research report

Design Provisions for Cold-Formed Steel Columns and Beam Columns

RESEARCH REPORT RP92-1

SEPTEMBER 1992
REVISION 2009

Committee on Specifications
for the Design of Cold-Formed
Steel Structural Members

American Iron and Steel Institute

The material contained herein has been developed by researchers based on their research findings. The material has also been reviewed by the American Iron and Steel Institute Committee on Specifications for the Design of Cold-Formed Steel Structural Members. The Committee acknowledges and is grateful for the contributions of such researchers.

The material herein is for general information only. The information in it should not be used without first securing competent advice with respect to its suitability for any given application. The publication of the information is not intended as a representation or warranty on the part of the American Iron and Steel Institute, or of any other person named herein, that the information is suitable for any general or particular use or of freedom from infringement of any patent or patents. Anyone making use of the information assumes all liability arising from such use.

Copyright 1992 American Iron and Steel Institute
Revised Edition Copyright 2009 American Iron and Steel Institute

Teoman Peköz, PhD
Structural Engineer

621 Cayuga Heights Road
Ithaca, New York 14850
Phone: 607-257-6624
607-255-6366
Fax: 607-255-3760
E-Mail: PEKOZT@BRIDGE.TN.CORNELL.EDU

September 30, 1992

TO: **American Iron and Steel Institute, Subcommittee 22 - Compression Members**

Rack Manufacturers Institute Specification Advisory Committee

FROM: **Teoman Peköz and Özgür Sümer**
SUBJECT: **Final Report - DESIGN PROVISIONS FOR COLD-FORMED STEEL COLUMNS AND BEAM COLUMNS**

Results of two research projects are presented together because of their close relationship:

- *Research to develop an improved design approach for cold-formed steel columns was carried out for the* ***AMERICAN IRON AND STEEL INSTITUTE.***

- *Research on cold-formed steel beam-columns was carried out for the* ***RACK MANUFACTURERS INSTITUTE*** *as a part of the research to develop an improved design approach for frames. Further studies on frame design will be reported separately.*

- *Possible design provisions based on this study are given in Appendix F.*

C O N T E N T S

In the first phase of the column research, the effect of local buckling and residual stresses on over-all column buckling was studied. These studies are discussed in Appendix A. It is seen in Appendix A that a desirable approach would be to adopt sufficiently accurate column design equations rather than trying to account for the effects of residual stresses on the post-local buckling behavior explicitly.

Figure 1 taken from Peköz, T. (1988) leads to the conclusion that the column design equations of the Load and Resistance Factor Design Specification of the American Institute of Steel Construction [1986] may be satisfactory. In this figure, curves designated AISI, AISC, ECCS are according to the AISI (1986), AISC (1986) and European Convention for Constructional Steelwork (1987) Recommendations, respectively. Curves designated with subscripts include resistance or safety factors. The work reported in Pekoz (1988) given as Appendix E did not include partiaally effective sections and sections loaded eccentrically.

1. DATA BASE

Test results from several sources were used in the evaluation of the present design provisions and possible changes to them for columns and beam columns. A wide variety of types of sections were used in these evaluations. The cross-sectional dimensions, and other pertinent information along with the test results are given in the tables of this appendix. The notation for the sections used are illustrated in Figs. B1 through B3.

The test results evaluated were on sections having component elements with a wide range of width to thickness ratios. Some of these sections were fully effective at buckling, some were not.

The following assumptions were made regarding the information not given in the references.

- The yield stress of the material at the flat portions is assumed equal to the yield stress of the virgin material.
- If not given explicitly, ultimate stress for the material is assumed as

  $F_{ult}=1.25F_y$

  These values were used in the equations to estimate the increase in the yield stress due to cold work.

- In the symmetric sections, dimensions are given as the outer dimensions and the corners are assumed to be sharp.
- For all cases dimensions given are the outer dimensions except for Specimens of Mulligan and Pekoz (1983) where the dimensions are the flat dimensions.
- If not given explicitly the outer radius is assumed as 4 times the thickness of the specimen.

2. CORRELATION STUDIES

Section C of the current AISI Specification (1986) has the following formulas for the nominal limit stress F_n:

For $F_e > F_y/2$ $\quad F_n = F_y(1 - F_y/4F_e)$

For $F_e \leq F_y/2$ $\quad F_n = F_e$

These equations can also be written as

For $\lambda_c \leq \sqrt{2}$ $\quad F_n = (1 - \lambda_c^2/4)F_y$

For $\lambda_c > \sqrt{2}$ $\quad F_n = F_y/\lambda_c^2$

where

$$\lambda_c = \sqrt{\frac{F_y}{F_e}}$$

An observed column strength divided by the column strength predicted using these equations is designated ra in the tables of Appendices C and D.

Chapter E of the AISC-LRFD Specification (1986) has the following formulas for the nominal limit state:

For $\lambda_c \leq 1.5$ $\quad F_n = (0.658^{\lambda_c^2})F_y$

For $\lambda_c > 1.5$ $\quad F_n = \left[\frac{0.877}{\lambda_c^2}\right]F_y$

An observed column strength divided by the column strength predicted using these equations is designated rc in the Tables of Appendices C and D.

In case the loading was eccentric with respect to the centroid of the effective section, ultimate loads were obtained using the interaction equations of the AISI Specification in Appendix C and the AISC-LRFD Specification in Appendix D. The interaction equations of the AISC-LRFD Specification were used in the form below:

For $\frac{P_u}{P_n} \geq 0.2$

$$\frac{P_u}{P_n} + \frac{8}{9}\left(\frac{M_{mux}}{M_{nx}} + \frac{M_{muy}}{M_{ny}}\right) \leq 1.0$$

For $\frac{P_u}{P_n} < 0.2$

$$\frac{P_u}{2P_n} + \left(\frac{M_{mux}}{M_{nx}} + \frac{M_{muy}}{M_{ny}}\right) \leq 1.0$$

where

$M_{mux} = C_{mx} M_{ux} / \alpha_{nx}$

$M_{muy} = C_{my} M_{uy} / \alpha_{ny}$

$1/\alpha_{nx}, 1/\alpha_{ny} = 1/\left[1 - \frac{P_u}{P_E}\right]$

All other terms are as defined in the AISI LRFD Specification.

The following are given in the tables of Appendices C and D:

- the value of the width of the widest element divided by the thickness is tabulated under wmax/t. For I sections made up of two back to back channels, wmax was taken as the flat width of the unstiffened element.
- eccentricities of the axial load in inches. Eccentricities are with respect to the centroidal axes of the full section. The symmetry axis for singly symmetric sections is the x axis.
- Ptest given is the ultimate load observed in test given in kips.
- rc and ra as defined above.
- means and coefficients of variation (c. o. v.), resistance factors (ϕ) and factors of safety (FS)

Resistance factors were calculated using the following statistics:

M_m = 1.10 Mean value of the material factor

V_m	=	0.10 Coefficient of variation of the material factor
F_m	=	1.00 Mean value of the fabrication factor
V_F	=	0.05 Coefficient of variation of the fabrication factor
P_m	=	Mean from the tests
V_p	=	c. o. v. from the tests

Factors of safety was based on the resistance factor and a live to dead load ratio of 5.

For each test series, calculations were repeated taking F_y as the yield stress of the flats and the average yield stress calculated according to the cold-forming effects formulas of the AISI Specification (1986).

The results given in Appendices C and D are summarized in Tables 1 and 2. In these tables, for each test series the following are given:

- means and coefficients of variation (c. o. v.), resistance factors and factors of safety. The results are designated calc. for those obtained with the AISC-LRFD Specification (1986) column design formulas and AISI for those obtained using the AISI Specification (1986) column design formulas.

- In Table 1 the results are obtained using the AISI Specification (1986) beam column formulas and in Table 2 results are obtained using the AISC-LRFD Specification (1986) beam column formulas.

- The numbers of tests for each series and the eccentricity characteristics are given. It is possible that for a series indicated as ex $\neq$ 0, a few specimen might have been tested concentrically even though the majority of sections were tested with eccentricity with respect to the y axis. Details of eccentricities can be found in the tables of the Appendices of C and D.

- For each test series the results of three types of calculations are given in Tables 1 and 2. These are given as follows:

    - First line in each group are the results for taking F_y as the yield stress of the flats

    - Second line is for taking for all sections F_y as the average yield stress calculated according to the cold-forming effects formulas of the AISI Specification (1986).

- Third line is taking F_y as in second line only for those sections that are fully effective.

- For those sections which were reported to have sharp corners only the type of analysis given in the first line was carried out.

3. CONCLUSIONS

The following conclusions can be drawn from the correlation studies:

- The test results evaluated represent a wide range of behavior modes. The specimens have partially or fully effective sections. They are subject to flexural or torsional flexural elastic and inelastic buckling.

- The results plotted in Figs. 1 and 2 show that the AISC-LRFD formulas represent the test results better than those of the AISI Specification. This can also be seen in Table 1. The means are closer to unity and the coefficients of variation are in general smaller for the AISC-LRFD column formulas than those for the AISI column formulas.

- In some cases the calculated value of the resistance factor is larger than unity, indicating that the predictions for those cases are overly conservative.

- It is seen in Table 1, that in general the eccentrically loaded columns required smaller resistance factors, indicating that the interaction equation used in the AISI Specification can be made more accurate. For this reason the studies reported in Table 2 and Appendix D were carried out.

- The results reported in Table 2 and Appendix D show that the AISC-LRFD beam column interaction equations are more accurate for predicting the test results. It should be pointed out that only the interaction equations are studied here, and not the approach of the AISC-LRFD Specification to account for P-Δ effects. These effects are being studied for the Rack Manufacturers Institute and will be reported separately.

- The ratio rc is plotted against the wmax/t ratios in Figs. 3 through 6. Figure 6 is for a wide range of wmax/t ratios and shows a trend of decreasing rc values as the wmax/t increases. This would indicate a possiblity of varying resistance factor of factors or safety for different values of wmax/t. However the additional complication introduced by this approach was not thought to be desirable. There appears some justification for the use of larger factor of safety for thinner sections as is done in the AISI ASD Specification.

- The results obtained using the AISC LRFD Specification column formulas and beam column interaction formulas are plotted in Fig. 7 through 9. The solid line represents the AISC LRFD interaction formulas. The results shown in these figures and tabulated in Table 2 lead to the conclusion that the AISC LRFD beam column equation give more accurate results.

- The use of the increased yield stress due to cold-forming does not seem to influence the c.o.v. for the results compared to using the yield stress of the flats. Obviously, the resistance factors increase and the required factors of safety decrease when the increased yield stresses are used. Though the numerical values do not indicate strong grounds for adopting either approach, it appears more reasonable to use the yield stress of the flat in design. This is a decision to be made by the Specification writing committees and subcommittees.

- The magnitude of the resistance factor and the factor of safety should be decided by the Specification writing Committees and Subcommittees on the basis of the information given in this report. Resistance factor values between 0.85 and 0.90 and factors of safety values between 1.92 and 1,67 appear quite reasonable.

- Possible design provisions based on this study are given in Appendix F. Plots to help the evaluation of the impact of these provisions are also given in Appendix F.

4. REFERENCES

American Institute of Steel Construction (1986), "Load and Resistance Factor Design Specification for Structural Steel Buildings," American Institute of Steel Construction 1986.

American Iron and Steel Institute (1986), "Specification for the Design of Cold-Formed Steel Structural Members," Washington, D.C.

Dat, D. T. and Pekoz, T., Project Director [1980], "The Strength of Cold-Formed Steel Columns," Research Report, Department of Structural Engineering, Cornell University, 1980.

DeWolf, J.T., Peköz, T. and Winter, G. (1973), "Local and Overall Buckling of Cold Formed Compression Members," Department of Structural Engineering, Cornell University.

DeWolf, J.T., Peköz, T. and Winter, G., (1974), "Local and Overall Buckling of Cold-Formed Steel Members," Journal of the Structural Division, October.

European Convention for Constructional Steelwork [1987], "European Recommendations for the Design of Light Gauge Steel Members," European Convention for Constructional Steelwork, 1987.

Kalyanaraman, V., Peköz, T. and Winter, G. (1972), "Performance of Unstiffened Compression Elements," Department of Structural Engineering Report, Cornell University.

Loh, T.S. and Peköz, T., Project Director (1985), "Combined Axial Load and Bending in Cold Formed Steel Members," Department of Structural Engineering Report, Cornell University.

Loughlan, J. (1979), "Mode Interaction in Lipped Channel Columns Under Concentric and Eccentric Loading," Ph.D. Thesis, Department of Mechanics of Materials, University of Strathclyde, Glasgow.

Mulligan, G.P. and Peköz, T. (1984), "Locally Buckled Thin-Walled Columns," Journal of the Structural Division, ASCE, November 1984.

Mulligan, G.P. and Peköz, T. Project Director (1983), The Influence of Local Buckling on the Structural Behavior of Single Symmetric Cold Formed Steel Columns," Department of Structural Engineering Report, Cornell University.

Peköz, T. (1988), "Design of cold-formed steel columns," Proceedings, Ninth International Conference on Cold-Formed Steel Structures, St. Louis, Mo. 27-42

Peköz, T. (1987), "Development of a Unified Approach to the Design of Cold-Formed Steel Members," American Iron and Steel Institute, Report SG-86-4, November 1986.

Thomasson, P.O. (1978), "Thin-Walled C-Shaped Panel in Axial Compression," Document D1:1978, Swedish Council for Building Research, Stockholm, Sweden.

Weng, C. C. and Peköz, T., Project Director (1987), "Flexural Buckling of Cold-Formed Steel Columns," Research Report, Department of Structural Engineering, Cornell University, 1987.

TABLE 1
SUMMARY OF RESULTS
AISI AND AISC-LRFD COLUMN DESIGN EQUATIONS WITH
AISI BEAM-COLUMN INTERACTION EQUATIONS

Mean Calc.	Mean AISI	c.o.v. Calc.	c.o.v. AISI	ϕ Calc.	ϕ AISI	F.S. Calc.	F.S. AISI
BOX SECTIONS OF DEWOLF, PEKOZ AND WINTER (1973) [N = 18, ex = 0, ey = 0]							
1.131	1.055	0.050	0.082	1.036	0.945	1.481	1.622
BACK TO BACK CHANNELS OF DEWOLF, PEKOZ AND WINTER (1973) [N = 16, ex = 0, ey = 0]							
1.267	1.184	0.076	0.058	1.141	1.080	1.344	1.420
BACK TO BACK CHANNELS KALYANARAMAN, PEKOZ AND WINTER (1972) [N = 15, ex = 0, ey = 0]							
1.096	0.999	0.114	0.105	0.954	0.877	1.608	1.748
TEST RESULTS OF WENG AND PEKOZ (1987) [N = 40, ex = 0, ey = 0]							
1.025	0.918	0.078	0.086	0.922	0.820	1.663	1.869
0.984	0.880	0.082	0.081	0.882	0.789	1.738	1.943
0.985	0.864	0.081	0.094	0.884	0.767	1.734	2.000
HAT SECTIONS OF DAT AND PEKOZ (1980) [N = 15, ex = 0, ey = 0]							
1.165	1.040	0.090	0.094	1.038	0.922	1.477	1.662
1.076	0.951	0.074	0.062	0.971	0.866	1.580	1.772
1.076	0.951	0.074	0.062	0.971	0.866	1.580	1.772
LIPPED CHANNELS OF DAT AND PEKOZ (1980) [N = 45, ex = 0, ey = 0]							
1.085	0.986	0.193	0.213	0.848	0.746	1.809	2.057
1.009	0.912	0.178	0.188	0.807	0.717	1.901	2.138
1.009	0.912	0.178	0.188	0.807	0.717	1.901	2.138
TEST RESULTS OF MULLIGAN AND PEKOZ (1983) ECCENTRICALLY LOADED COLUMNS [N = 9, ex ≠ 0, ey = 0]							
1.073	1.040	0.153	0.162	0.889	0.852	1.724	1.800
1.062	1.028	0.151	0.160	0.882	0.844	1.738	1.816
1.073	1.040	0.153	0.162	0.889	0.852	1.724	1.800
TEST RESULTS OF MULLIGAN AND PEKOZ (1983) CONCENTRICALLY LOADED COLUMNS [N = 13, ex = 0, ey = 0]							
1.201	1.147	0.090	0.087	1.070	1.024	1.433	1.497
1.190	1.135	0.090	0.087	1.059	1.014	1.447	1.512
1.201	1.147	0.090	0.087	1.070	1.024	1.433	1.497

TABLE 1 (Cont.)
SUMMARY OF RESULTS
AISI AND AISC-LRFD COLUMN DESIGN EQUATIONS WITH
AISI BEAM-COLUMN INTERACTION EQUATIONS

Mean Calc.	Mean AISI	c.o.v. Calc.	c.o.v. AISI	ϕ Calc.	ϕ AISI	F.S. Calc.	F.S. AISI
HAT SECTIONS OF PEKOZ AND WINTER (1967) FROM PEKOZ (1987), TABLE 3.3-1 [N = 18, ex ≠ 0, ey = 0]							
1.239	1.127	0.167	0.140	1.007	0.951	1.523	1.613
1.221	1.110	0.178	0.151	0.976	0.922	1.571	1.663
1.221	1.110	0.178	0.151	0.976	0.922	1.571	1.663
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985) FROM PEKOZ (1987), TABLE 3.3-2 [N = 6, ex ≠ 0, ey = 0]							
1.575	1.554	0.227	0.227	1.163	1.147	1.318	1.336
1.489	1.469	0.207	0.208	1.137	1.121	1.349	1.368
1.489	1.469	0.207	0.208	1.137	1.121	1.349	1.368
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985) FROM PEKOZ (1987), TABLE 3.3-3 [N = 17, ex = 0, ey ≠ 0]							
1.405	1.367	0.128	0.126	1.202	1.174	1.276	1.307
1.345	1.309	0.124	0.121	1.157	1.129	1.325	1.358
1.345	1.309	0.124	0.121	1.157	1.129	1.325	1.358
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985) FROM PEKOZ (1987), TABLE 3.3-4 [N = 7, ex ≠ 0, ey ≠ 0]							
1.615	1.593	0.078	0.080	1.453	1.431	1.055	1.071
1.542	1.521	0.082	0.084	1.383	1.361	1.108	1.126
1.542	1.521	0.082	0.084	1.383	1.361	1.108	1.126
LIPPED CHANNEL SECTIONS OF THOMASSON (1978) FROM PEKOZ (1987), TABLE 7.3-2 [N = 13, ex = 0, ey = 0]							
1.039	0.976	0.099	0.087	0.918	0.871	1.670	1.760
1.034	0.971	0.098	0.086	0.914	0.867	1.677	1.768
1.039	0.976	0.099	0.087	0.918	0.871	1.670	1.760
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985) FROM PEKOZ (1987), TABLE 7.3-3 [N = 19, ex = 0, ey = 0]							
1.101	1.083	0.083	0.081	0.986	0.971	1.555	1.579
1.084	1.065	0.080	0.077	0.974	0.958	1.575	1.600
1.100	1.080	0.082	0.079	0.986	0.970	1.555	1.580

TABLE 1 (Cont.)
SUMMARY OF RESULTS
AISI AND AISC-LRFD COLUMN DESIGN EQUATIONS WITH
AISI BEAM-COLUMN INTERACTION EQUATIONS

Mean Calc.	Mean AISI	c.o.v. Calc.	c.o.v. AISI	ϕ Calc.	ϕ AISI	F.S. Calc.	F.S. AISI
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985) FROM PEKOZ (1987), TABLE 7.3-4 [N = 13, ex $\neq$ 0, ey $\neq$ 0]							
1.287	1.251	0.234	0.244	0.938	0.897	1.634	1.709
1.264	1.229	0.223	0.232	0.940	0.899	1.631	1.706
1.273	1.238	0.219	0.228	0.954	0.913	1.607	1.680
LIPPED CHANNEL SECTIONS OF LOUGHLAN (1979) FROM PEKOZ (1987), TABLE 7.3-5 [N = 20, ex = 0, ey = 0]							
1.087	1.049	0.050	0.046	0.996	0.963	1.540	1.592
1.077	1.040	0.050	0.046	0.987	0.954	1.554	1.607
1.087	1.049	0.050	0.046	0.996	0.963	1.540	1.592
HAT SECTIONS OF LOH AND PEKOZ (1985) [N = 15, ex $\neq$ 0, ey = 0]							
1.076	1.012	0.179	0.192	0.860	0.791	1.784	1.939
1.069	1.005	0.176	0.189	0.856	0.790	1.790	1.941
1.076	1.012	0.179	0.192	0.860	0.791	1.784	1.939
ALL TEST RESULTS FROM PEKOZ (1987), TABLES 3.3-2 ; 3.3-3 ; 3.3-4 [N = 30]							
1.488	1.458	0.154	0.157	1.231	1.202	1.246	1.276
1.420	1.390	0.146	0.148	1.188	1.160	1.290	1.322
1.420	1.390	0.146	0.148	1.188	1.160	1.290	1.322
ALL TEST RESULTS FROM PEKOZ (1987), TABLES 7.3-3, 7.3-4 [N = 32]							
1.177	1.151	0.187	0.189	0.927	0.904	1.653	1.696
1.157	1.131	0.179	0.182	0.923	0.900	1.661	1.704
1.170	1.144	0.176	0.178	0.939	0.915	1.633	1.675
ALL TEST RESULTS FROM PEKOZ (1987), TABLES 3.3-2 , 3.3-3 , 3.3-4 , 7.3-2 , 7.3-3 , 7.3-4 , 7.3-5 [N = 95]							
1.248	1.215	0.212	0.221	0.946	0.906	1.622	1.692
1.217	1.185	0.195	0.204	0.948	0.909	1.617	1.687
1.224	1.192	0.191	0.200	0.960	0.921	1.597	1.666

TABLE 2
SUMMARY OF RESULTS
AISI AND AISC-LRFD COLUMN DESIGN EQUATIONS WITH
LRFD BEAM-COLUMN INTERACTION EQUATIONS

Mean Calc.	c.o.v. Calc.	ϕ Calc.	F.S. Calc
BOX SECTIONS OF DEWOLF, PEKOZ AND WINTER (1973) [N = 18, ex = 0, ey = 0]			
1.131	0.050	1.036	1.481
BACK TO BACK CHANNELS OF DEWOLF, PEKOZ AND WINTER (1973) [N = 16, ex = 0, ey = 0]			
1.267	0.076	1.141	1.344
BACK TO BACK CHANNELS OF KALYANARAMAN, PEKOZ AND WINTER (1972) [N = 15, ex = 0, ey = 0]			
1.096	0.114	0.954	1.608

