
.9
+.0045 WL²


-.0011 WL²
+.0073 WL²
-.0081 WL²
5 SPAN TOTAL = -.0395 WL²
-.0451 WL²
+.0075 WL²
-.0001 WL²
+.0007 WL²
+.0269 WL²
5 SPAN TOTAL = -.0045 WL²
-.0386 WL²
+.0064 WL²
+.0010 WL²
-.0059 WL²
+.0519 WL²
5 SPAN TOTAL = +.0205 WL²
-.0321 WL²
+.0053 WL²
1
2
3


+.0021 WL²
-.0124 WL²
+.0669 WL²
5 SPAN TOTAL = +.0355 WL²
4
-.0255 WL²
+.0042 WL²
+.0032 WL²
-.0189 WL²
+.0719 WL²
5 SPAN TOTAL = +.0405 WL²
5
-.0189 WL²
+.0031 WL²


END REACTION AND END SHEAR
SHEAR IN END SPAN AT INTERMEDIATE SUPPORT ②
SHEAR IN SPAN 2 AT INTERMEDIATE SUPPORT ②

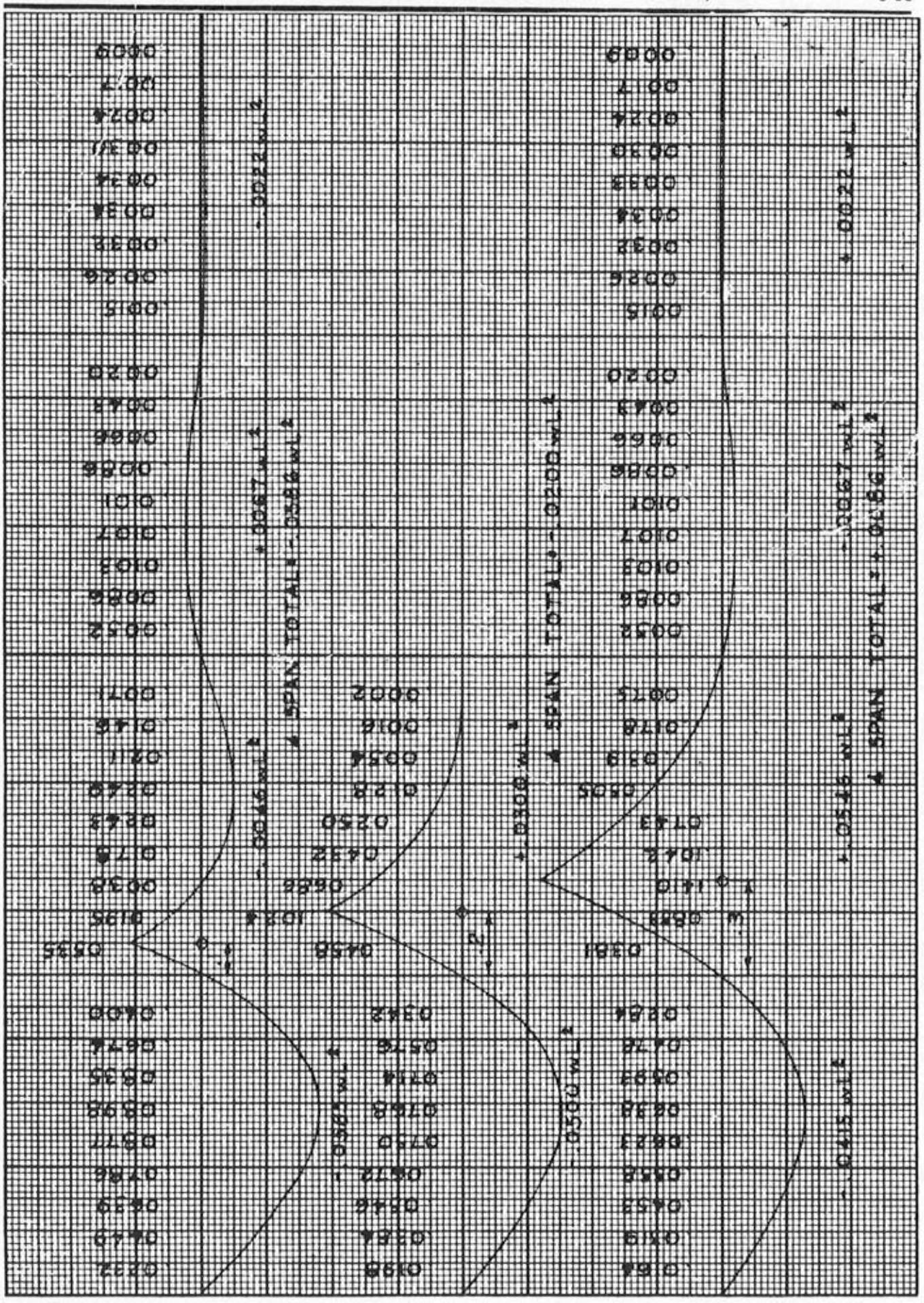