Mean Calc.	Mean AISI	c.o.v. Calc.	c.o.v. AISI	ϕ Calc.	ϕ AISI	F.S. Calc.	F.S. AISI
TEST RESULTS OF WENG AND PEKOZ (1987) [N = 40, ex = 0, ey = 0]							
1.024	0.918	0.078	0.086	0.922	0.820	1.663	1.869
0.984	0.880	0.082	0.081	0.882	0.789	1.738	1.943
0.985	0.864	0.081	0.094	0.884	0.766	1.734	2.001
HAT SECTIONS OF DAT AND PEKOZ (1980) [N = 15, ex = 0, ey = 0]							
1.165	1.040	0.090	0.094	1.038	0.922	1.477	1.662
1.165	1.040	0.090	0.094	1.038	0.922	1.477	1.662
1.076	0.951	0.074	0.062	0.971	0.866	1.580	1.772
LIPPED CHANNELS OF DAT AND PEKOZ (1980) [N = 45, ex = 0, ey = 0]							
1.085	0.986	0.193	0.213	0.848	0.746	1.809	2.057
1.081	0.982	0.185	0.204	0.855	0.753	1.794	2.036
1.009	0.912	0.178	0.188	0.807	0.717	1.901	2.138
TEST RESULTS OF MULLIGAN AND PEKOZ (1983) ECCENTRICALLY LOADED COLUMNS [N = 13, ex = 0, ey = 0]							
1.051	1.018	0.142	0.150	0.884	0.847	1.734	1.810
1.040	1.006	0.140	0.149	0.877	0.839	1.749	1.828
1.051	1.018	0.142	0.150	0.884	0.847	1.734	1.810

TABLE 2 (Cont.)
SUMMARY OF RESULTS
AISI AND AISC-LRFD COLUMN DESIGN EQUATIONS WITH
LRFD BEAM-COLUMN INTERACTION EQUATIONS

Mean Calc.	Mean AISI	c.o.v. Calc.	c.o.v. AISI	ϕ Calc.	ϕ AISI	F.S. Calc.	F.S. AISI
TEST RESULTS OF MULLIGAN AND PEKOZ (1983) CONCENTRICALLY LOADED COLUMNS [N = 13, ex = 0, ey = 0]							
1.176	1.123	0.083	0.080	1.053	1.008	1.456	1.521
1.165	1.111	0.083	0.080	1.044	0.998	1.469	1.536
1.176	1.123	0.083	0.080	1.053	1.008	1.456	1.521
HAT SECTIONS OF PEKOZ AND WINTER (1967) FROM PEKOZ (1987), TABLE 3.3-1 [N = 18, ex ≠ 0, ey = 0]							
1.207	1.095	0.188	0.162	0.950	0.897	1.614	1.710
1.191	1.081	0.199	0.172	0.921	0.872	1.664	1.759
1.191	1.081	0.199	0.172	0.921	0.872	1.664	1.759
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985) FROM PEKOZ (1987), TABLE 3.3-2 [N = 6, ex ≠ 0, ey = 0]							
1.457	1.437	0.220	0.220	1.089	1.074	1.408	1.428
1.378	1.359	0.200	0.201	1.065	1.048	1.440	1.463
1.378	1.359	0.200	0.201	1.065	1.048	1.440	1.463
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985) FROM PEKOZ (1987), TABLE 3.3-3 [N = 17, ex = 0, ey ≠ 0]							
1.313	1.276	0.126	0.123	1.127	1.099	1.361	1.395
1.258	1.221	0.122	0.119	1.084	1.057	1.414	1.451
1.258	1.221	0.122	0.119	1.084	1.057	1.414	1.451
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985) FROM PEKOZ (1987), TABLE 3.3-4 [N = 17, ex = 0, ey ≠ 0]							
1.479	1.457	0.077	0.079	1.332	1.310	1.151	1.171
1.412	1.390	0.080	0.083	1.268	1.246	1.209	1.231
1.412	1.390	0.080	0.083	1.268	1.246	1.209	1.231
LIPPED CHANNEL SECTIONS OF THOMASSON (1978) FROM PEKOZ (1987), TABLE 7.3-2 [N = 13, ex = 0, ey = 0]							
1.015	0.952	0.099	0.086	0.897	0.851	1.710	1.802
1.010	0.947	0.097	0.085	0.894	0.847	1.716	1.811
1.015	0.952	0.099	0.086	0.897	0.851	1.710	1.802

TABLE 2 (Cont.)
SUMMARY OF RESULTS
AISI AND AISC-LRFD COLUMN DESIGN EQUATIONS WITH LRFD BEAM-COLUMN INTERACTION EQUATIONS

Mean Calc.	Mean AISI	c.o.v. Calc.	c.o.v. AISI	ϕ Calc.	ϕ AISI	F.S. Calc.	F.S. AISI
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985) FROM PEKOZ (1987), TABLE 7.3-3 [N = 19, ex = 0, ey = 0]							
1.024	1.006	0.085	0.082	0.916	0.902	1.674	1.701
1.008	0.989	0.081	0.078	0.905	0.890	1.694	1.723
1.024	1.006	0.085	0.082	0.916	0.902	1.674	1.701
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985) FROM PEKOZ (1987), TABLE 7.3-4 [N 13= , ex ≠ 0, ey ≠ 0]							
1.199	1.163	0.223	0.234	0.890	0.849	1.722	1.806
1.177	1.142	0.212	0.222	0.892	0.850	1.719	1.803
1.186	1.151	0.208	0.218	0.905	0.863	1.695	1.776
LIPPED CHANNEL SECTIONS OF LOUGHLAN (1979) FROM PEKOZ (1987), TABLE 7.3-5 [N = 20, ex = 0, ey = 0]							
1.051	1.013	0.049	0.045	0.963	0.930	1.592	1.648
1.041	1.003	0.050	0.045	0.954	0.922	1.607	1.664
1.051	1.013	0.049	0.045	0.963	0.930	1.592	1.648
HAT SECTIONS OF LOH AND PEKOZ (1985) [N = 15, ex ≠ 0, ey = 0]							
1.057	0.990	0.171	0.184	0.853	0.785	1.797	1.954
1.049	0.983	0.169	0.181	0.850	0.783	1.804	1.959
1.057	0.990	0.171	0.184	0.853	0.785	1.797	1.954
ALL TEST RESULTS FROM PEKOZ (1987), TABLES 3.3-2 ; 3.3-3 ; 3.3-4 [N = 30]							
1.381	1.351	0.148	0.150	1.152	1.124	1.330	1.364
1.318	1.288	0.139	0.142	1.112	1.084	1.379	1.415
1.318	1.288	0.139	0.142	1.112	1.084	1.379	1.415
ALL TEST RESULTS FROM PEKOZ (1987), TABLES 7.3-3, 7.3-4 [N = 32]							
1.095	1.070	0.182	0.184	0.870	0.847	1.762	1.809
1.077	1.051	0.174	0.176	0.866	0.843	1.770	1.818
1.090	1.065	0.170	0.172	0.882	0.859	1.739	1.785
ALL TEST RESULTS FROM PEKOZ (1987), TABLES 3.3-2 , 3.3-3 , 3.3-4 7.3-2 , 7.3-3 , 7.3-4 , 7.3-5 [N = 95]							
1.174	1.141	0.196	0.205	0.912	0.874	1.680	1.754
1.146	1.114	0.180	0.189	0.914	0.876	1.678	1.750
1.153	1.121	0.176	0.184	0.925	0.887	1.658	1.728

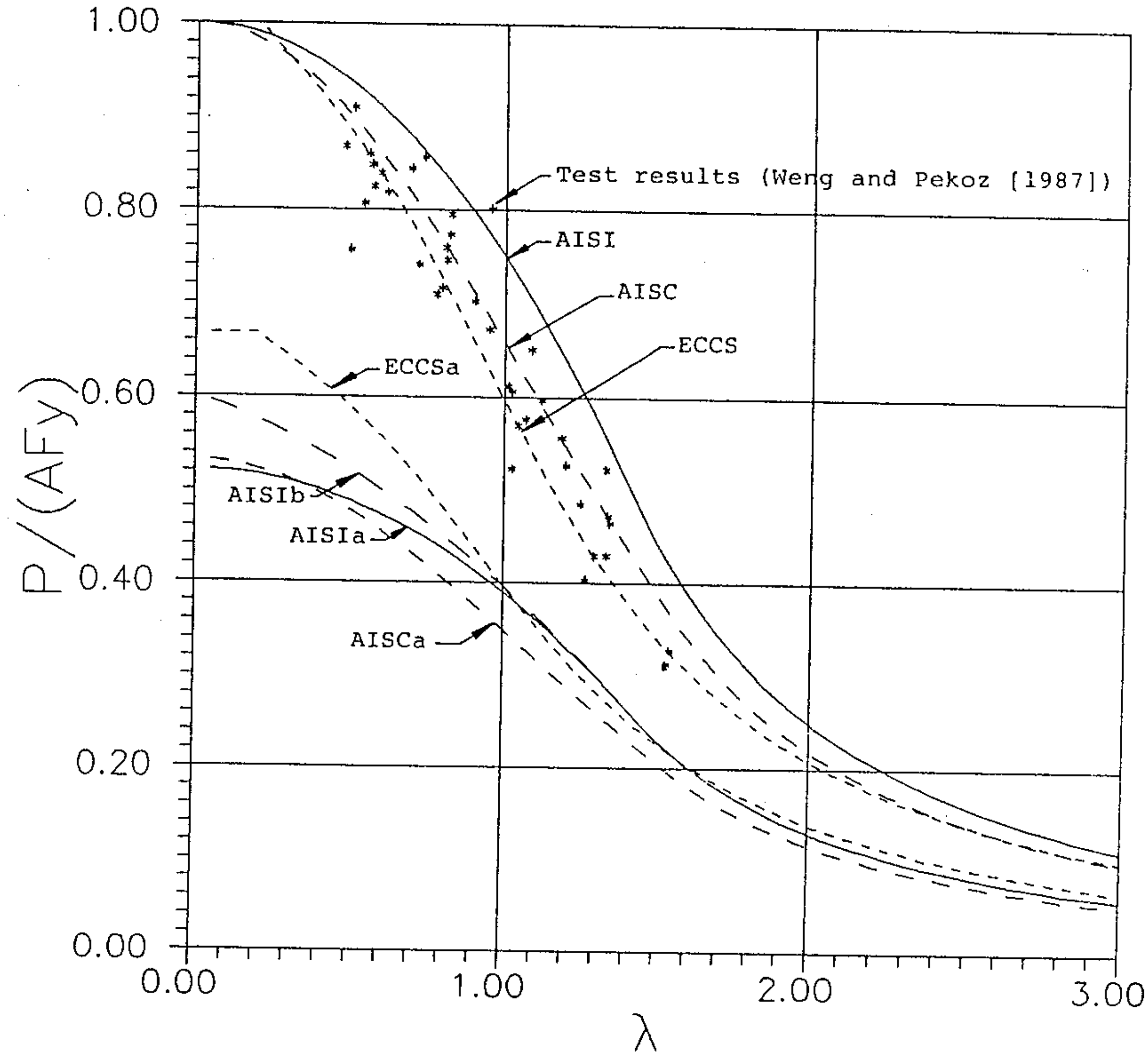


Fig. 1 COLUMN DESIGN EQUATIONS AND LIPPED CHANNEL SECTIONS OF WENG AND PEKOZ (1987) TAKEN FROM PEKOZ(1988)

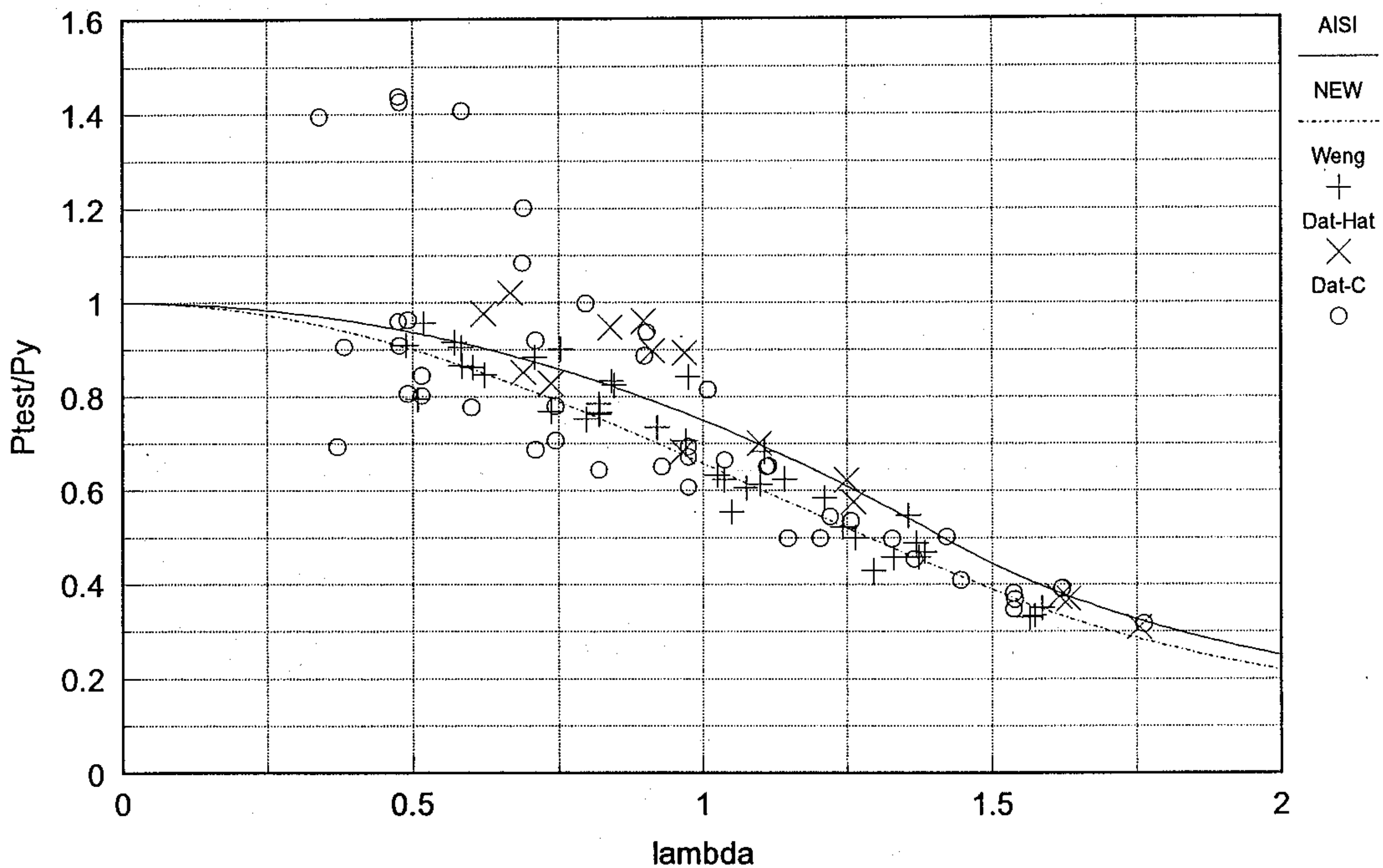


Fig. 2 LIPPED CHANNEL SECTIONS OF WENG AND PEKOZ (1987), HAT AND LIPPED CHANNELS OF DAT AND PEKOZ (1980)

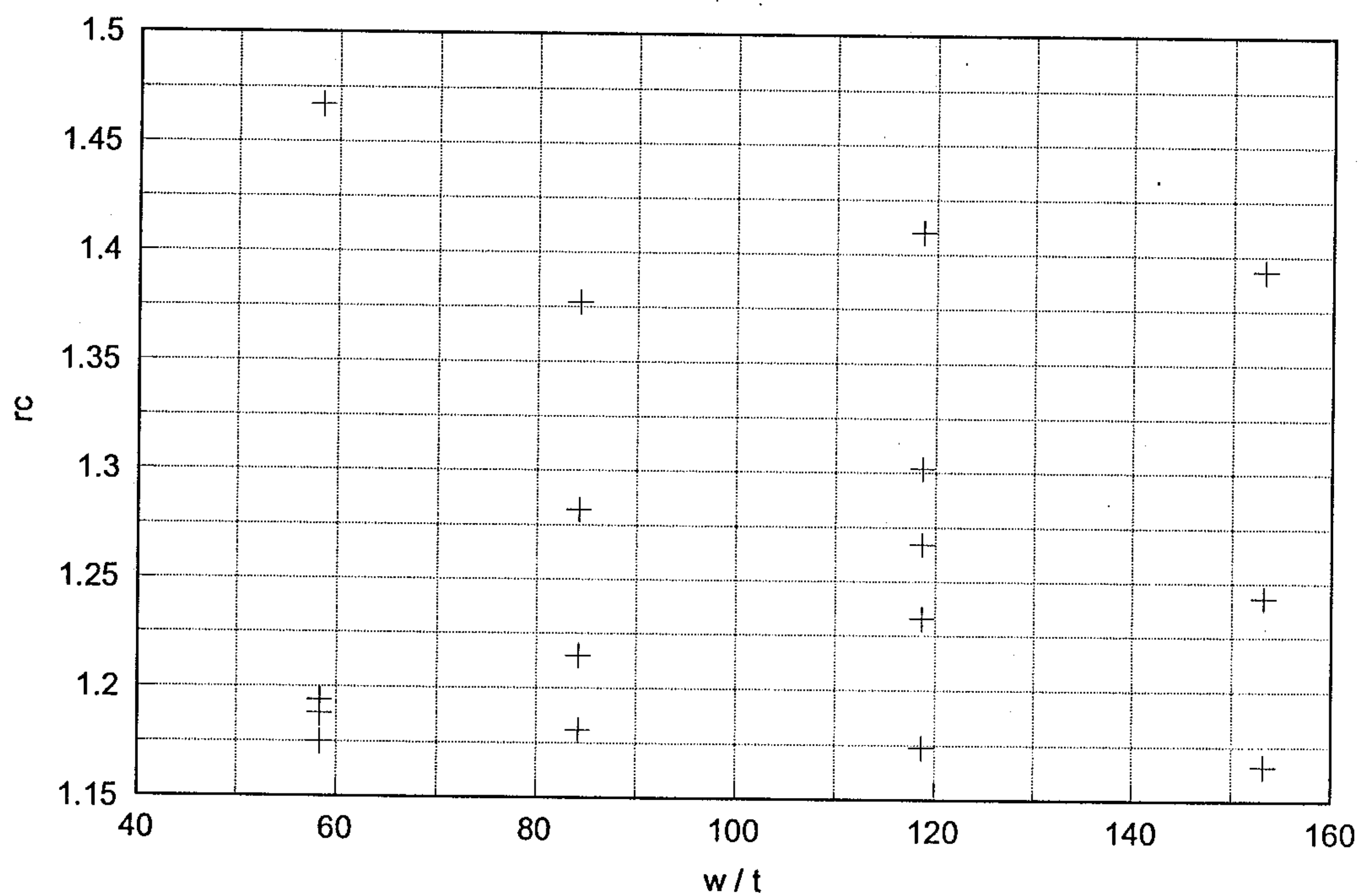


Fig. 3 BOX SECTIONS OF DEWOLF, PEKOZ AND WINTER (1973)

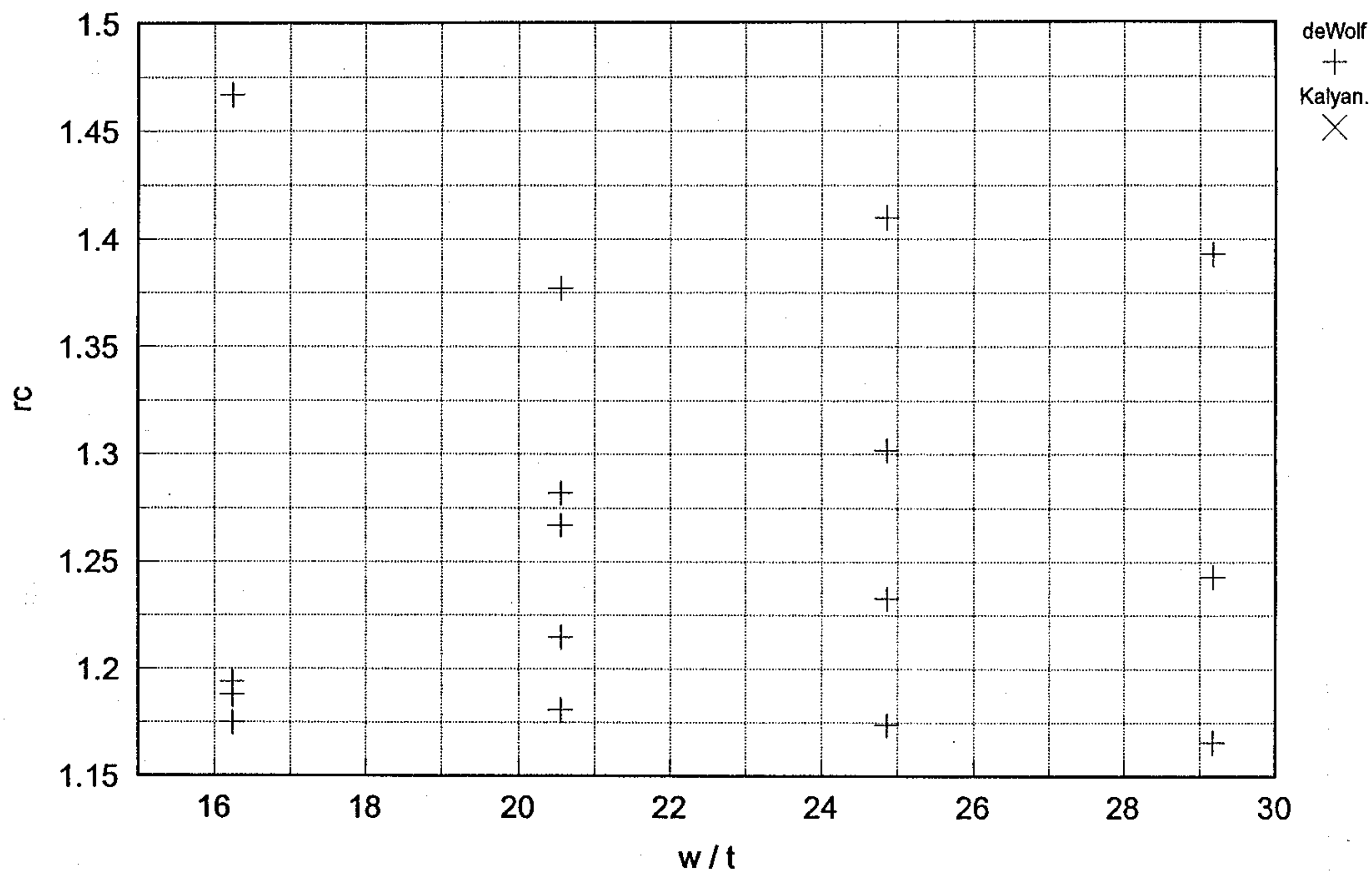


Fig. 4 BACK TO BACK CHANNELS OF DEWOLF, PEKOZ AND WINTER (1973)
BACK TO BACK CHANNELS OF KALYANARAMAN, PEKOZ AND WINTER (1972)

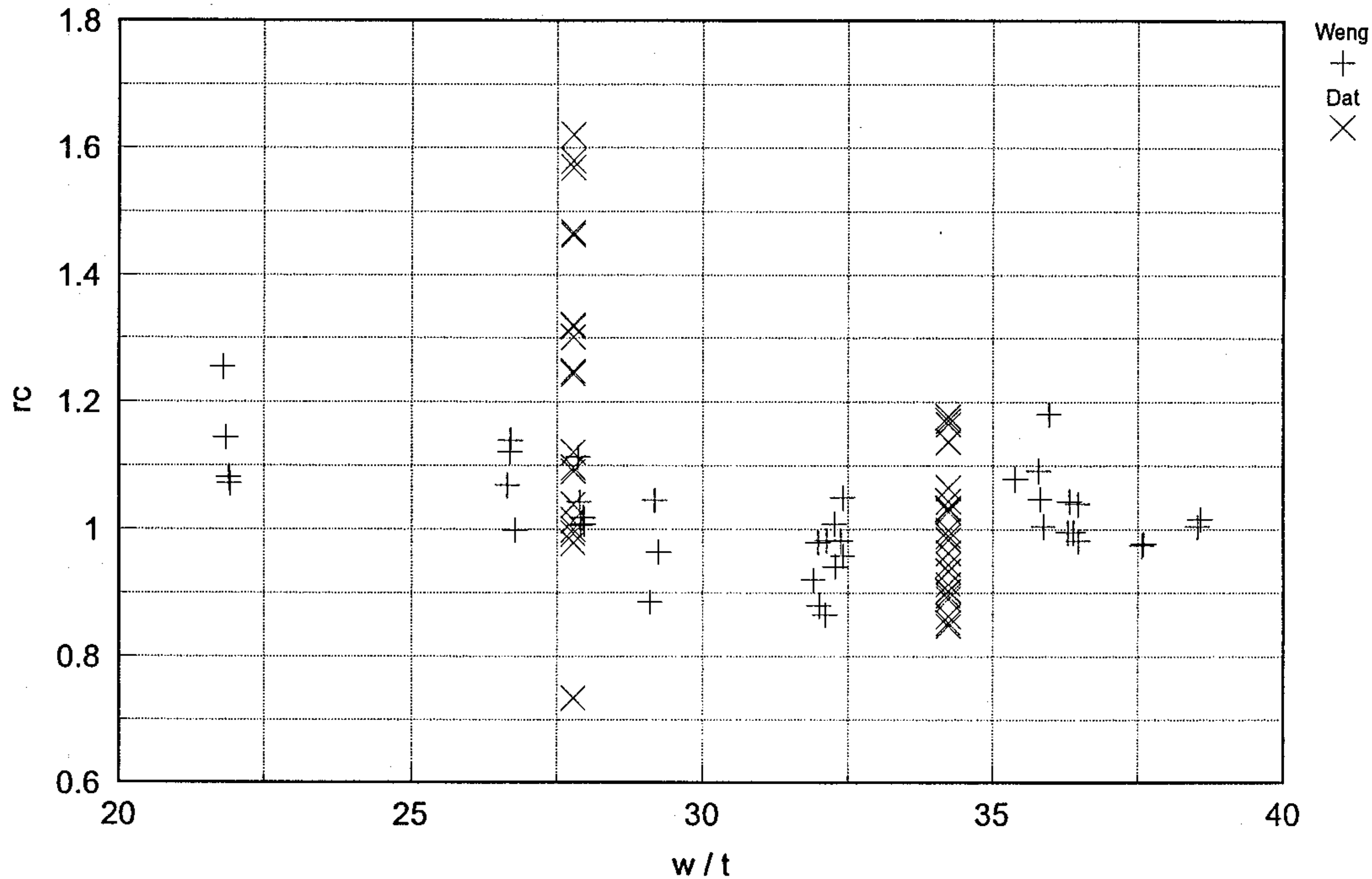


Fig. 5 LIPPED CHANNEL SECTIONS OF WENG AND PEKOZ (1987) AND LIPPED CHANNELS OF DAT AND PEKOZ (1980)

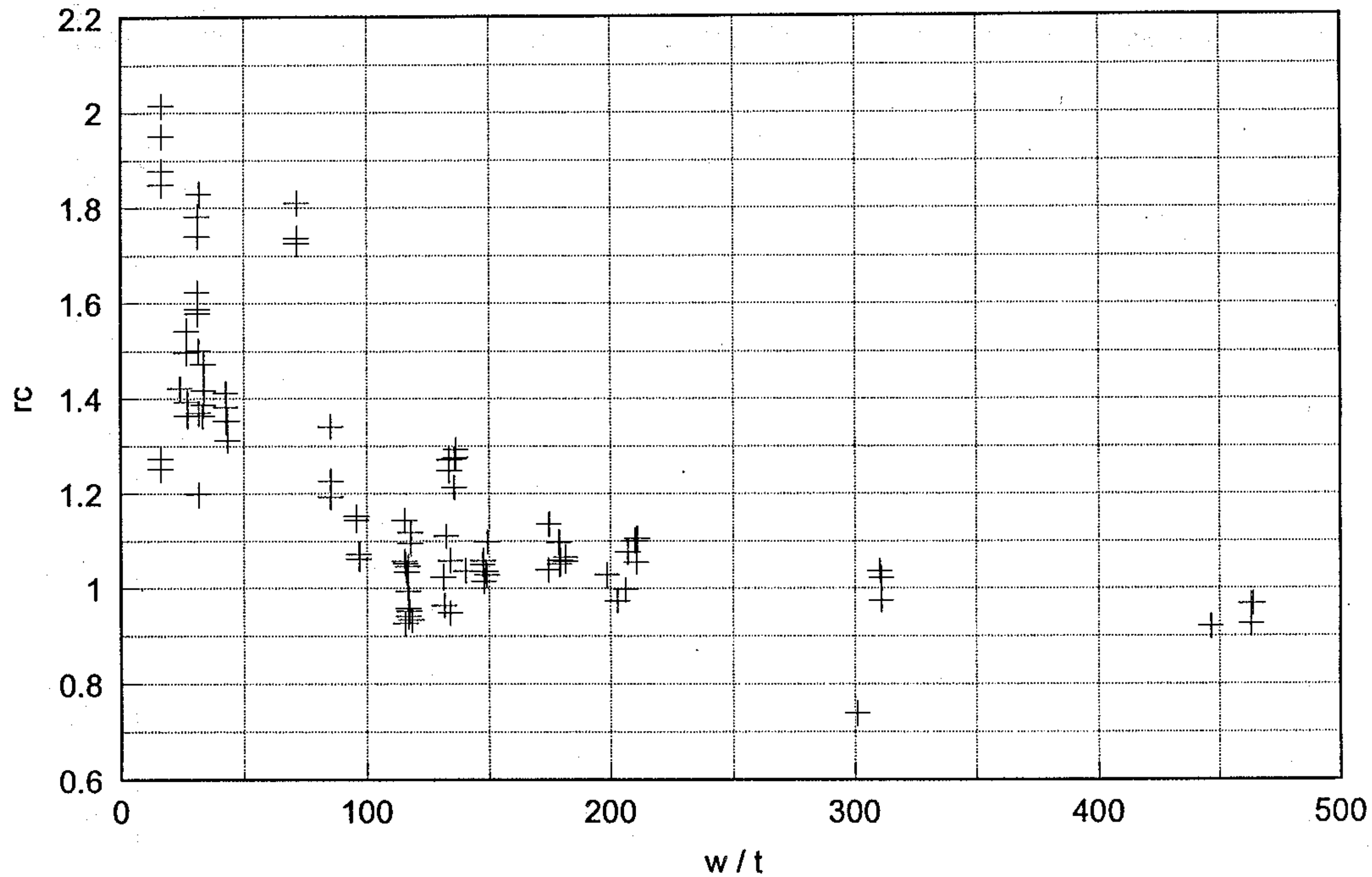


Fig. 6 ALL TEST RESULTS, FROM PEKOZ (1987), TABLES 3.3-2 , 3.3-3 , 3.3-4 , 7.3-2 , 7.3-3 , 7.3-4 , 7.3-5

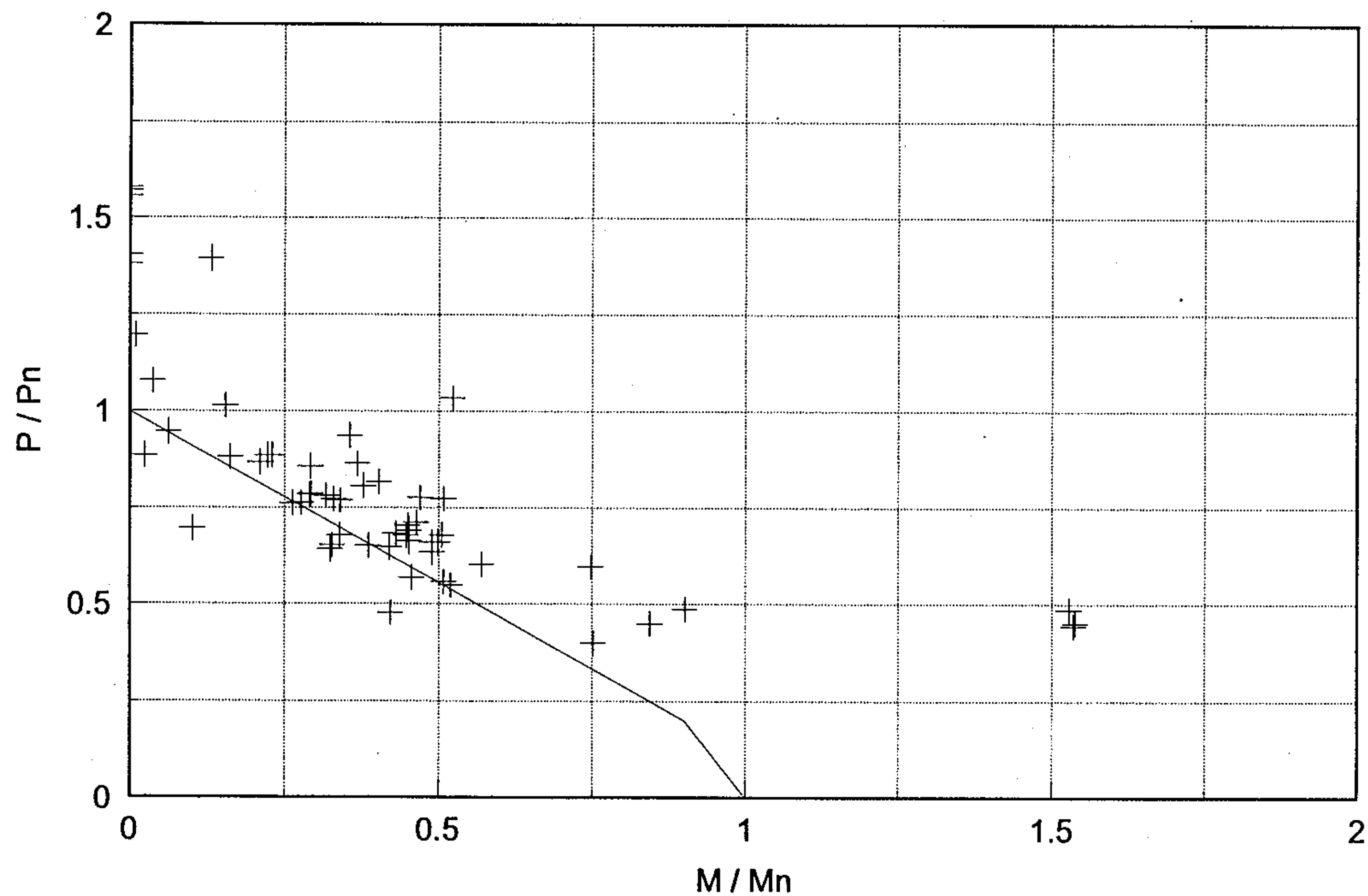


Fig. 7 LIPPED CHANNEL SECTIONS OF MULLIGAN AND PEKOZ (1983), HAT SECTIONS OF PEKOZ AND WINTER (1967), LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985) [ex ≠ 0, ey = 0]

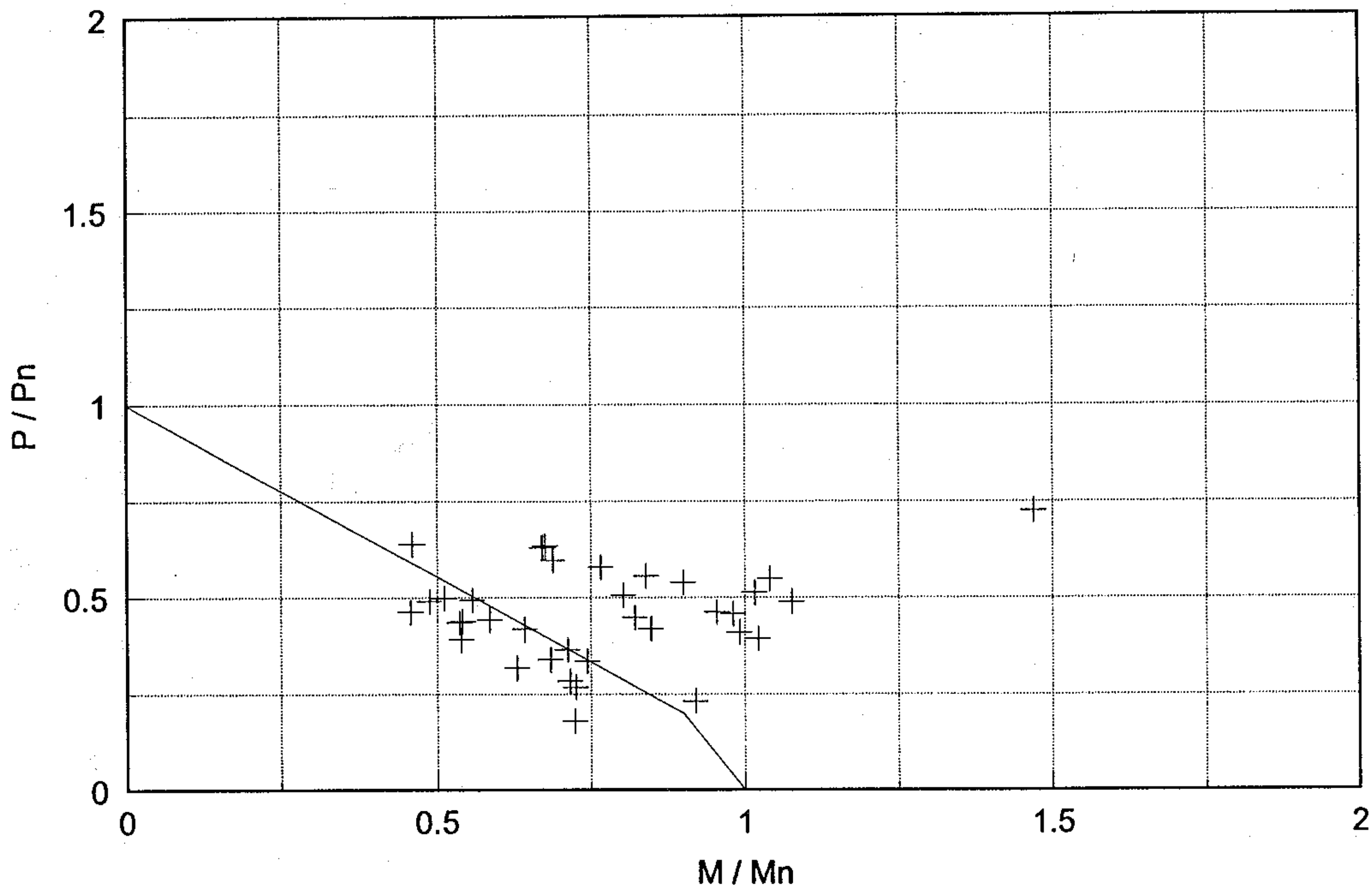


Fig. 8 LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985) [ex = 0, ey $\neq$ 0]

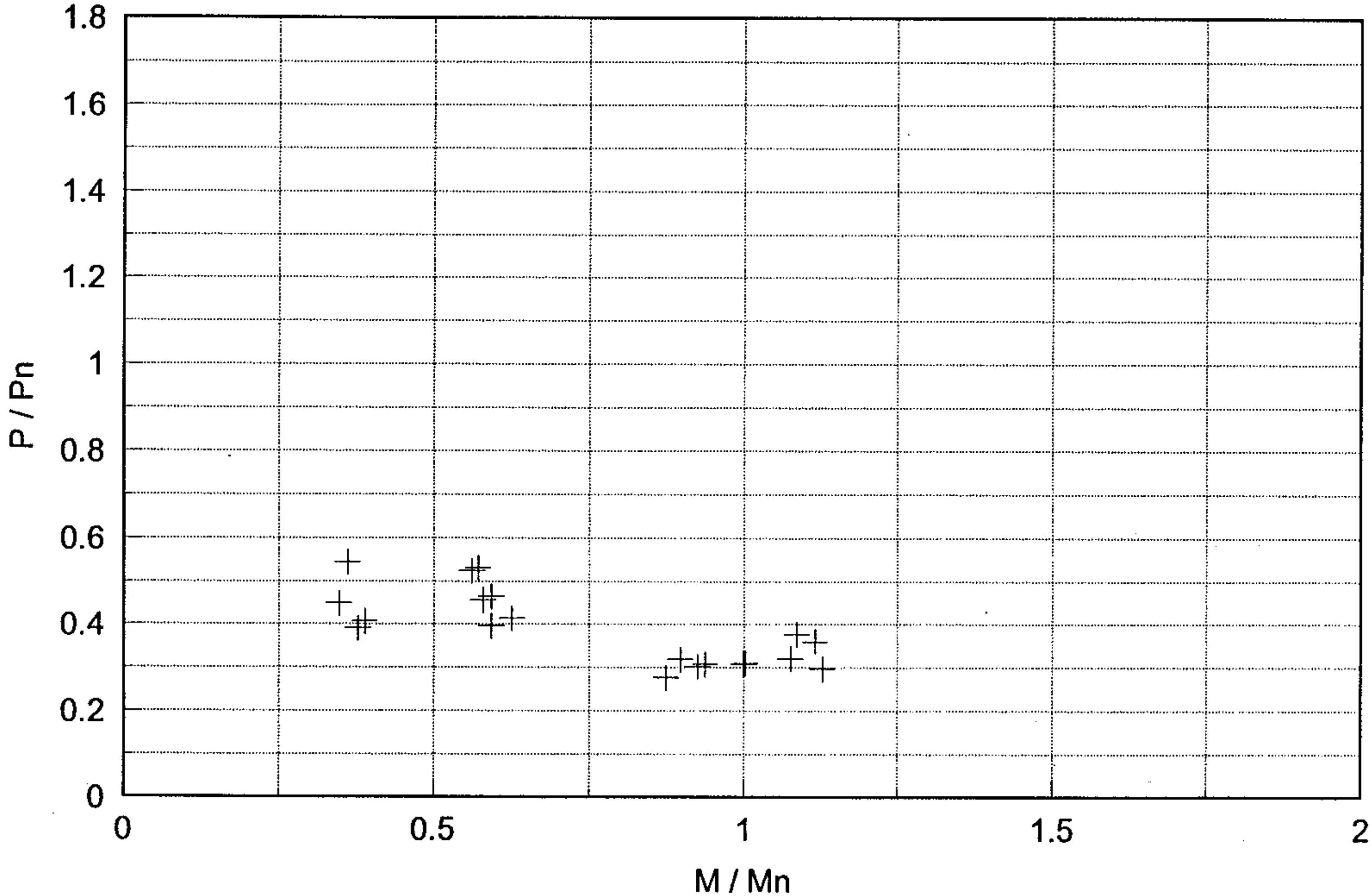


Fig. 9 LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985) [ex ≠ 0, ey ≠ 0]

APPENDIX A - EFFECT OF LOCAL BUCKLING AND RESIDUAL STRESSES

Local buckling is known to influence the overall buckling of columns. The current AISI column design approach has been shown to be unsatisfactory if the component elements of a column are close to the limiting values for local buckling. However the specification was also shown to be quite satisfactory if the elements have flat width-to-thickness ratios in excess of 1.6 times the limiting value or one-half the limiting value.

The primary reason for the unconservatism was therefore thought to be the local buckling effects when the plate slenderness is close to the limiting value.

A1. WENG'S APPROACH FOR LOCAL BUCKLING EFFECTS

The effect of residual stresses on the post-local buckling behavior of columns has been studied and a design procedure has been formulated in Weng (1991). The following is a critical look at this approach. The approach involves determining the effective widths as follows:

The column buckling stress F_u is determined ignoring local buckling.

The effective width, b, of a component elements is determined by

$$b = \rho w$$

where w is the flat width and

$$\rho = \frac{1-0.22\lambda_r}{\lambda_r}$$

The plate slenderness λ_r for the component elements is determined using the equation

$$\lambda_r = \left(\frac{1.052}{\sqrt{K}}\right)\left(\frac{W}{t_r}\right)\sqrt{\frac{F_u}{E}}$$

where

$$t_r = \phi t$$

If $F_u \le 0.5F_y \text{ and } \lambda \ge 0.673$ then

$$\phi = 1$$

If $F_u > 0.5F_y \text{ and } \lambda < 0.673$ then

$$\phi = 1 - \left(0.5 - \frac{0.005}{\left(\frac{F_u}{F_y}\right) - 0.49}\right) \cdot \sqrt{2\left(1 - \frac{F_u}{F_y}\right)}$$

After the effective section is determined, the axial load is assumed to be at the centroid of the gross section and the member is treated as a beam column with eccentric load with respect to the centroid of the effective section.

A better understanding of the implication of the above approach can be gotten by plotting the resulting ρ versus λ as is done in Fig. A1. In this figure ρ is designated RO and λ is designated LAMBDA. This plot is produced by a computer Program as follows:

In the AISI Specification, ρ is determined as

$$\rho = \frac{1 - 0.22\lambda}{\lambda}$$

Basically Weng's approach is to replace λ by λ/ϕ. Figure A1 was produced by assuming values of λ and calculating ρ by Weng's approach.

It is seen clearly in Fig. A1 that at $\lambda = 0.673$ the approach leads to a severe discontinuity which cannot be justified and thus should not be considered for adoption in its present form. The reason why the approach gives good estimates of the test results of Weng and Dat is that the approach is based on these test results.