SHEAR IN SPAN 2
AT INTERMEDIATE SUPPORT ③
SHEAR IN SPAN 3
AT INTERMEDIATE SUPPORT ③

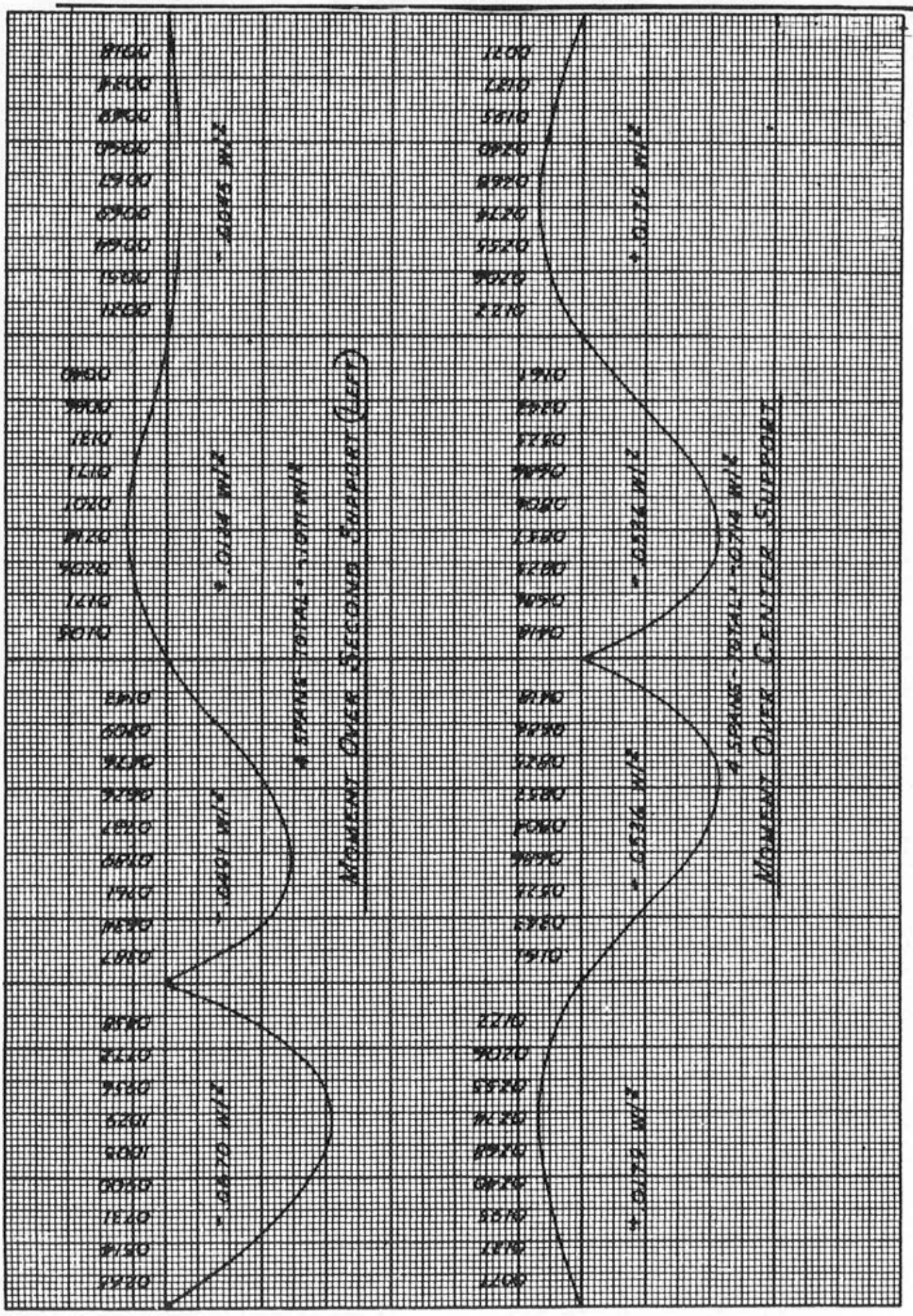

INTERMEDIATE REACTION AT SUPPORT ②
INTERMEDIATE REACTION AT SUPPORT ③

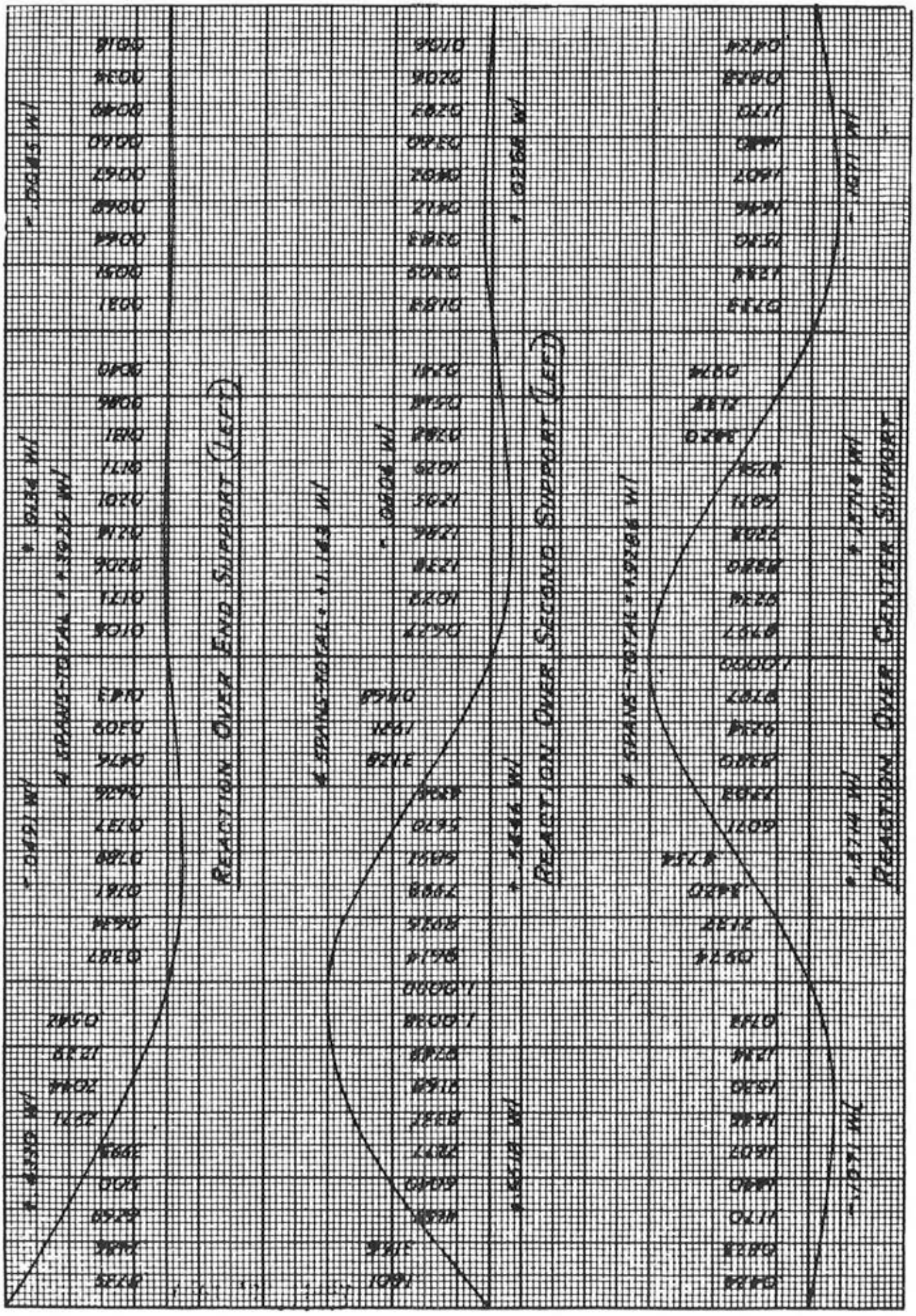
INFLUENCE LINES FOR FOUR EQUAL SPANS
SUPPORTED ENDS
SPANS UNITY - LOADS UNITY
MOMENT AT O
M_o = coeff$_p$ X PL
4 SPAN TOTAL = +.0343 WL^2
4 SPAN TOTAL = +.0386 WL^2
4 SPAN TOTAL = +.0729 WL^2
-.0049 WL^2
+.0013 WL^2
-.0005 WL^2
-.0098 WL^2
+.0027 WL^2
-.0009 WL^2
-.0147 WL^2
+.0040 WL^2
-.0013 WL^2
+.0383 WL^2
+.0666 WL^2
+.0849 WL^2
1
2
3
4