A2. LOCAL BUCKLING STUDIES PERFORMED

Other approaches of accounting for possible local buckling were tried. These involve the modification of the Winter effective width equation for calculating the effective widths of column sections. The results are plotted in Fig. A2. The effective width ratios, ρ, for a 0.1 inch thick element are determined and plotted for various widths. The yield stress is assumed to be 50 ksi. In this figure the solid line designated W is for the current Winter effective width approach. This approach will be referred to as Approach 1. The modified Winter approaches involve introducing a third segment which is a straight line. This segment is inserted between the λ_1 and λ_2 values. At these values ρ is assumed to be same as in the adjoining segments. The λ_1, λ_2 values tried are (0.75, 0.6) and (1.0, 0.5). These approaches will be referred to as Approaches 2 and 3. The curves for these approaches are designated in Fig. A2 as MW1 and MW2, respectively. Such approaches could represent the effect of residual stresses which might "round out" the discontinuity around λ = 0.673.

The other lines in Fig. A2 were obtained using a reduced value of K. The reasoning behind this is as follows. The effective width equations have been used satisfactorily for flexural members. In flexural members the longitudinal edges of the flanges are supported against rotation more rigidly by webs that have stress gradients than in the same member if the webs were subjected to uniform compression. This topic will be discussed further in connection with the finite strip analysis. A reduction of K from what is commonly used in flexural members (K = 4) would give an idea of what the consequence of having a less rigid supporting condition along the longitudinal edges of the plate elements. The values of K tried were 0.9x4 and 0.8x4. These approaches will be referred to as Approaches 4 and 5. The curves for these approaches are designated as .9K and .8K in Fig. A2. The approaches discussed above and their designations are summarized in the table below.

Approach	Line designation in Fig. A2	λ_1	λ_2	K
1	W	NA	NA	4
2	MW1	0.75	0.60	4
3	MW2	1.00	0.50	4
4	.9K	NA	NA	3.6
5	.8K	NA	NA	3.2

A3. COLUMN BUCKLING BEHAVIOR STUDIES

The local buckling and post-buckling behavior models discussed above were applied to the columns tested by Dat and Weng. The test results were compared with the values obtained using the Approaches 1 through 5. The results of computer studies are displayed in Tables 3 and 4. In these tables the notation is as follows:

SEC — Section Designation given in Weng, Peköz

AP, BP, CP, T — Cross sectional dimensions

L — Effective length of specimen for flexural buckling

RLAM1 — The ratio of the actual w/t of the most slender component element to the value of w/t that will make the value of $\lambda = .673$ at F_u

for that element, namely, $$\frac{\frac{w}{t}}{\frac{219.76}{\sqrt{F_u}}}.$$

RLAM2 — The ratio of the actual w/t of the most slender component element to the value of w/t that will make the value of $\lambda = .673$ at F_y

for that element, namely, $$\frac{\frac{w}{t}}{\frac{219.76}{\sqrt{F_y}}}.$$

R1 through R5 — The ratio the observed ultimate column load divided by the ultimate load calculated using Approaches 1 through 5.

RA1 through RA5 — The ratio the effective area calculated using Approaches 1 through 5 divided by gross area.

F_n — Nominal ultimate stress for the column calculated according to the AISI Specification ignoring local buckling

w — Flat width

The results are plotted for each of the approaches in Figs. A3a through A4e.

The following conclusions can be drawn from the above studies:

- Basically all the approaches give similar results. Therefore the above modifications to the effective width approach are not satisfactory. Further modifications need to be studied.

- The specimens had RLAM1 and RLAM2 values that cover the range between .6 and 1.1. tests on specimens with RLAM1 and RLAM2 values above 1.1 would be desirable. Test results in this range will be studied and if necessary new tests will be carried out. The information given in Peköz (1988) on additional tests carried out will be included in this study.

A4. FINITE STRIP ANALYSIS

The possibility of more rigid support along the longitudinal edges of component plate elements was discussed above. In order to get a quantitative estimate of the edge support finite strip studies were carried out for the column section shown in Fig. A5. This is the section of Specimen RFC14. The test results for this section had the worst correlation with the calculated values.

Local buckling stress versus length is plotted in Figs. 6a and b for the case of uniform stress around the cross-section. Local buckling stress is designated LOAD in the figure. Mode shapes in Fig. A6c for various lengths. Plate buckling coefficient K can be calculated for the most slender element of the cross-section as follows:

The plate buckling stress can be expressed as

$$\sigma_{CR}=\frac{E\pi^2K}{12(1-\mu^2)(w/t)^2}$$

This equation can be solved for K as follows

$$K=\frac{12(1-\mu^2)(w/t)^2}{E\pi^2}\sigma_{CR}$$

Noting that

$$w=H-T-2R$$

$$w=3.00-.075-2x.22$$

$$w=2.485$$

substituting the values of E and μ, the above equation becomes

$$K=\frac{12(.91)(2.485/.075)^2}{29500\pi^2}\sigma_{CR}$$

Thus

$$K=.0421\sigma_{CR}$$

It is seen in Fig. A6b that σ_{cr} = 103.7526 and K = 103.7526 x .0412 = 4.272.

Local buckling stress versus length is plotted in Figs. A7a and b for the case of bending to cause compression in the most slender element of the cross-section. Local buckling stress is designated LOAD in the figure. Mode shapes in Fig. A7c for various lengths. In accordance with the above reasoning It is seen in Fig. A6b that σ_{cr} = 106.61 and K = 106.61 x .0412 = 4.38.

It is seen that the two buckling coefficients are too close to each other to make any difference in the outcome of calculations of column strength.

A5. POSSIBLE FLEXURAL TESTS

A parametric study for possible bending tests using a lipped C column section 3 in. deep, 1.63 in. wide with lips that are 1.5 in. wide is shown in Table A3. Two different thicknesses, .1 and .075 in., are studied. In this table geometric parameters as well as expected moments are given. The following is the notation used in the Table.

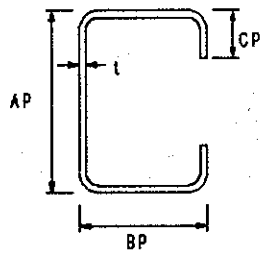
MNO Ultimate moment computed using Approach 1 described above
MYO Yield moment computed using Approach 1 described above
RN The ultimate moment computed using Approach N described above divided by MNO (values of N vary from 2 to 5)
RYN The yield moment computed using Approach N described above divided by MYO (values of N vary from 2 to 5)

It is seen that since R and RY values are close to 1.000, performing bending tests on columns would not give conclusive results on the behavior of the slender stiffened element of the columns.

A6. CONCLUSIONS

The studies conducted here show that new tests within the context of this project would not be too conclusive for getting simple enough column design procedures. It would be more fruitful to correlate available column test results with possible design formulations.

TABLE A1

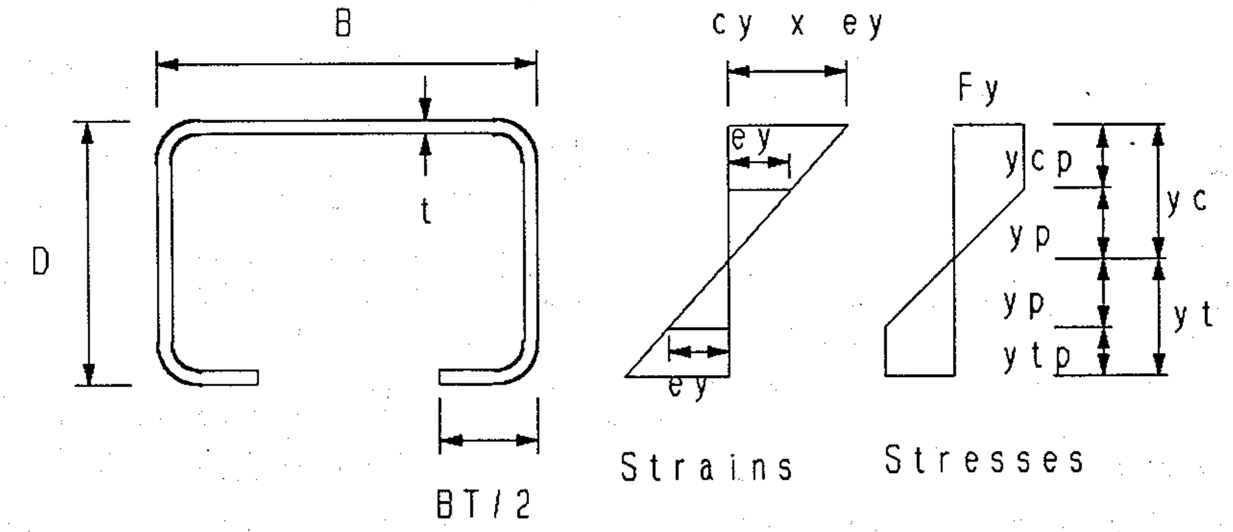


SEC	AP	BP	CP	T	INTR	FY	L	PU	R1	R2	R3	R4	R5
RFC14-1	3.00	1.76	0.69	0.075	0.219	55.1	27.0	25.30	0.93	0.94	0.96	0.94	0.95
							38.7	22.30	0.90	0.91	0.92	0.90	0.91
							51.0	16.40	0.77	0.77	0.78	0.77	0.77
							63.0	12.70	0.74	0.74	0.75	0.74	0.74
							75.5	9.70	0.79	0.79	0.79	0.79	0.79
RFC13-1	3.07	1.63	0.71	0.096	0.156	51.8	27.0	30.20	0.94	0.94	0.95	0.94	0.94
							39.0	29.20	1.02	1.02	1.02	1.02	1.02
							51.0	23.80	0.98	0.98	0.99	0.98	0.98
							63.0	17.00	0.91	0.91	0.91	0.91	0.91
RFC11-1	3.15	1.65	0.71	0.119	0.156	40.4	27.0	32.30	1.03	1.03	1.03	1.03	1.03
							39.0	30.30	1.05	1.05	1.05	1.05	1.05
							51.0	28.50	1.11	1.11	1.11	1.11	1.11
							63.0	19.70	0.92	0.92	0.92	0.92	0.92
R14 -1	3.02	1.66	0.61	0.075	0.219	49.7	27.0	23.20	0.99	1.00	1.02	1.00	1.01
							39.0	19.40	0.92	0.92	0.94	0.92	0.93
							51.0	15.40	0.85	0.85	0.86	0.85	0.85
							63.0	11.60	0.82	0.82	0.82	0.82	0.82
							75.0	8.50	0.84	0.84	0.84	0.84	0.84
R13 -1	3.01	1.63	0.61	0.086	0.219	50.2	27.0	26.20	0.99	0.99	1.00	0.99	0.99
							39.0	23.80	1.00	1.00	1.01	1.00	1.00
							51.0	17.80	0.89	0.89	0.90	0.89	0.89
							63.0	13.20	0.86	0.86	0.86	0.86	0.86
							73.0	10.10	0.87	0.87	0.87	0.87	0.87
PBC14-1	3.00	1.63	0.61	0.071	0.156	36.3	27.0	16.10	0.97	0.97	0.99	0.97	0.98
							39.0	15.60	1.01	1.01	1.03	1.01	1.01
							51.0	13.00	0.93	0.93	0.95	0.93	0.93
							63.0	11.20	0.94	0.94	0.95	0.94	0.94
							75.0	9.70	1.02	1.02	1.02	1.02	1.02
PBC13-1	3.03	1.62	0.61	0.087	0.156	38.4	26.8	18.00	0.85	0.85	0.85	0.85	0.85
							39.0	17.50	0.89	0.89	0.90	0.89	0.89
							51.0	16.00	0.92	0.92	0.93	0.92	0.93
P11 -1	5.04	2.49	0.88	0.120	0.125	32.1	55.0	34.20	0.89	0.90	0.92	0.89	0.90
							75.0	30.40	0.87	0.87	0.89	0.87	0.87
							90.0	27.80	0.88	0.88	0.89	0.88	0.88
							110.0	22.30	0.85	0.85	0.86	0.85	0.85
P16 -1	2.64	1.38	0.62	0.064	0.094	32.8	31.0	11.20	0.96	0.96	0.97	0.96	0.96
							41.0	10.40	0.96	0.96	0.98	0.96	0.96
							52.0	8.00	0.84	0.84	0.85	0.84	0.84
							62.0	6.90	0.86	0.86	0.86	0.86	0.86
							69.0	6.20	0.90	0.90	0.91	0.90	0.91

TABLE A2

SEC	L	PU	R1	RA1	R2	RA2	R3	RA3	R4	RA4	R5	RA5	RLAM1	RLAM2
RFC14-1	27.0	25.30	0.93	0.99	0.94	0.99	0.96	0.97	0.94	0.98	0.97	0.96	1.04	1.09
RFC14-2	38.7	22.30	0.90	1.00	0.91	0.99	0.92	0.97	0.90	0.99	0.93	0.97	1.00	1.09
RFC14-3	51.0	16.40	0.77	1.00	0.77	1.00	0.78	0.98	0.77	1.00	0.78	0.98	0.92	1.09
RFC14-4	63.0	12.70	0.74	1.00	0.74	1.00	0.75	0.99	0.74	1.00	0.74	1.00	0.83	1.09
RFC14-5	75.5	9.70	0.79	1.00	0.79	1.00	0.79	1.00	0.79	1.00	0.79	1.00	0.70	1.09
RFC13-1	27.0	30.20	0.94	1.00	0.94	1.00	0.95	0.99	0.94	1.00	0.94	1.00	0.84	0.87
RFC13-2	39.0	29.20	1.02	1.00	1.02	1.00	1.02	0.99	1.02	1.00	1.02	1.00	0.79	0.87
RFC13-3	51.0	23.80	0.98	1.00	0.98	1.00	0.99	0.99	0.98	1.00	0.99	0.99	0.73	0.87
RFC13-4	63.0	17.00	0.91	1.00	0.91	1.00	0.91	0.99	0.91	1.00	0.91	1.00	0.64	0.87
RFC11-1	27.0	32.30	1.03	1.00	1.03	1.00	1.03	1.00	1.03	1.00	1.03	1.00	0.61	0.63
RFC11-2	39.0	30.30	1.05	1.00	1.05	1.00	1.05	1.00	1.05	1.00	1.05	1.00	0.59	0.63
RFC11-3	51.0	28.50	1.11	1.00	1.11	1.00	1.11	1.00	1.11	1.00	1.11	1.00	0.55	0.63
RFC11-4	63.0	19.70	0.92	1.00	0.92	1.00	0.92	1.00	0.92	1.00	0.92	1.00	0.50	0.63
R14 -1	27.0	23.20	0.99	1.00	1.00	0.99	1.02	0.97	1.00	0.99	1.03	0.97	1.00	1.04
R14 -2	39.0	19.40	0.92	1.00	0.92	0.99	0.94	0.98	0.92	1.00	0.94	0.98	0.95	1.04
R14 -3	51.0	15.40	0.85	1.00	0.85	1.00	0.86	0.99	0.85	1.00	0.86	0.99	0.88	1.04
R14 -4	63.0	11.60	0.82	1.00	0.82	1.00	0.82	1.00	0.82	1.00	0.82	1.00	0.78	1.04
R14 -5	75.0	8.50	0.84	1.00	0.84	1.00	0.84	0.99	0.84	1.00	0.84	1.00	0.66	1.04
R13 -1	27.0	26.20	0.99	1.00	0.99	1.00	1.01	0.99	0.99	1.00	1.00	0.99	0.86	0.90
R13 -2	39.0	23.80	1.00	1.00	1.00	1.00	1.01	0.99	1.00	1.00	1.00	1.00	0.82	0.90
R13 -3	51.0	17.80	0.89	1.00	0.89	1.00	0.90	0.99	0.89	1.00	0.90	0.99	0.75	0.90
R13 -4	63.0	13.20	0.86	1.00	0.86	1.00	0.86	0.99	0.86	1.00	0.86	1.00	0.66	0.90
R13 -5	73.0	10.10	0.87	1.00	0.87	1.00	0.87	1.00	0.87	1.00	0.87	1.00	0.57	0.90
PBC14-1	27.0	16.10	0.97	1.00	0.97	0.99	0.99	0.98	0.97	1.00	0.99	0.97	0.95	0.98
PBC14-2	39.0	15.60	1.01	1.00	1.01	1.00	1.03	0.98	1.01	1.00	1.03	0.98	0.92	0.98
PBC14-3	51.0	13.00	0.93	1.00	0.93	1.00	0.95	0.99	0.93	1.00	0.94	0.99	0.87	0.98
PBC14-4	63.0	11.20	0.94	1.00	0.94	1.00	0.95	0.99	0.94	1.00	0.94	1.00	0.81	0.98
PBC14-5	75.0	9.70	1.02	1.00	1.02	1.00	1.02	1.00	1.02	1.00	1.02	1.00	0.72	0.98
PBC13-1	26.8	18.00	0.85	1.00	0.85	1.00	0.85	0.99	0.85	1.00	0.85	1.00	0.80	0.82
PBC13-2	39.0	17.50	0.89	1.00	0.89	1.00	0.90	1.00	0.89	1.00	0.89	1.00	0.76	0.82
PBC13-3	51.0	16.00	0.92	1.00	0.92	1.00	0.93	0.99	0.92	1.00	0.93	0.99	0.72	0.82
P11 -1	55.0	34.20	0.89	1.00	0.90	1.00	0.92	0.98	0.89	1.00	0.92	0.98	0.93	0.98
P11 -2	75.0	30.40	0.87	1.00	0.87	1.00	0.89	0.98	0.87	1.00	0.89	0.99	0.89	0.98
P11 -3	90.0	27.80	0.88	1.00	0.88	1.00	0.89	0.99	0.88	1.00	0.88	1.00	0.84	0.98
P11 -4	110.0	22.30	0.85	1.00	0.85	1.00	0.86	1.00	0.85	1.00	0.85	1.00	0.77	0.98
P16 -1	31.0	11.20	0.96	1.00	0.96	1.00	0.97	0.98	0.96	1.00	0.97	0.99	0.90	0.95
P16 -2	41.0	10.40	0.96	1.00	0.96	1.00	0.98	0.99	0.96	1.00	0.97	0.99	0.87	0.95
P16 -3	52.0	8.00	0.84	1.00	0.84	1.00	0.85	0.99	0.84	1.00	0.84	1.00	0.81	0.95
P16 -4	62.0	6.90	0.86	1.00	0.86	1.00	0.86	1.00	0.86	1.00	0.86	1.00	0.75	0.95
P16 -5	69.0	6.20	0.90	1.00	0.90	1.00	0.91	0.99	0.90	1.00	0.91	0.99	0.69	0.95

Table 3



D	B	BT	T
1.63	3.00	1.50	.100

BC	CY	LA	RO	YC	YT	YP	YCP	YTP	Z	SX	XBAR	MN	MY
3.00	1.53	0.65	1.00	0.44	1.19	0.29	0.15	0.90	0.46	0.36	0.66	23.203	18.016
2.94	1.53	0.65	0.98	0.45	1.17	0.30	0.16	0.88	0.46	0.36	0.66	23.058	17.979
2.80	1.53	0.65	0.93	0.49	1.14	0.32	0.17	0.82	0.45	0.36	0.67	22.661	17.878
2.97	1.53	0.68	0.99	0.44	1.18	0.29	0.15	0.89	0.46	0.36	0.66	23.137	17.999
2.77	1.53	0.78	0.92	0.50	1.13	0.32	0.17	0.81	0.45	0.36	0.68	22.588	17.860

MNO	MYO	R2	RY2	R3	RY3	R4	RY4	R5	RY5
23.20	18.02	0.9937	0.9979	0.9766	0.9923	0.9971	0.9990	0.9735	0.9913

D	B	BT	T
1.63	3.00	1.50	.075

BC	CY	LA	RO	YC	YT	YP	YCP	YTP	Z	SX	XBAR	MN	MY
2.58	1.00	0.87	0.86	0.54	1.08	0.54	0.00	0.54	0.32	0.27	0.69	16.110	13.291
2.58	1.00	0.87	0.86	0.54	1.08	0.54	0.00	0.54	0.32	0.27	0.69	16.110	13.291
2.50	1.00	0.87	0.83	0.56	1.06	0.56	0.00	0.50	0.32	0.26	0.70	15.875	13.241
2.49	1.00	0.91	0.83	0.56	1.06	0.56	0.00	0.50	0.32	0.26	0.70	15.862	13.238
2.28	1.00	1.04	0.76	0.62	1.01	0.62	0.00	0.39	0.30	0.26	0.72	15.236	13.102

MNO	MYO	R2	RY2	R3	RY3	R4	RY4	R5	RY5
16.11	13.29	1.0000	1.0000	0.9854	0.9962	0.9846	0.9960	0.9457	0.9858

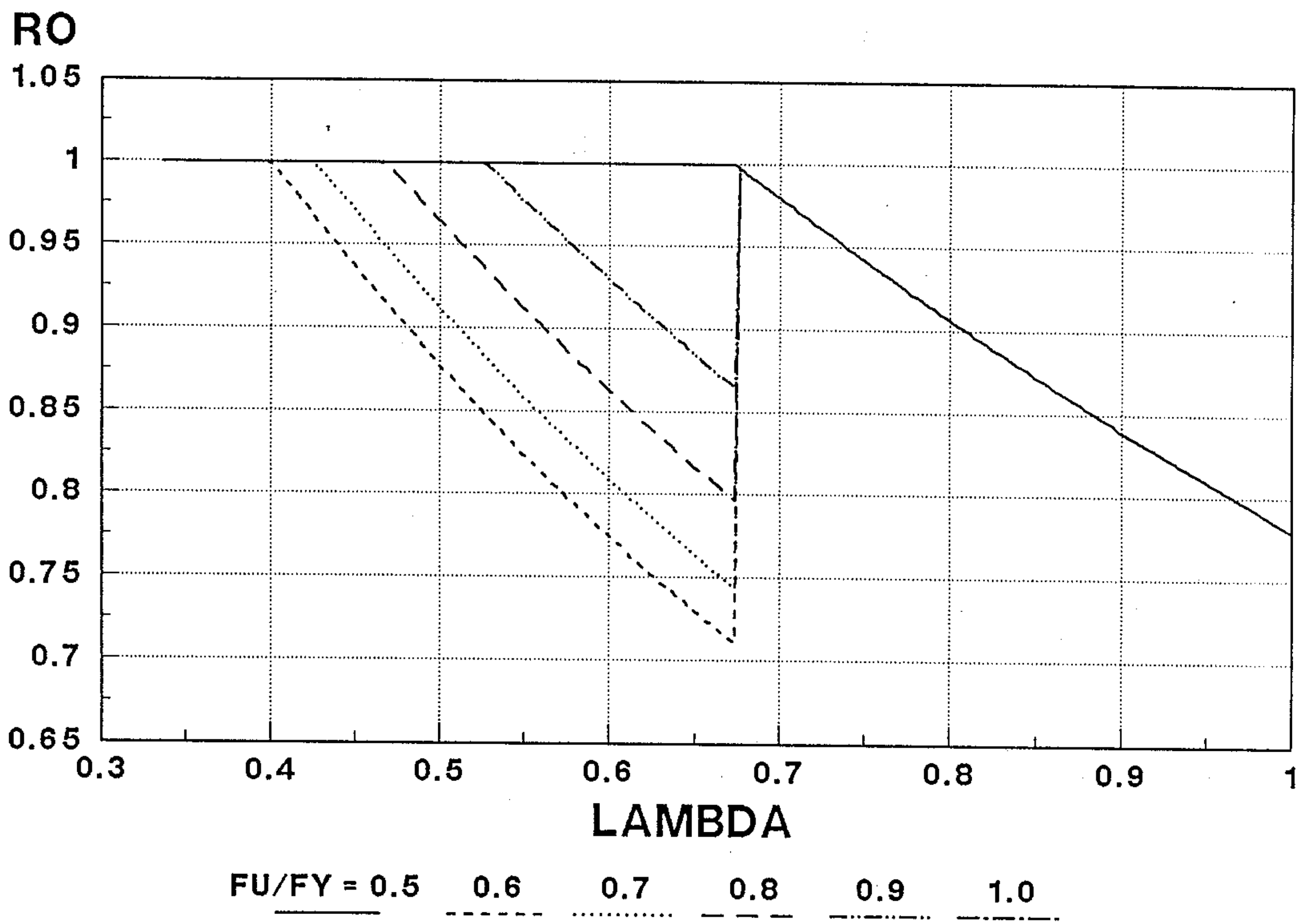


Fig. A1 A representation of Weng's approach to account for the effect of residual stresses of effective widths

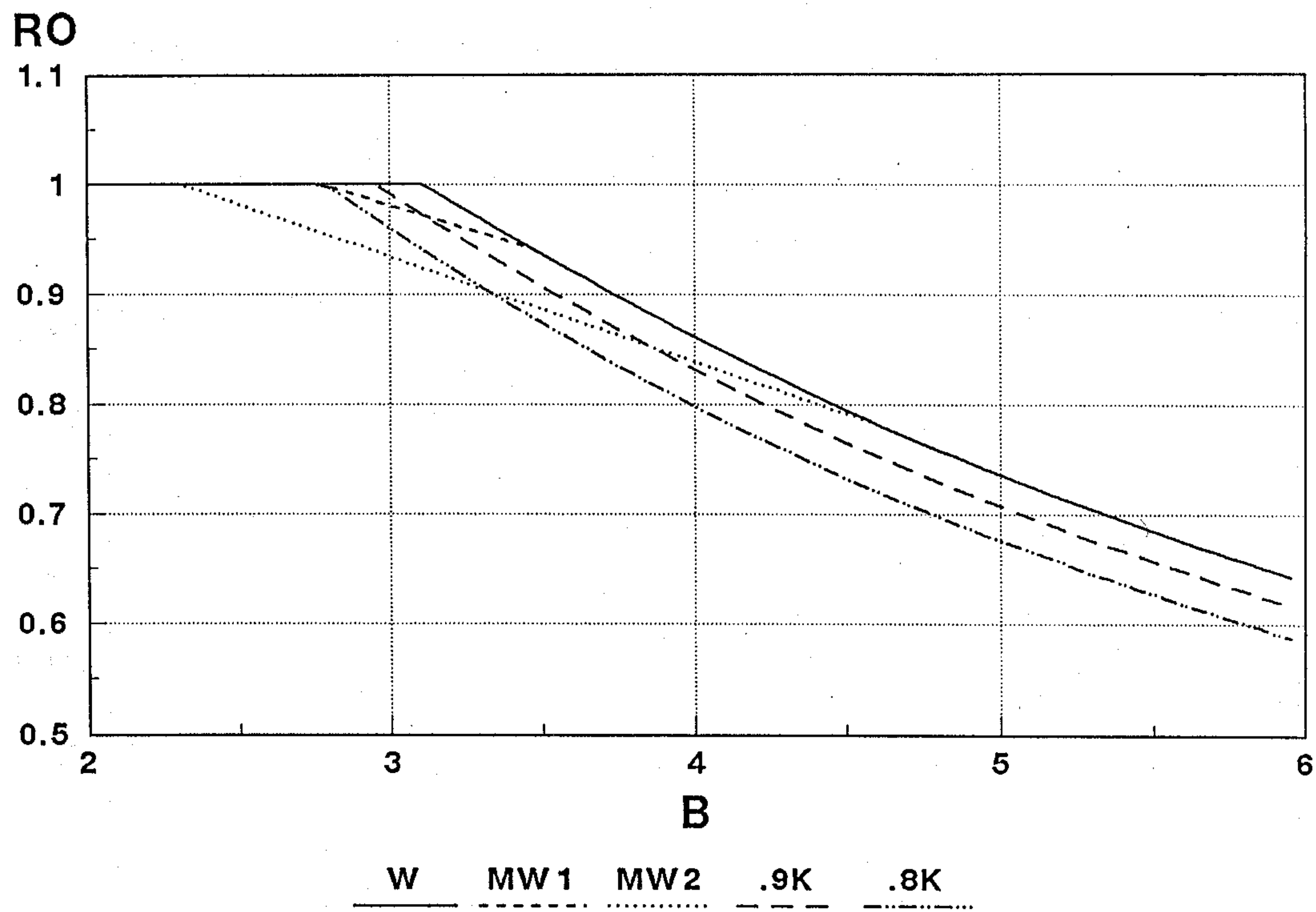


Fig. A2 Effective width approaches tried

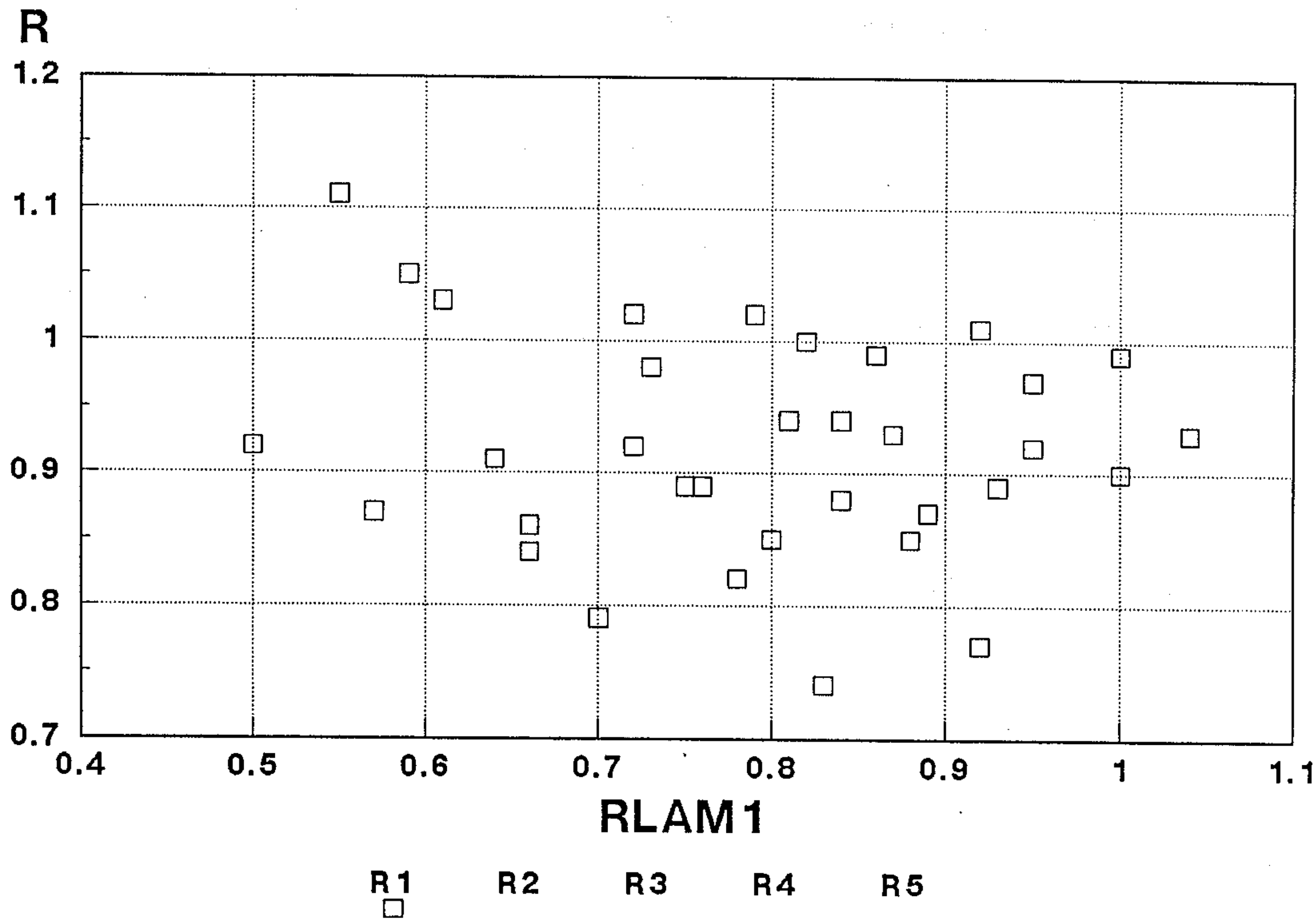


Fig. A3a Observed column ultimate loads divided by ultimate load calculated using Approach 1

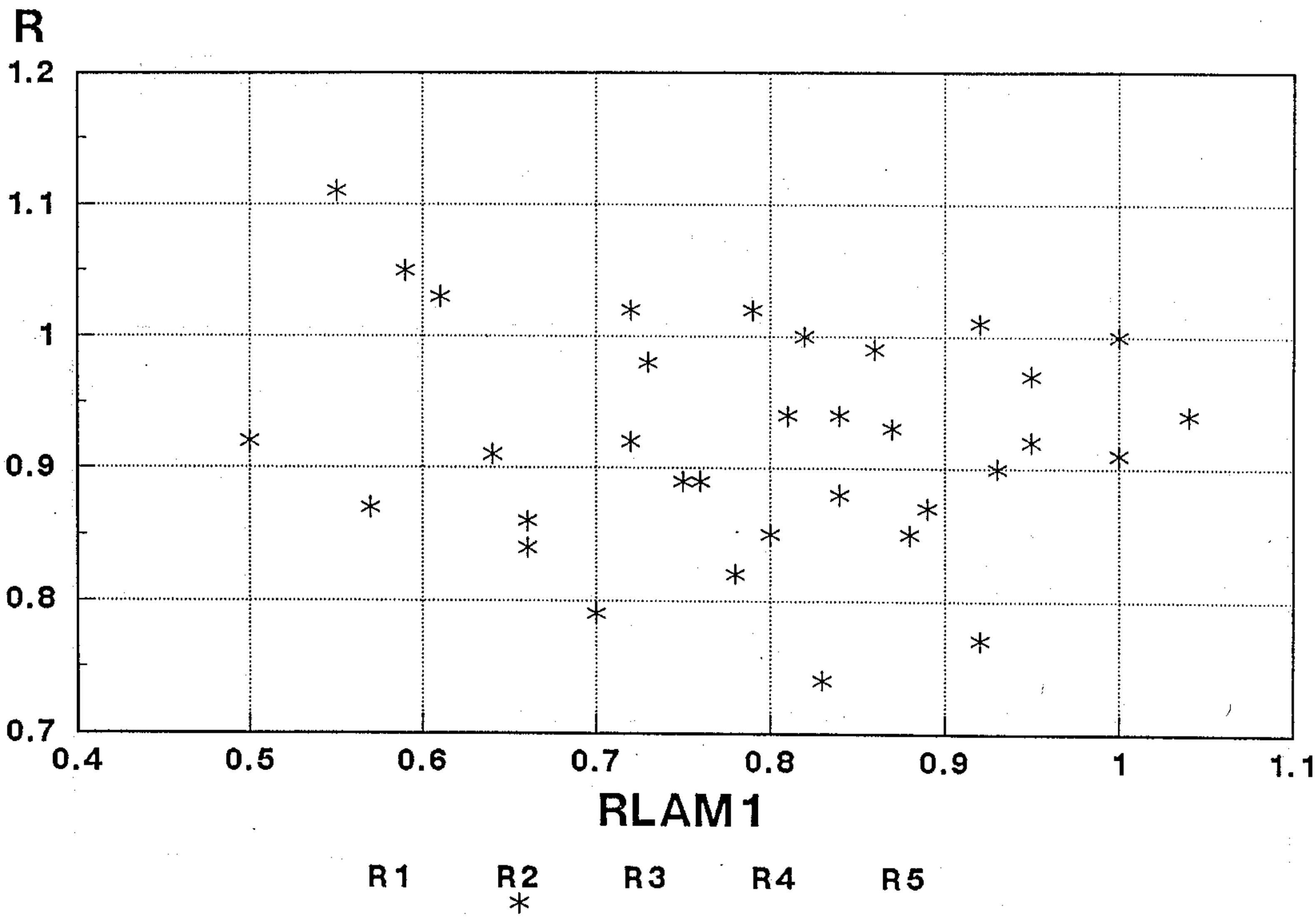


Fig. A3b Observed column ultimate loads divided by ultimate load calculated using Approach 2

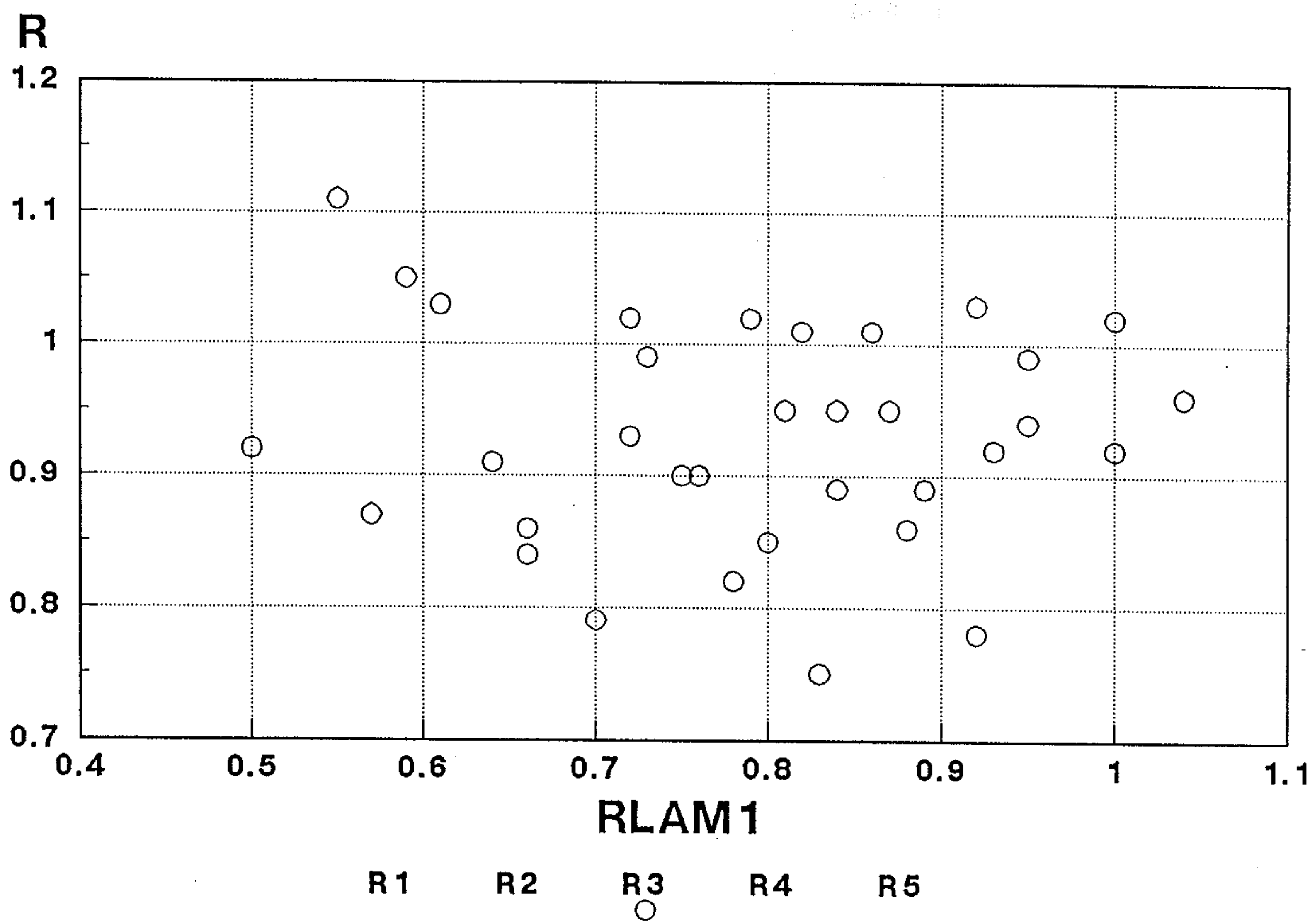


Fig. A3c Observed column ultimate loads divided by ultimate load calculated using Approach 3

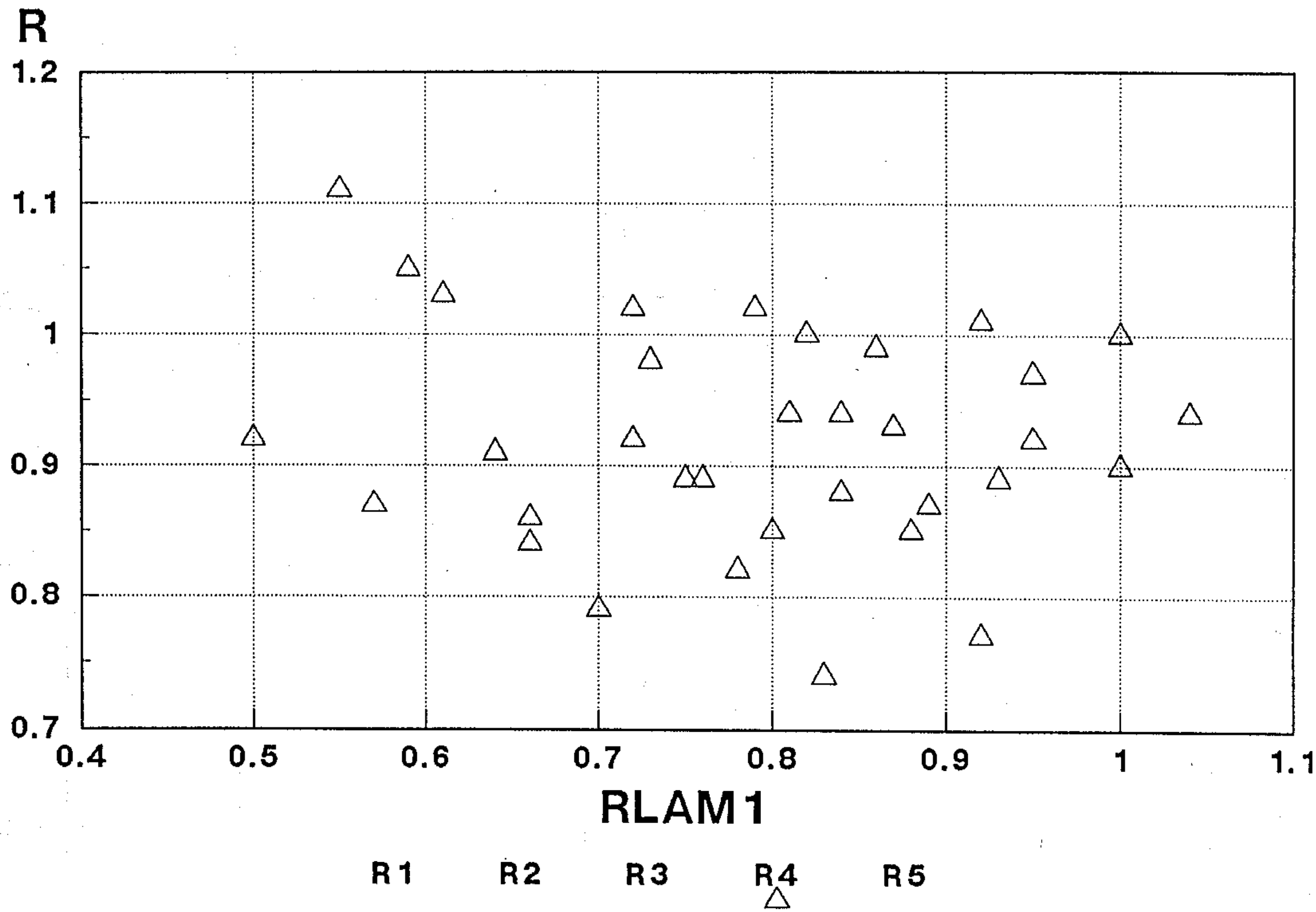


Fig. A3d Observed column ultimate loads divided by ultimate load calculated using Approach 4