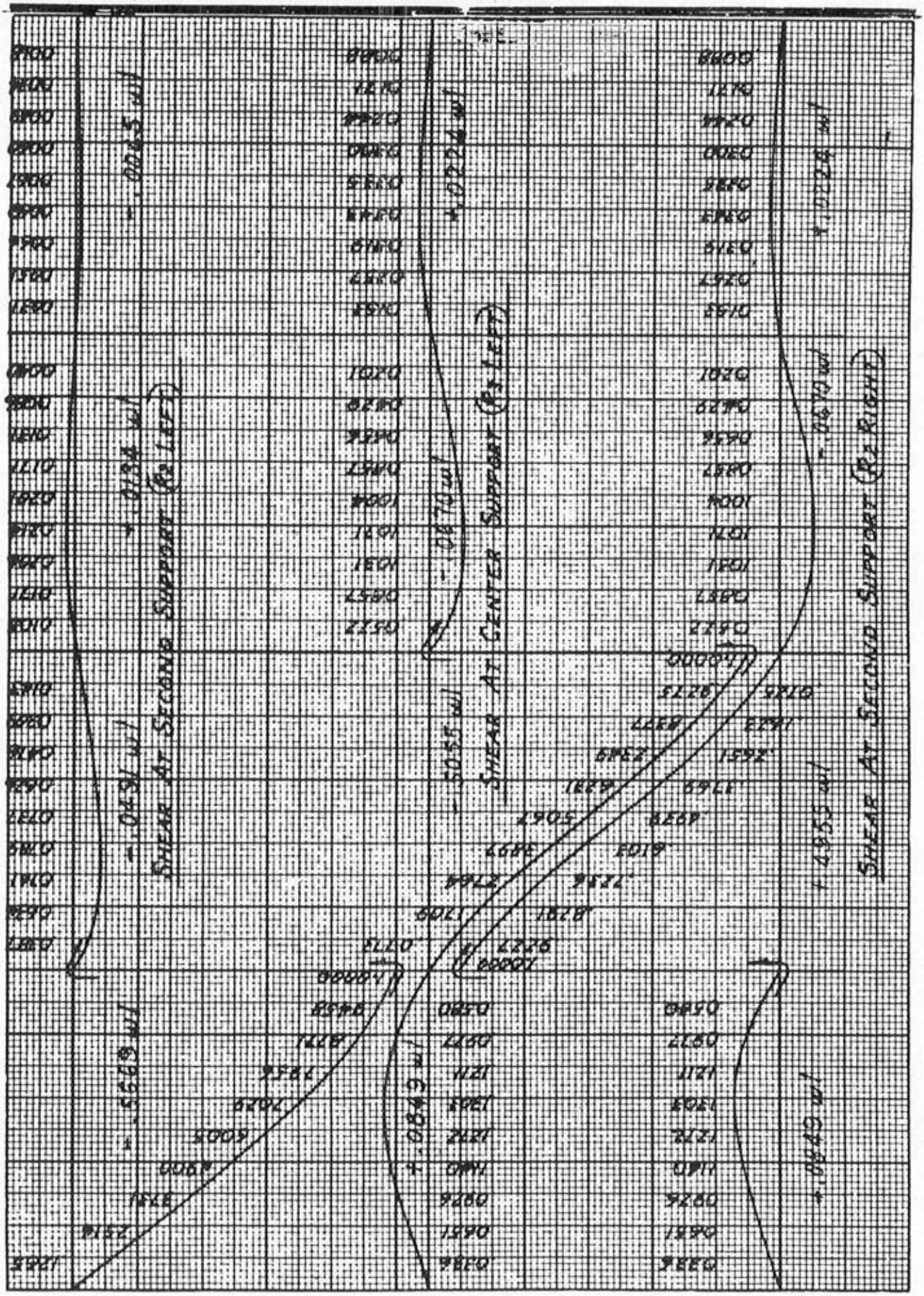
-.0018 WL2
+.0054 WL2
-.0196 WL2
+.0932 WL2
4 SPAN TOTAL = +.0771 WL2
-.0022 WL2
+.0067 WL2
-.0246 WL2
+.0915 WL2
4 SPAN TOTAL = +.0714 WL2
-.0027 WL2
+.0080 WL2
-.0295 WL2
+.0798 WL2
4 SPAN TOTAL = +.0557 WL2