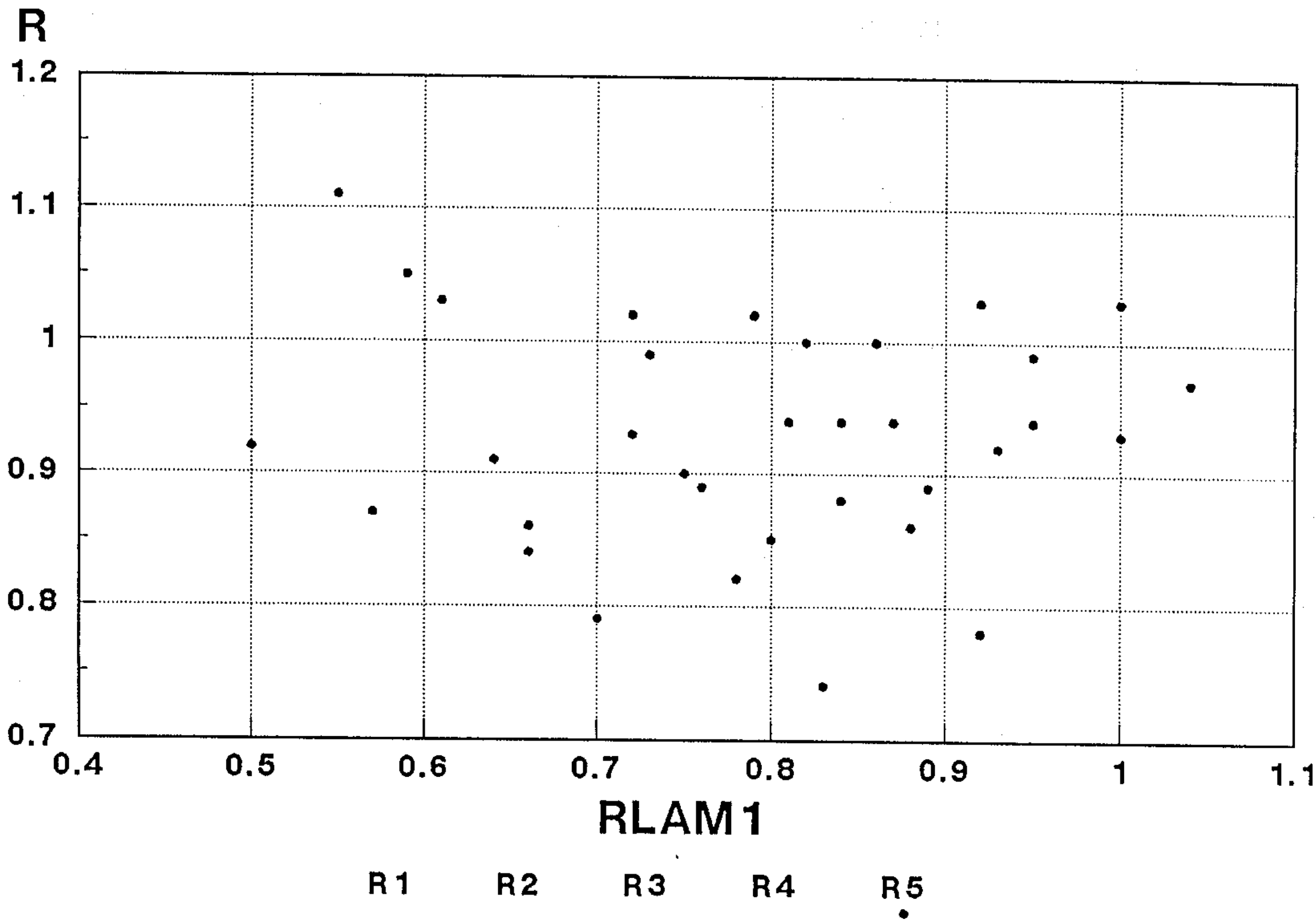


Fig. A3e Observed column ultimate loads divided by ultimate load calculated using Approach 5

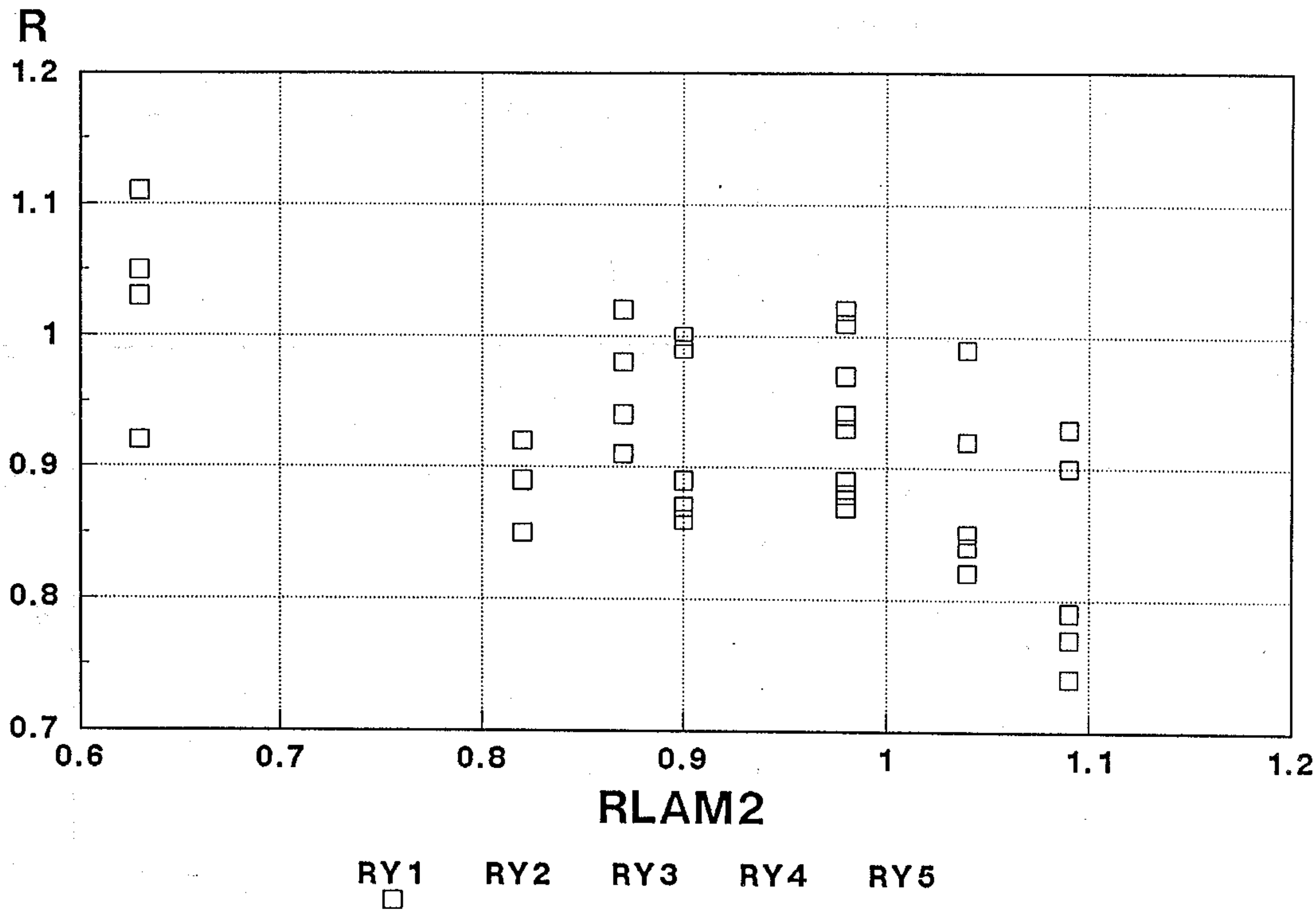


Fig. A4a Observed column ultimate loads divided by ultimate load calculated using Approach 1

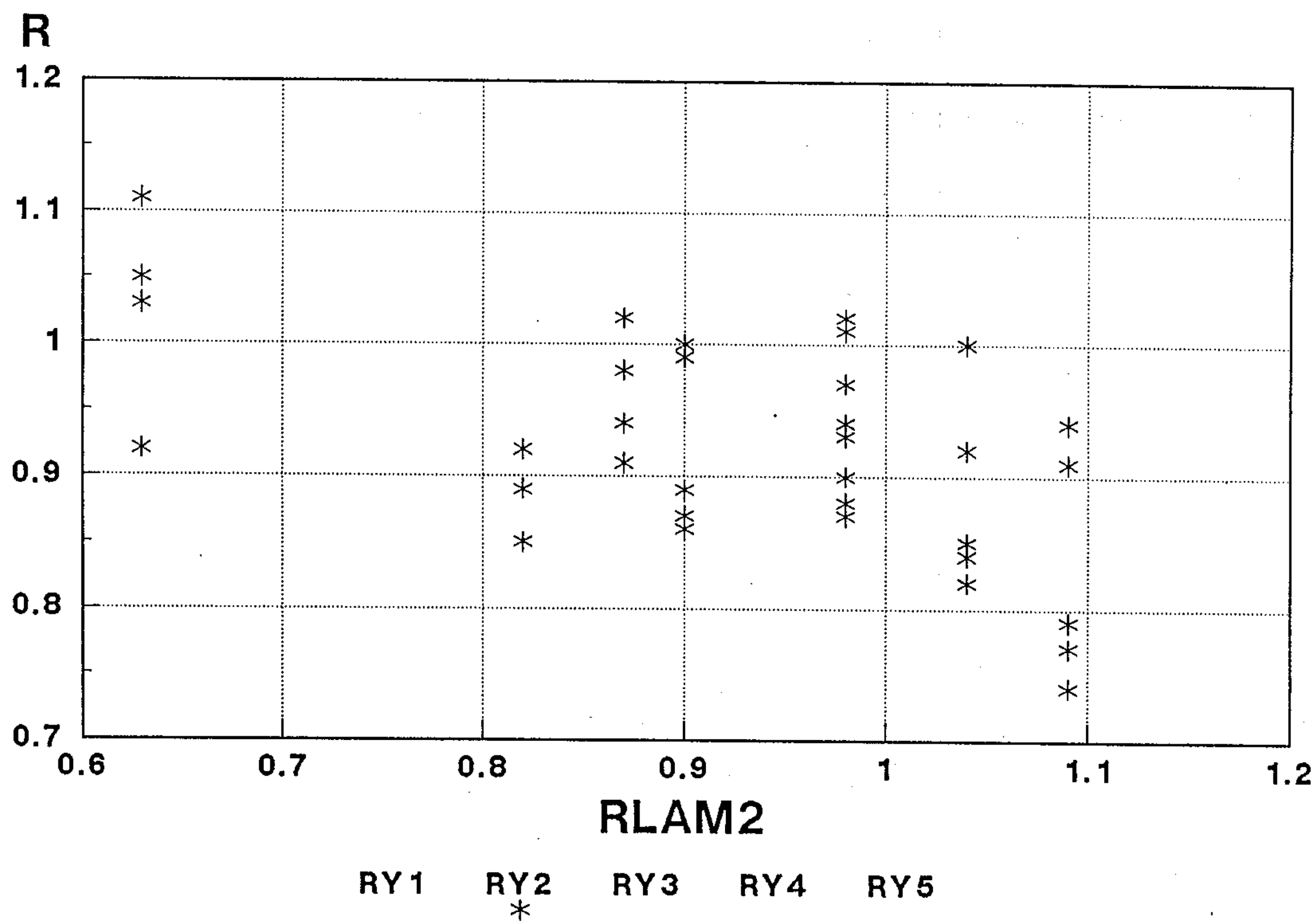


Fig. A4b Observed column ultimate loads divided by ultimate load calculated using Approach 2

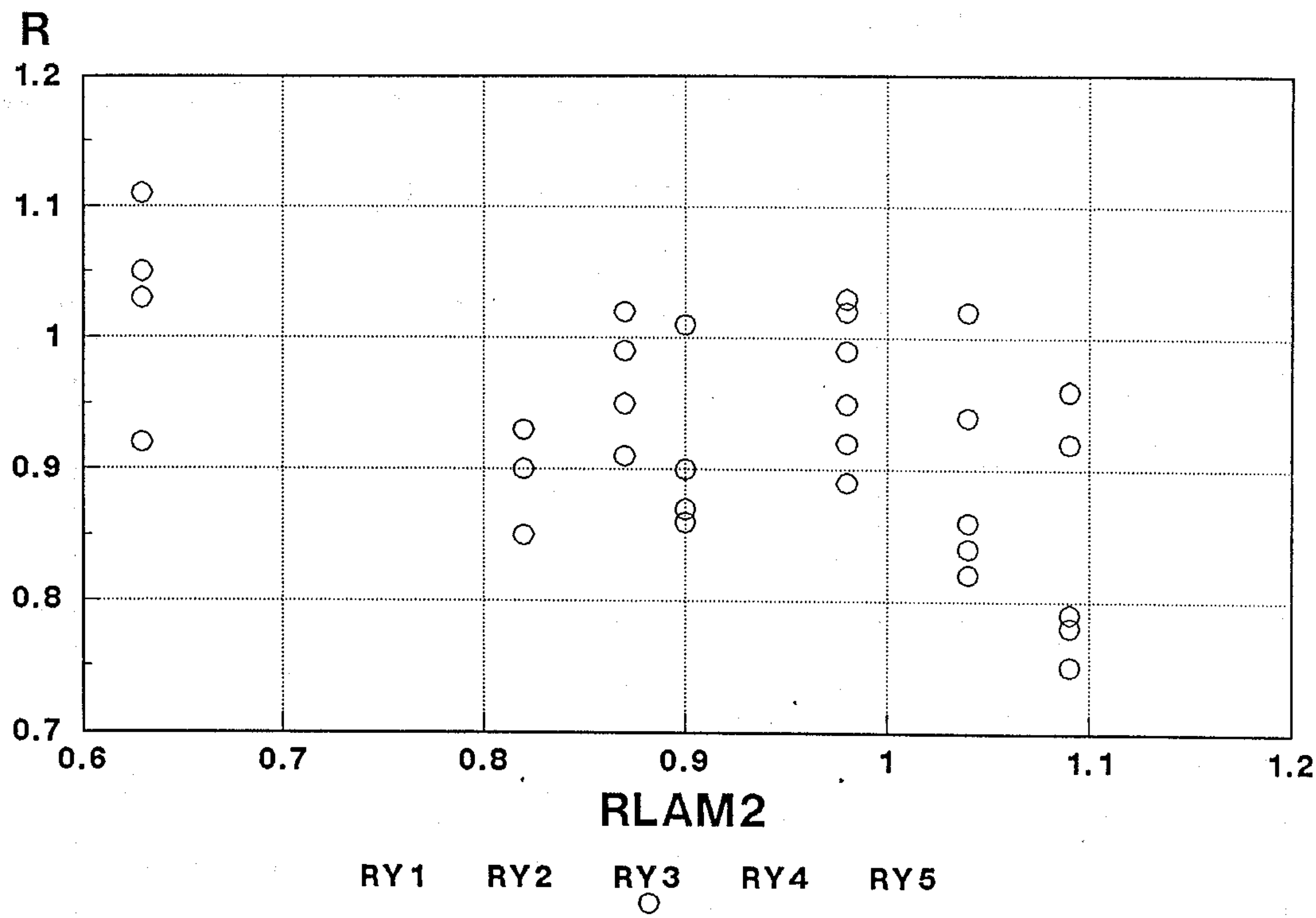


Fig. A4c Observed column ultimate loads divided by ultimate load calculated using Approach 3

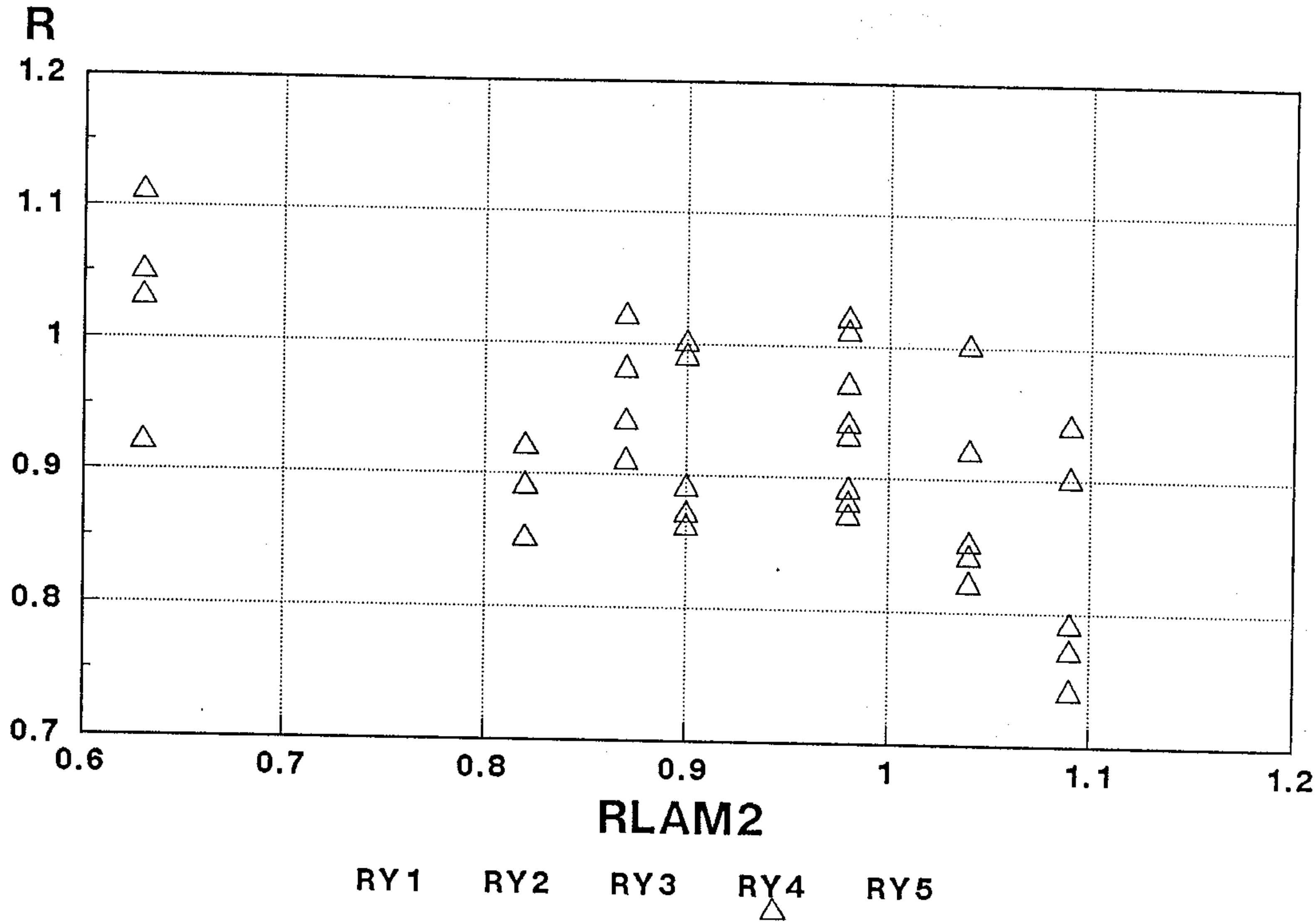


Fig. A4d Observed column ultimate loads divided by ultimate load calculated using Approach 4

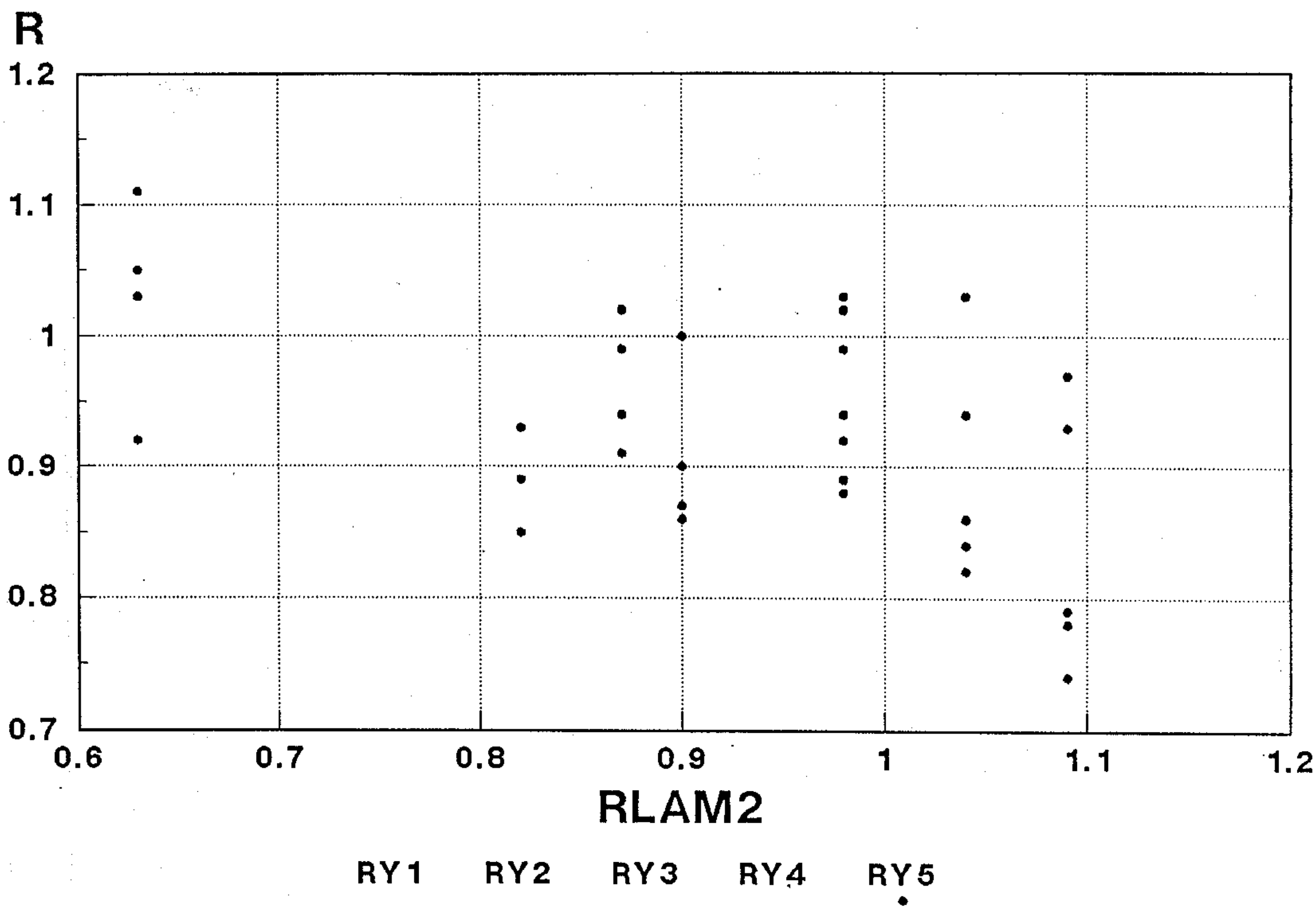
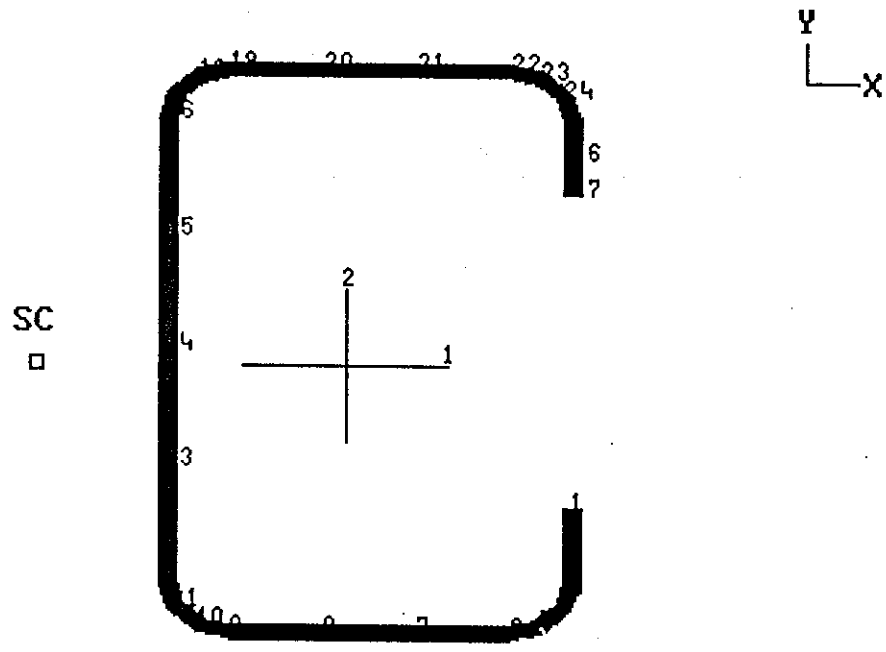