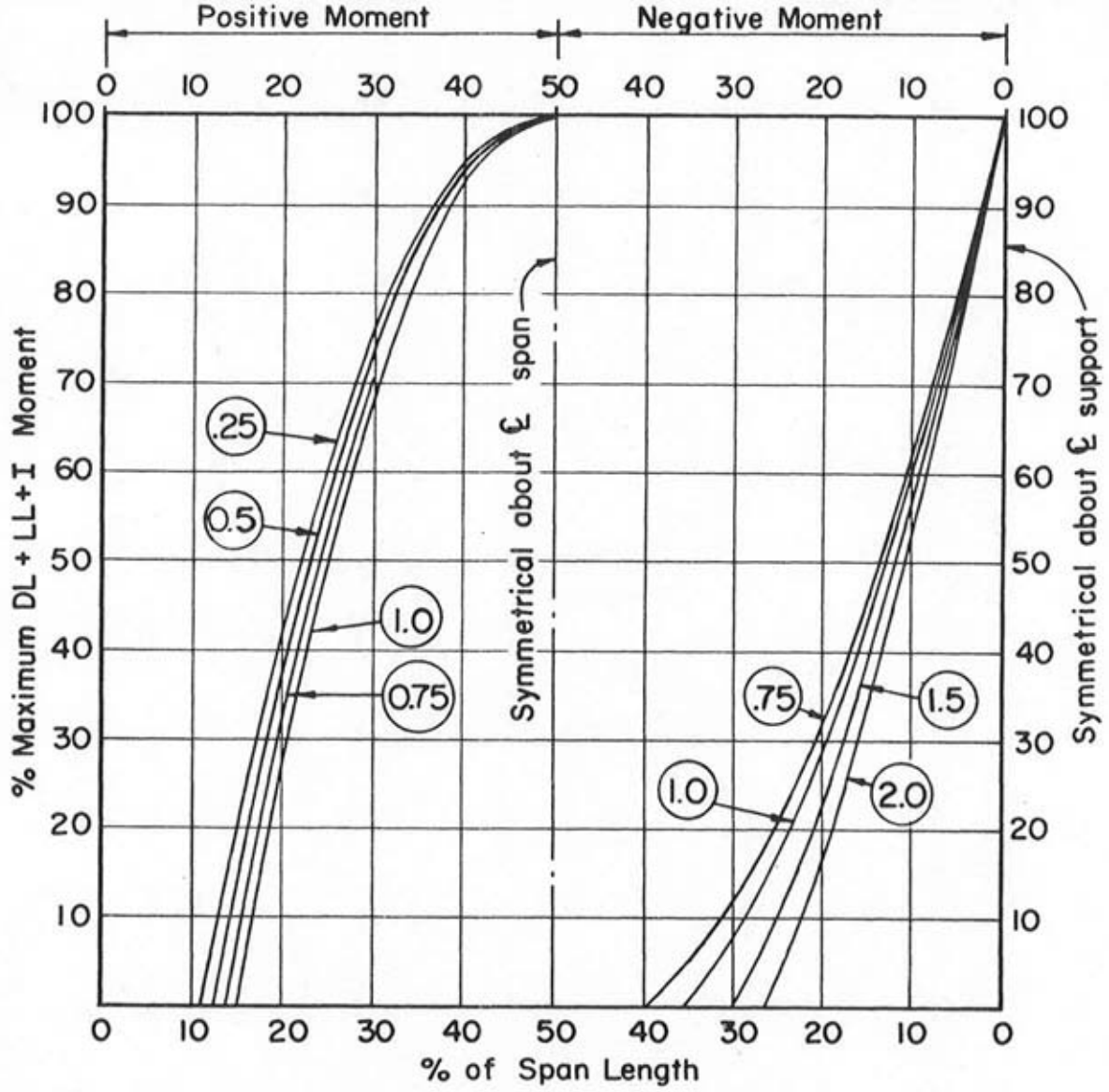
4 SPAN TOTAL = .0514 WL²
+ .0121 WL²
- .0040 WL²
- .0442 WL²
- .0153 WL²
4 SPAN TOTAL = .0057 WL²
+ .0407 WL²
- .0036 WL²
- .0393 WL²
+ .0264 WL²
4 SPAN TOTAL = .0300 WL²
+ .0094 WL²
- .0031 WL²
- .0344 WL²
+ .0581 WL²




MOMENT OVER SECOND SUPPORT (LEFT)
4 SPANS - TOTAL = -.1071 W/L²
MOMENT OVER CENTER SUPPORT
4 SPANS - TOTAL = -.0714 W/L²


REACTION OVER END SUPPORT (LEFT)
REACTION OVER SECOND SUPPORT (LEFT)
REACTION OVER CENTER SUPPORT


SHEAR AT SECOND SUPPORT (R.L.)
SHEAR AT CENTER SUPPORT (R.L.)
SHEAR AT SECOND SUPPORT (R.L.)



NOTES: Use for Continuous Structures with approximately equal Spans, or adjacent to 3/4 length simply supported end span.

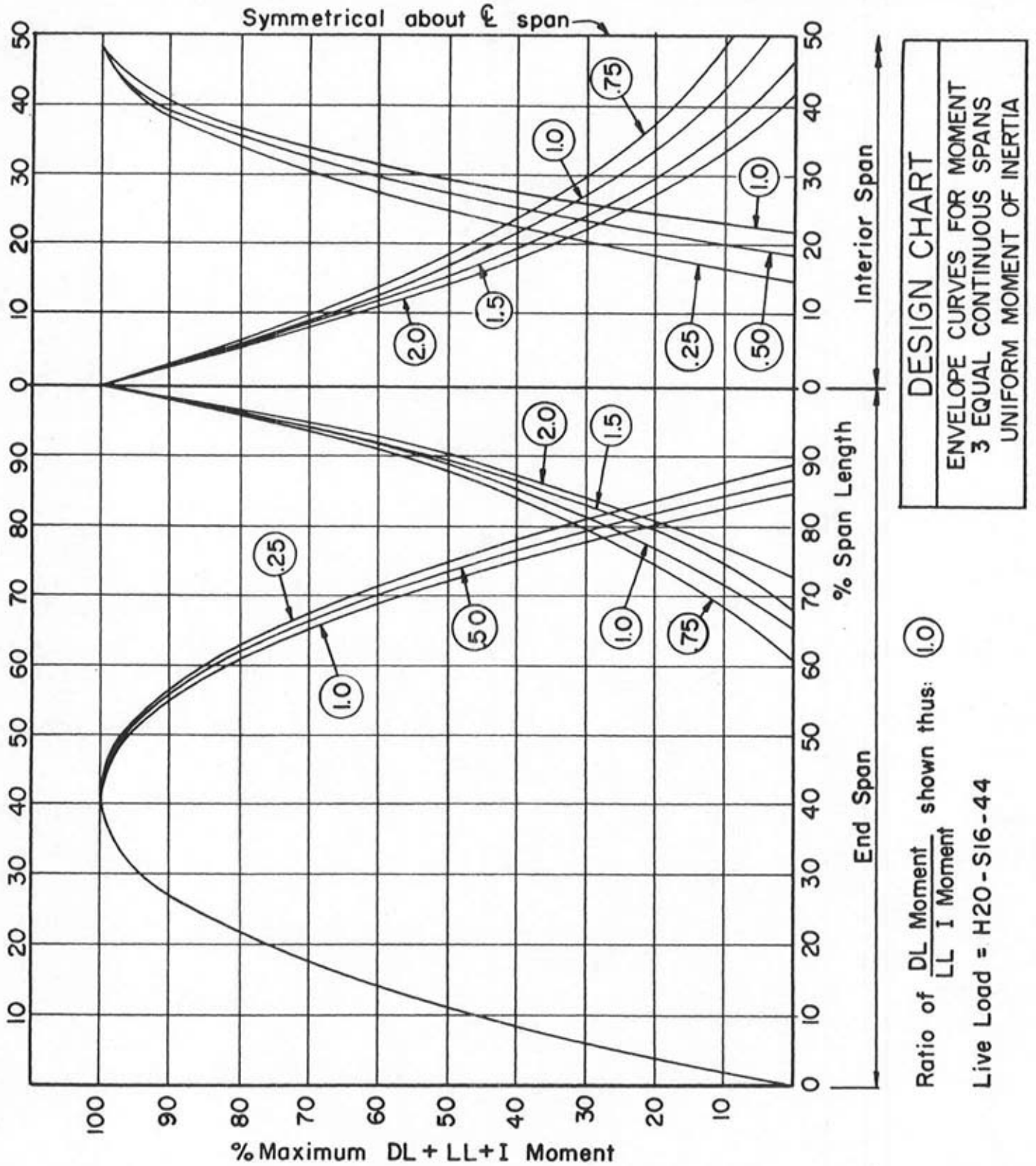
Ratio of $\frac{\text{DL Moment}}{\text{LL + I Moment}}$ shown thus: (1.0)

AASHO 1944, and subsequent revisions.