Fig. A4e Observed column ultimate loads divided by ultimate load calculated using Approach 5

PREFINST

PROFILE NR. 1

A	=	0.5365E+00
Ix	=	0.7511E+00
Wx	=	0.5007E+00
Iy	=	0.2394E+00
Wy	=	0.2236E+00
I1	=	0.7511E+00
I2	=	0.2394E+00
Gx	=	0.6892E+00
Gy	=	0.1500E+01
It	=	0.1006E-02
Iw	=	0.5925E+00
SCx	=	-0.9055E+00
SCy	=	0.1499E+01



R => Return

H=.300E+01 B=.176E+01 CL=.690E+00 T=.75E-01
R=.22E+00

Fig. A5 Section properties of the section used for finite strip analysis

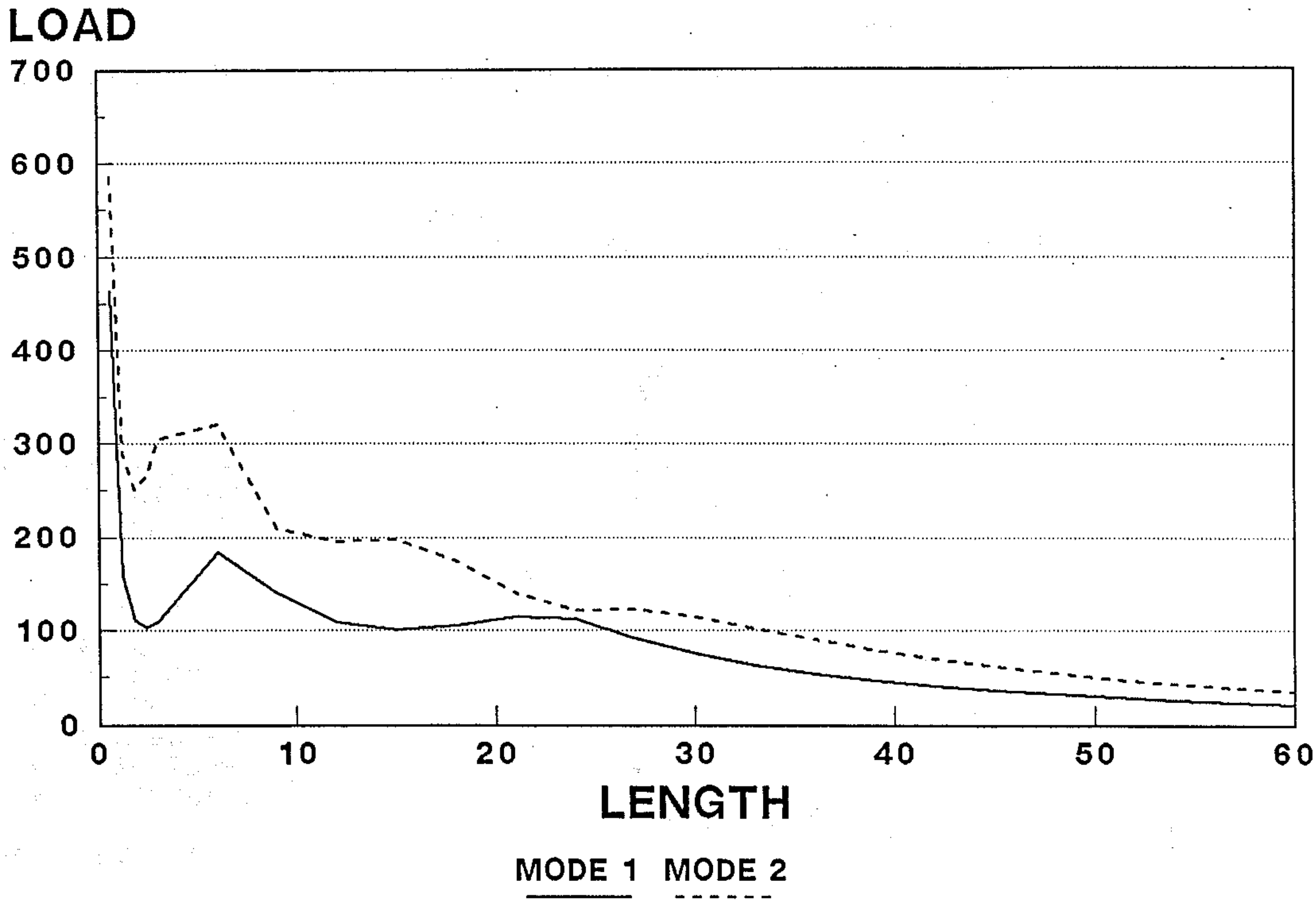


Fig. A6a Finite strip analysis results for uniform compression

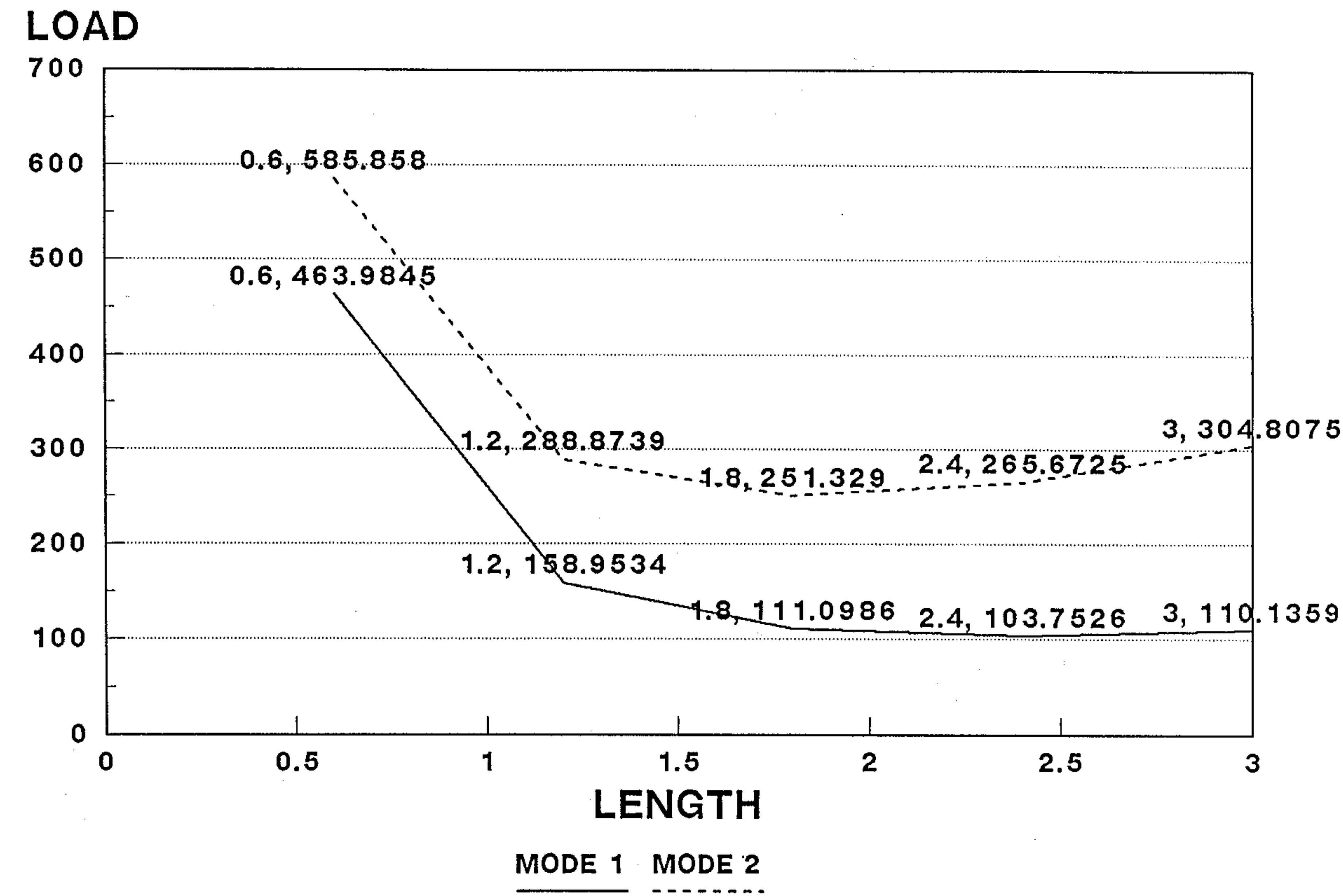


Fig. A6b Finite strip analysis results for uniform compression

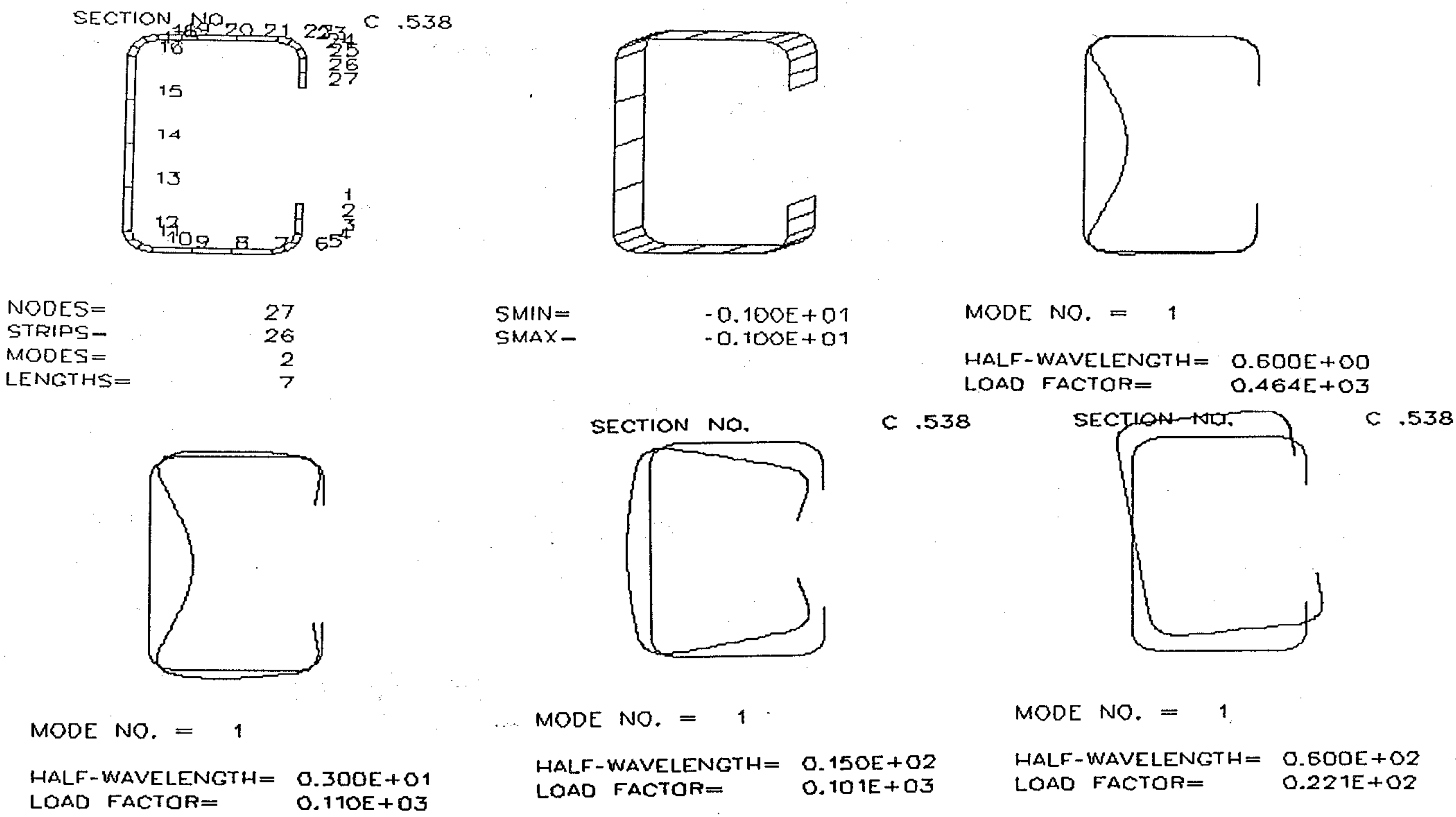


Fig. A6c Local buckling shapes for uniform compression

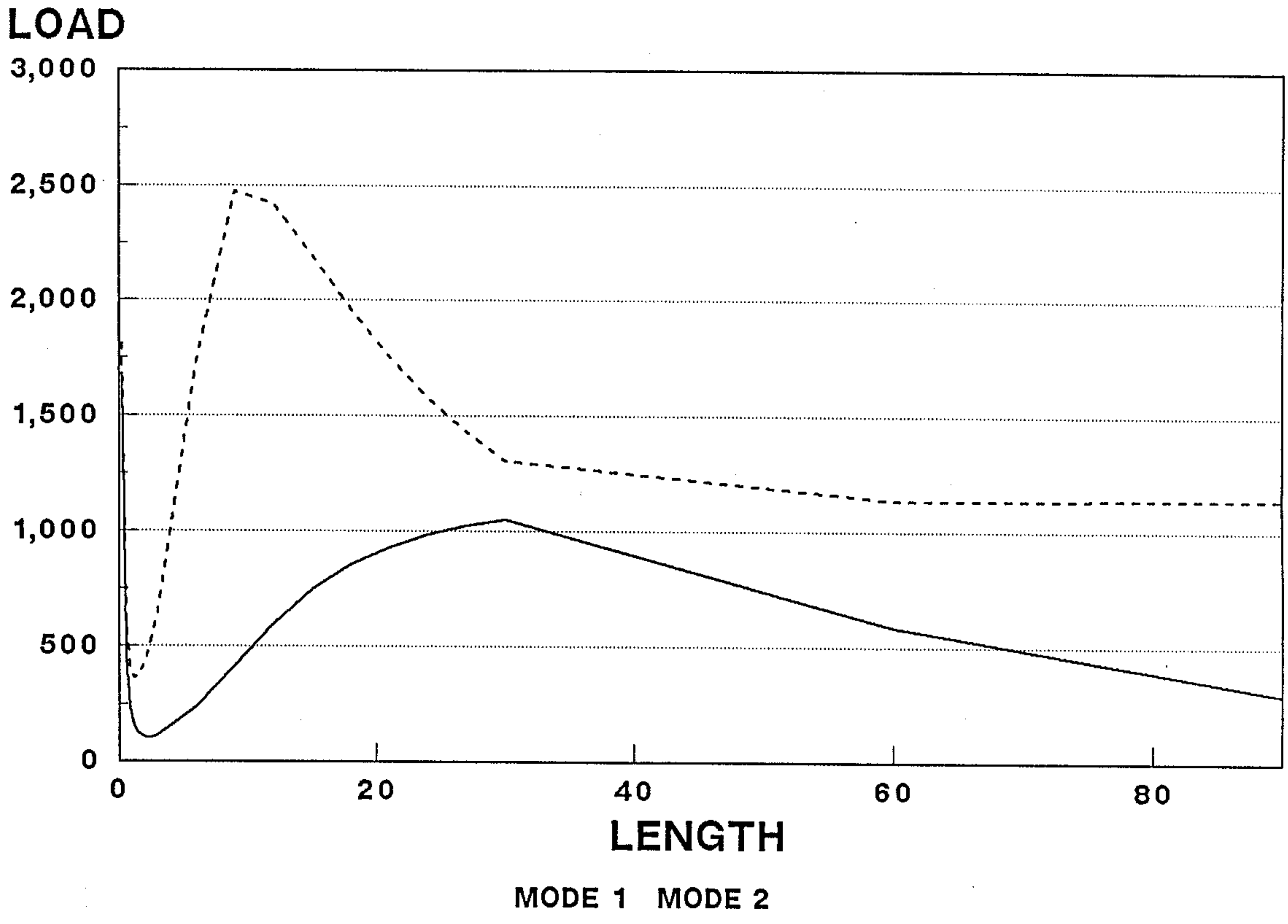


Fig. A7a Finite strip analysis results for bending

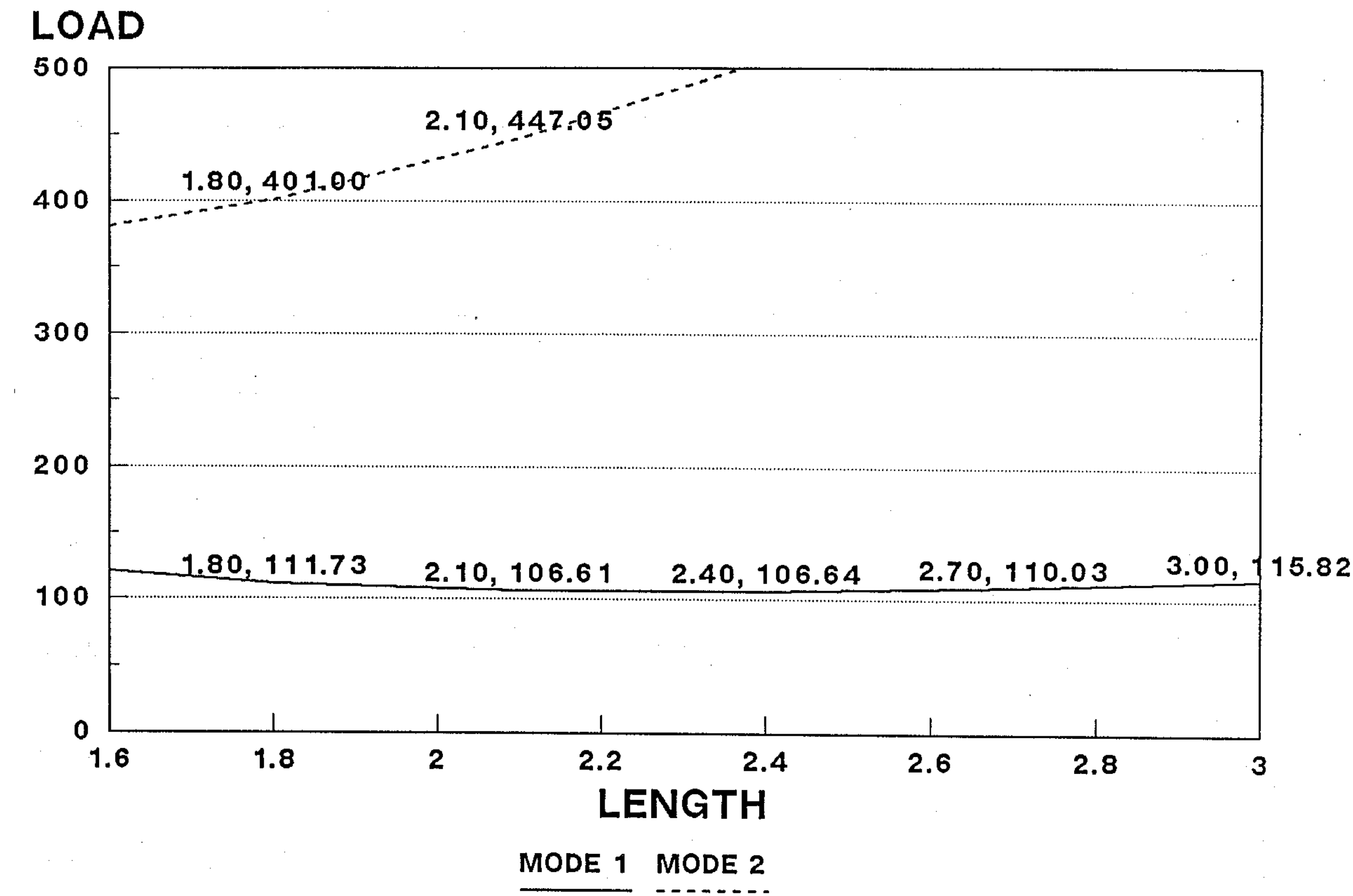
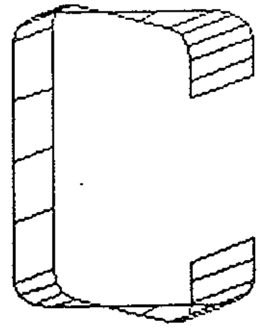
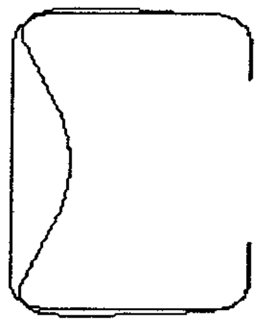


Fig. A7b Finite strip analysis results for bending



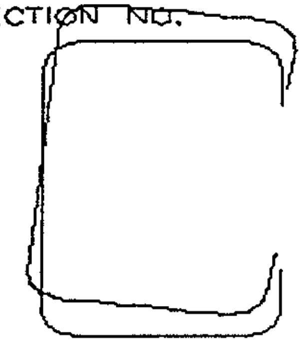
SMIN= -0.999E+00
SMAX- 0.159E+01



MODE NO. = 1

HALF-WAVELENGTH= 0.240E+01
LOAD FACTOR= 0.109E+03

SECTION NO. CBEND1



MODE NO. = 1

HALF-WAVELENGTH= 0.600E+02
LOAD FACTOR= 0.594E+03

Fig. A7c Local buckling shapes for bending

APPENDIX B - DATA BASE

TABLE B1
BOX SECTIONS OF DEWOLF, PEKOZ AND WINTER (1973)

Specimen	L/r	D	W	t	Ftest	Fyield
S1	8.500	3.500	2.000	0.058	40.500	41.900
S1	39.000	3.500	2.000	0.058	37.400	41.900
S1	69.100	3.500	2.000	0.058	34.600	41.900
S1	114.100	3.500	2.000	0.058	20.900	41.900
S2	11.700	5.000	2.000	0.058	33.900	41.900
S2	66.000	5.000	2.000	0.058	27.200	41.900
S2	102.000	5.000	2.000	0.058	20.800	41.900
S2	123.500	5.000	2.000	0.058	17.200	41.900
S3	13.600	7.000	2.000	0.058	29.300	41.900
S3	29.000	7.000	2.000	0.058	27.800	41.900
S3	109.800	7.000	2.000	0.058	15.500	41.900
S3	109.800	7.000	2.000	0.058	15.100	41.900
S3	109.800	7.000	2.000	0.058	14.400	41.900
S4	13.800	9.000	2.000	0.058	24.600	41.900
S4	42.600	9.000	2.000	0.058	22.600	41.900
S4	65.500	9.000	2.000	0.058	19.600	41.900
S4	116.000	9.000	2.000	0.058	11.800	41.900
S4	138.200	9.000	2.000	0.058	9.200	41.900