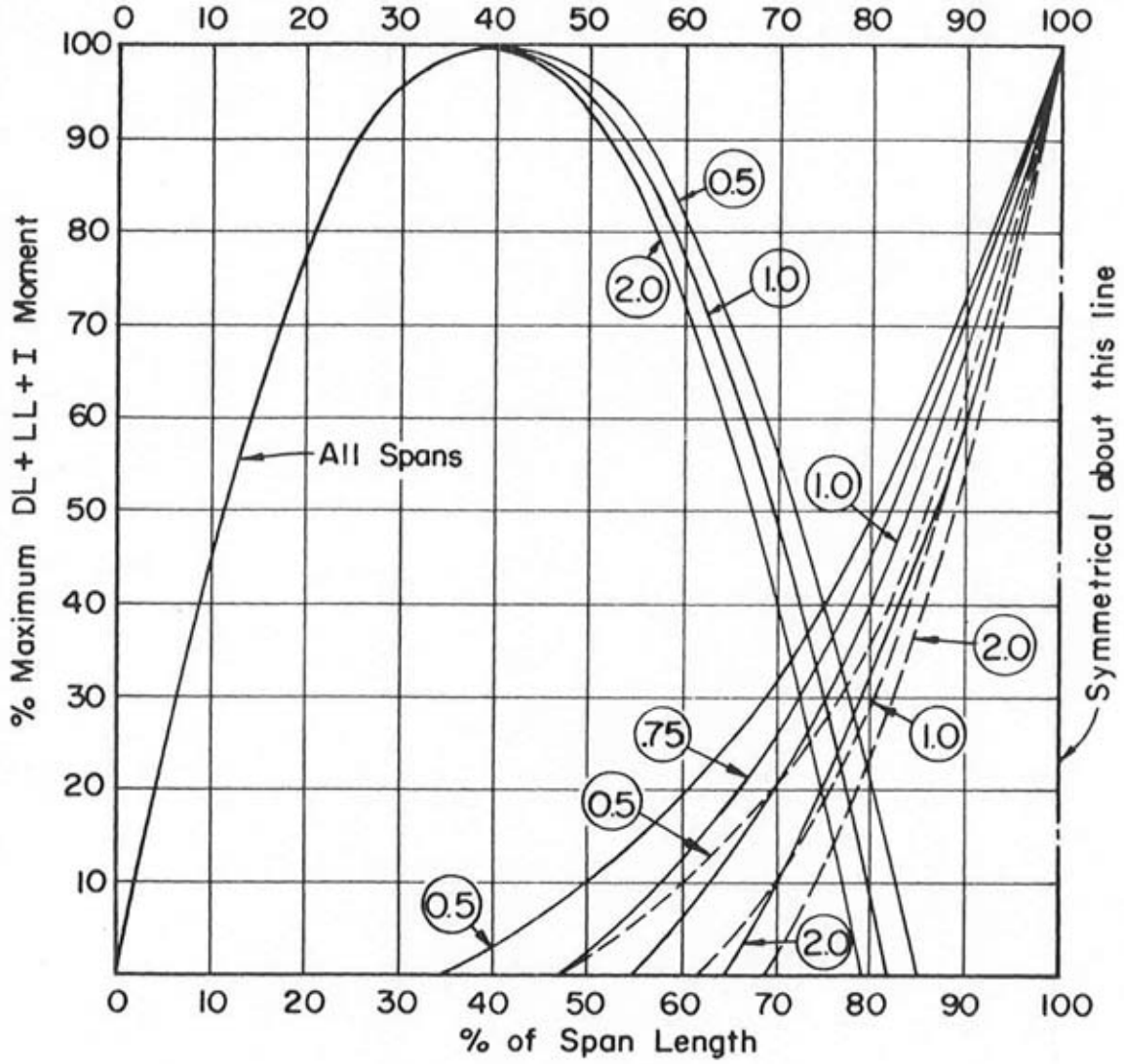
LL H20-S16-44

USE OF CHART: Calculate max. negative DL+LL+IM at support by conventional methods. Call this total 100%. Find ratio $\frac{DLM}{LL+IM}$ using max. M values at support. To find max. neg. M at other points in span, read % from proper ratio curve and multiply max. neg. M at support by this %. Calculate max. positive DL+LL+I M at ℄ span, and continue as above, referring all values to ℄ span.

DESIGN CHART
ENVELOPE CURVES FOR MOMENT-INTERIOR SPAN - UNIFORM MOM. OF INERTIA



This chart can be used for any structure of 3 continuous spans of uniform moment of inertia. In a structure having columns fixed with the deck the negative moment curves will change from the values indicated. For "Use of Chart" see Design Chart on Interior Span.



Ratio of $\frac{\text{DL Moment}}{\text{LL+I Moment}}$ shown thus: (1.0)

This chart can be used for a 2 span continuous structure in which the ends and center are simply supported. It may be used for a structure in which the center bent is fixed with the girders, however bar lengths will be slightly longer than required.

SOLID LINES —— 50' spans
DASHED LINES - - - - - 100' spans

DESIGN CHART
ENVELOPE CURVES FOR MOMENT 2 EQUAL CONTINUOUS SPANS UNIFORM I LIVE LOAD H20-S16-44