TABLE B2
BACK TO BACK CHANNELS OF DEWOLF, PEKOZ AND WINTER (1973)

Specimen	L/r	D	W	t	Ftest	Fyield
U1	12.900	3.000	1.000	0.058	43.800	41.900
U1	55.700	3.000	1.000	0.058	37.900	41.900
U1	89.100	3.000	1.000	0.058	36.200	41.900
U1	116.600	3.000	1.000	0.058	21.600	41.900
U2	12.000	3.000	1.250	0.058	42.000	41.900
U2	12.000	3.000	1.250	0.058	40.800	41.900
U2	53.000	3.000	1.250	0.058	38.600	41.900
U2	85.600	3.000	1.250	0.058	32.800	41.900
U2	108.000	3.000	1.250	0.058	24.100	41.900
U3	9.500	3.000	1.500	0.058	39.600	41.900
U3	42.200	3.000	1.500	0.058	34.600	41.900
U3	77.900	3.000	1.500	0.058	33.400	41.900
U3	95.500	3.000	1.500	0.058	26.400	41.900
U4	7.900	3.000	1.750	0.058	37.200	41.900
U4	44.100	3.000	1.750	0.058	31.700	41.900
U4	92.400	3.000	1.750	0.058	27.200	41.900

TABLE B3

SECTIONS OF KALYANARAMAN, PEKOZ AND WINTER (1972)

Specimen		L/r	D	W	t	Ftest	Fyield
LC-I	1	49.450	4.024	2.866	0.049	14.960	31.590
LC-I	2	72.070	4.031	2.869	0.049	14.070	31.590
LC-I	3	95.840	4.006	2.876	0.049	11.000	30.730
LC-II	1	52.710	4.007	2.500	0.049	16.170	30.260
LC-II	2	83.130	4.018	2.501	0.049	13.160	30.260
LC-II	3	113.070	4.008	2.509	0.049	9.950	25.680
LC-III	1	58.100	4.039	2.113	0.049	16.490	31.290
LC-III	2	98.480	4.015	2.120	0.048	11.660	31.110
LC-III	3	138.330	3.990	2.126	0.049	8.830	25.680
LC-IV	1	68.660	3.018	1.743	0.047	12.190	31.050
LC-IV	2	97.370	3.004	1.726	0.048	11.290	30.500
LC-IV	3	125.000	3.015	1.742	0.049	8.960	31.290
LC-V	1	73.530	3.029	1.488	0.049	14.630	33.180
LC-V	2	91.700	2.996	1.502	0.049	12.650	30.630
LC-V	3	122.360	3.027	1.490	0.049	10.750	33.180

TABLE B4
SECTIONS OF WENG AND PEKOZ (1987)

Specimen	Length	a	b	c	t	radius	ex	ey	Ptest	Fyield	Fultimate
RFC11	27.000	3.157	1.646	0.709	0.119	0.275	0.000	0.000	32.300	40.380	53.120
RFC11 #2	39.000	3.149	1.639	0.705	0.119	0.275	0.000	0.000	30.300	40.380	53.120
RFC11 #3	51.000	3.143	1.654	0.714	0.119	0.275	0.000	0.000	28.500	40.380	53.120
RFC11 #4	63.000	3.155	1.649	0.698	0.119	0.275	0.000	0.000	19.700	40.380	53.120
RFC13	27.000	3.074	1.631	0.702	0.096	0.252	0.000	0.000	30.200	51.850	62.210
RFC13 #2	39.000	3.066	1.629	0.721	0.096	0.252	0.000	0.000	29.200	51.850	62.210
RFC13 #3	51.000	3.067	1.620	0.715	0.096	0.252	0.000	0.000	23.800	51.850	62.210
RFC13 #4	63.000	3.061	1.617	0.719	0.096	0.252	0.000	0.000	17.000	51.850	62.210
RFC14	27.000	2.987	1.766	0.687	0.075	0.294	0.000	0.000	25.300	55.090	76.550
RFC14 #2	38.700	2.998	1.751	0.705	0.075	0.294	0.000	0.000	22.300	55.090	76.550
RFC14 #3	51.000	2.988	1.757	0.696	0.075	0.294	0.000	0.000	16.400	55.090	76.550
RFC14 #4	63.000	2.996	1.760	0.694	0.075	0.294	0.000	0.000	12.700	55.090	76.550
RFC14 #5	75.500	2.981	1.748	0.688	0.075	0.294	0.000	0.000	9.700	55.090	76.550
PBC13	26.800	3.018	1.620	0.605	0.087	0.243	0.000	0.000	18.000	38.400	50.560
PBC13 #2	39.000	3.029	1.625	0.610	0.087	0.242	0.000	0.000	17.500	38.400	50.560
PBC13 #3	51.000	3.025	1.614	0.613	0.087	0.243	0.000	0.000	16.000	38.400	50.560
PBC14	27.000	3.001	1.629	0.611	0.071	0.227	0.000	0.000	16.100	36.300	50.070
PBC14 #2	39.000	2.995	1.625	0.603	0.071	0.227	0.000	0.000	15.600	36.300	50.070
PBC14 #3	51.000	2.997	1.637	0.601	0.071	0.227	0.000	0.000	13.000	36.300	50.070
PBC14 #4	63.000	3.004	1.630	0.605	0.072	0.228	0.000	0.000	11.200	36.300	50.070
PBC14 #5	75.000	3.008	1.632	0.609	0.071	0.227	0.000	0.000	9.700	36.300	50.070
R13	27.000	3.008	1.635	0.614	0.086	0.305	0.000	0.000	26.200	50.150	70.630
R13 #2	39.000	3.006	1.633	0.605	0.086	0.305	0.000	0.000	23.800	50.150	70.630
R13 #3	51.000	3.014	1.641	0.608	0.086	0.305	0.000	0.000	17.800	50.150	70.630
R13 #4	63.000	3.015	1.628	0.597	0.086	0.305	0.000	0.000	13.200	50.150	70.630
R13 #5	73.000	3.010	1.630	0.601	0.086	0.305	0.000	0.000	10.100	50.150	70.630
R14	27.000	3.019	1.649	0.608	0.075	0.294	0.000	0.000	23.200	49.730	69.320
R14 #2	39.000	3.008	1.663	0.614	0.075	0.294	0.000	0.000	19.400	49.730	69.320
R14 #3	51.000	3.016	1.655	0.616	0.075	0.294	0.000	0.000	15.400	49.730	69.320
R14 #4	63.000	3.019	1.658	0.601	0.075	0.294	0.000	0.000	11.600	49.730	69.320
R14 #5	75.000	3.009	1.664	0.613	0.075	0.294	0.000	0.000	8.500	49.730	69.320
P11	55.000	5.031	2.488	0.878	0.118	0.243	0.000	0.000	34.200	30.590	50.950
P11 #2	75.000	5.037	2.499	0.864	0.118	0.243	0.000	0.000	30.400	30.590	50.950
P11 #3	90.000	5.042	2.486	0.879	0.121	0.246	0.000	0.000	27.800	33.600	51.910
P11 #4	110.000	5.038	2.491	0.882	0.121	0.246	0.000	0.000	22.300	33.600	51.910
P16	31.000	2.645	1.373	0.628	0.064	0.158	0.000	0.000	11.200	33.450	40.130
P16 #2	41.000	2.650	1.383	0.620	0.064	0.158	0.000	0.000	10.400	33.450	40.130
P16 #3	52.000	2.651	1.372	0.619	0.064	0.158	0.000	0.000	8.000	32.060	45.090
P16 #4	62.000	2.639	1.379	0.623	0.064	0.158	0.000	0.000	6.900	33.450	40.130
P16 #5	69.000	2.641	1.377	0.625	0.064	0.158	0.000	0.000	6.200	33.450	40.130

TABLE B5
HAT SECTIONS OF DAT AND PEKOZ (1980)

Specimen	Length	a	b	c	t	r1	r2	ex	ey	Ptest	Fyield	Faverage
H11 -E1	19.400	0.140	0.470	0.440	0.120	0.400	0.400	0.000	0.000	18.500	42.830	51.620
H11 -E3	28.000	0.140	0.470	0.440	0.120	0.400	0.400	0.000	0.000	18.200	42.830	51.620
H11 -E4	39.000	0.140	0.470	0.440	0.120	0.400	0.400	0.000	0.000	11.800	42.830	51.620
H11 -E5	51.000	0.140	0.470	0.440	0.120	0.400	0.400	0.000	0.000	7.000	42.830	51.620
H11 -E2	23.000	0.140	0.470	0.440	0.120	0.400	0.400	0.000	0.000	15.700	42.830	51.620
H7 -F1	31.000	0.150	0.672	0.860	0.179	0.500	0.527	0.000	0.000	45.000	44.540	54.850
H7 -F2	39.000	0.150	0.672	0.860	0.179	0.500	0.527	0.000	0.000	41.800	44.540	54.850
H7 -F3	42.400	0.150	0.672	0.860	0.179	0.500	0.527	0.000	0.000	39.600	44.540	54.850
H7 -F4	45.000	0.150	0.672	0.860	0.179	0.500	0.527	0.000	0.000	39.400	44.540	54.850
H7 -F5	51.000	0.150	0.672	0.860	0.179	0.500	0.527	0.000	0.000	30.900	44.540	54.850
HT -G1	27.900	0.200	0.450	1.000	0.300	0.542	0.632	0.000	0.000	97.400	58.000	60.690
HT -G1	39.000	0.200	0.450	1.000	0.300	0.542	0.632	0.000	0.000	78.000	58.000	60.690
HT -G3	51.000	0.200	0.450	1.000	0.300	0.542	0.632	0.000	0.000	65.800	58.000	60.690
HT -G4	65.400	0.200	0.450	1.000	0.300	0.542	0.632	0.000	0.000	42.750	58.000	60.690
HT -G5	71.000	0.200	0.450	1.000	0.300	0.542	0.632	0.000	0.000	35.400	58.000	60.690

TABLE B6
LIPPED CHANNELS OF DAT AND PEKOZ (1980)

Specimen	Length	a	b	c	t	r1	r2	ex	ey	Ptest	Fyield	Faverage
PBC14 -A3	27.000	2.500	1.200	0.500	0.073	0.200	0.200	0.000	0.000	20.200	38.980	44.750
PBC14 -A5	39.000	2.500	1.200	0.500	0.073	0.200	0.200	0.000	0.000	19.300	38.980	44.750
PBC14 -A9	57.000	2.500	1.200	0.500	0.073	0.200	0.200	0.000	0.000	13.950	38.980	44.750
PBC14 -A11	69.000	2.500	1.200	0.500	0.073	0.200	0.200	0.000	0.000	11.200	38.980	44.750
PBC14 -A13	78.000	2.500	1.200	0.500	0.073	0.200	0.200	0.000	0.000	10.500	38.980	44.750
PBC14 -A14	89.000	2.500	1.200	0.500	0.073	0.200	0.200	0.000	0.000	8.200	38.980	44.750
PBC14 -A1	21.000	2.500	1.200	0.500	0.073	0.200	0.200	0.000	0.000	19.000	38.980	44.750
PBC14 -A2	27.000	2.500	1.200	0.500	0.073	0.200	0.200	0.000	0.000	16.900	38.980	44.750
PBC14 -A4	33.000	2.500	1.200	0.500	0.073	0.200	0.200	0.000	0.000	16.300	38.980	44.750
PBC14 -A6	39.000	2.500	1.200	0.500	0.073	0.200	0.200	0.000	0.000	14.400	38.980	44.750
PBC14 -A7	45.000	2.500	1.200	0.500	0.073	0.200	0.200	0.000	0.000	13.500	38.980	44.750
PBC14 -A8	51.000	2.500	1.200	0.500	0.073	0.200	0.200	0.000	0.000	13.660	38.980	44.750
PBC14 -A10	63.000	2.500	1.200	0.500	0.073	0.200	0.200	0.000	0.000	10.450	38.980	44.750
PBC14 -A12	75.000	2.500	1.200	0.500	0.073	0.200	0.200	0.000	0.000	9.500	38.980	44.750
RFC14 -B2	27.000	2.500	1.200	0.500	0.073	0.200	0.200	0.000	0.000	19.500	44.540	47.910
RFC14 -B4	39.000	2.500	1.200	0.500	0.073	0.200	0.200	0.000	0.000	18.000	44.540	47.910
RFC14 -B5	51.000	2.500	1.200	0.500	0.073	0.200	0.200	0.000	0.000	16.000	44.540	47.910
RFC14 -B6	51.000	2.500	1.200	0.500	0.073	0.200	0.200	0.000	0.000	15.500	44.540	47.910
RFC14 -B9	80.500	2.500	1.200	0.500	0.073	0.200	0.200	0.000	0.000	8.800	44.540	47.910
RFC14 -B10	80.500	2.500	1.200	0.500	0.073	0.200	0.200	0.000	0.000	8.000	44.540	47.910
RFC14 -B11	84.900	2.500	1.200	0.500	0.073	0.200	0.200	0.000	0.000	9.050	44.540	47.910
RFC14 -B1	27.000	2.500	1.200	0.500	0.073	0.200	0.200	0.000	0.000	18.500	44.540	47.910
RFC14 -B3	39.000	2.500	1.200	0.500	0.073	0.200	0.200	0.000	0.000	16.300	44.540	47.910
RFC14 -B7	51.000	2.500	1.200	0.500	0.073	0.200	0.200	0.000	0.000	14.000	44.540	47.910
RFC14 -B8	63.000	2.500	1.200	0.500	0.073	0.200	0.200	0.000	0.000	11.500	44.540	47.910
PBC13 -C3	39.000	2.500	1.200	0.500	0.090	0.200	0.200	0.000	0.000	26.400	38.050	44.260
PBC13 -C4	51.000	2.500	1.200	0.500	0.090	0.200	0.200	0.000	0.000	21.600	38.050	44.260
PBC13 -C5	63.000	2.500	1.200	0.500	0.090	0.200	0.200	0.000	0.000	15.850	38.050	44.260
PBC13 -C6	82.000	2.500	1.200	0.500	0.090	0.200	0.200	0.000	0.000	9.950	38.050	44.260
PBC13 -C7	100.000	2.500	1.200	0.500	0.090	0.200	0.200	0.000	0.000	7.700	38.050	44.260
PBC13 -C1	27.000	2.500	1.200	0.500	0.090	0.200	0.200	0.000	0.000	35.000	38.050	44.260
PBC13 -C2	27.000	2.500	1.200	0.500	0.090	0.200	0.200	0.000	0.000	23.380	38.050	44.260
RFC13 -D6	39.000	2.500	1.200	0.500	0.090	0.200	0.200	0.000	0.000	29.500	38.340	44.270
RFC13 -D7	45.000	2.500	1.200	0.500	0.090	0.200	0.200	0.000	0.000	24.500	38.340	44.270
RFC13 -D8	51.000	2.500	1.200	0.500	0.090	0.200	0.200	0.000	0.000	23.000	38.340	44.270
RFC13 -D9	57.000	2.500	1.200	0.500	0.090	0.200	0.200	0.000	0.000	20.000	38.340	44.270
RFC13 -D10	63.000	2.500	1.200	0.500	0.090	0.200	0.200	0.000	0.000	16.000	38.340	44.270
RFC13 -D11	69.000	2.500	1.200	0.500	0.090	0.200	0.200	0.000	0.000	13.350	38.340	44.270
RFC13 -D12	75.000	2.500	1.200	0.500	0.090	0.200	0.200	0.000	0.000	12.200	38.340	44.270
RFC13 -D13	87.000	2.500	1.200	0.500	0.090	0.200	0.200	0.000	0.000	9.030	38.340	44.270
RFC13 -D1	19.250	2.500	1.200	0.500	0.090	0.200	0.200	0.000	0.000	34.200	38.340	44.270
RFC13 -D2	21.000	2.500	1.200	0.500	0.090	0.200	0.200	0.000	0.000	17.000	38.340	44.270
RFC13 -D3	27.000	2.500	1.200	0.500	0.090	0.200	0.200	0.000	0.000	35.000	38.340	44.270
RFC13 -D4	27.000	2.500	1.200	0.500	0.090	0.200	0.200	0.000	0.000	22.300	38.340	44.270
RFC13 -D5	33.000	2.500	1.200	0.500	0.090	0.200	0.200	0.000	0.000	34.500	38.340	44.270

TABLE B7
SECTIONS OF MULLIGAN AND PEKOZ (1983)

	Specimen	Length	a	b	c	t	radius	ex	ey	Ptest	Fyield	Fultimate
1	C1	63.000	5.856	2.885	0.559	0.045	0.154	0.000	0.000	9.800	32.410	40.513
2	C2	75.020	5.837	2.888	0.519	0.045	0.152	0.000	0.000	10.400	31.950	39.938
3	C3	121.100	5.872	2.884	0.517	0.046	0.154	0.000	0.000	8.200	31.950	39.938
4	C4	121.000	5.805	2.885	0.538	0.045	0.156	0.000	0.000	8.400	31.950	39.938
5	C5	75.000	5.836	2.841	0.556	0.048	0.164	0.000	0.000	11.800	32.470	40.588
6	C1	72.010	8.813	2.895	0.528	0.045	0.152	0.000	0.000	9.600	32.590	40.737
7	C2	95.120	8.821	2.882	0.532	0.045	0.156	0.000	0.000	8.750	32.410	40.513
8	C3	118.000	8.841	2.894	0.534	0.044	0.150	0.000	0.000	7.600	32.410	40.513
9	C4	95.030	8.750	2.871	0.562	0.048	0.164	0.000	0.000	10.800	33.060	41.325
10	C1	99.160	4.184	4.148	0.612	0.048	0.166	0.000	0.000	11.000	34.340	42.925
11	C1	75.070	8.418	4.172	0.623	0.048	0.162	0.000	0.000	12.300	31.820	39.775
12	C2	99.070	8.441	4.144	0.600	0.048	0.166	0.000	0.000	12.100	35.420	44.275
13	C3	99.160	8.434	4.156	0.587	0.048	0.166	0.000	0.000	11.800	33.850	42.313

TABLE B8
SECTIONS OF MULLIGAN AND PEKOZ (1983)

Specimen	Length	a	b	c	t	radius	ex	ey	Ptest	Fyield	Fultimate
C1.1	19.960	5.832	1.378	0.231	0.048	0.131	-0.203	0.000	8.000	32.790	40.988
C2.1	75.000	5.836	2.835	0.542	0.047	0.168	-0.536	0.000	10.300	31.820	39.775
C2.2	75.720	5.842	2.850	0.562	0.048	0.166	-0.534	0.000	8.750	31.820	39.775
C2.3	75.660	5.816	2.851	0.546	0.048	0.166	-0.982	0.000	6.750	31.820	39.775
C2.4	75.000	5.812	2.863	0.550	0.048	0.164	-0.212	0.000	12.400	32.470	40.588
C2.1	95.050	8.852	2.865	0.551	0.048	0.156	-0.424	0.000	10.400	34.980	43.725
C2.2	95.090	8.790	2.875	0.585	0.048	0.156	-0.397	0.000	10.000	34.340	42.925
C2.1	99.030	8.415	4.180	0.614	0.048	0.152	-0.521	0.000	12.500	33.060	41.325
C2.2	99.190	8.422	4.164	0.609	0.048	0.164	-0.515	0.000	8.750	34.340	42.925

TABLE B9
HAT SECTIONS OF PEKOZ AND WINTER (1967)
FROM PEKOZ (1987), TABLE 3.3-1

Specimen	Length	a	b	c	t	radius	ex	ey	Ptest	Fyield	Fultimate
LH1 -LS - 1	53.000	1.200	1.650	0.450	0.058	0.232	-0.100	0.000	3.990	45.000	56.250
LH1 -LS - 2	53.000	1.200	1.650	0.450	0.058	0.232	-0.900	0.000	2.210	45.000	56.250
LH1 -LS - 3	53.000	1.200	1.650	0.450	0.058	0.232	-1.400	0.000	1.570	45.000	56.250
LH2 -LS - 1	53.000	0.950	1.925	0.506	0.058	0.232	0.000	0.000	3.730	45.000	56.250
LH2 -LS - 2	53.000	0.950	1.925	0.506	0.058	0.232	-1.330	0.000	1.830	45.000	56.250
LH2 -LS - 3	53.000	0.950	1.925	0.506	0.058	0.232	-1.860	0.000	1.290	45.000	56.250
LH3 -LS - 1	53.000	0.950	1.450	0.450	0.058	0.232	0.000	0.000	3.220	45.000	56.250
LH3 -LS - 2	53.000	0.950	1.450	0.450	0.058	0.232	-0.760	0.000	1.780	45.000	56.250
LH3 -LS - 3	53.000	0.950	1.450	0.450	0.058	0.232	-1.260	0.000	1.280	45.000	56.250
LH4 -LS - 1	53.000	1.296	1.719	0.445	0.048	0.192	0.000	0.000	4.000	45.000	56.250
LH4 -LS - 2	53.000	1.296	1.719	0.445	0.048	0.192	-0.950	0.000	1.810	45.000	56.250
LH4 -LS - 3	53.000	1.296	1.719	0.445	0.048	0.192	-1.450	0.000	1.550	45.000	56.250
LH5 -LS - 1	53.000	0.968	1.969	0.460	0.048	0.192	0.000	0.000	3.060	45.000	56.250
LH5 -LS - 2	53.000	0.968	1.969	0.460	0.048	0.192	-1.020	0.000	1.520	45.000	56.250
LH5 -LS - 3	53.000	0.968	1.969	0.460	0.048	0.192	-1.520	0.000	1.270	45.000	56.250
LH6 -LS - 1	53.000	0.968	1.484	0.460	0.048	0.192	0.000	0.000	2.840	45.000	56.250
LH6 -LS - 2	53.000	0.968	1.484	0.460	0.048	0.192	-0.760	0.000	1.470	45.000	56.250
LH6 -LS - 3	53.000	0.968	1.484	0.460	0.048	0.192	-1.270	0.000	1.140	45.000	56.250

TABLE B10
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985)
FROM PEKOZ (1987), TABLE 3.3-2

Specimen	Length	a	b	c	t	radius	ex	ey	Ptest	Fyield	Fultimate
LC1 -LS - 1	39.000	2.922	2.922	0.711	0.078	0.223	-1.500	0.000	12.750	45.500	56.875
LC1 -LS - 2	51.000	2.922	2.922	0.711	0.078	0.223	-1.500	0.000	11.250	45.500	56.875
LC1 -LS - 3	63.000	2.922	2.922	0.711	0.078	0.223	-1.500	0.000	9.450	45.500	56.875
LC2 -LS - 1	36.600	2.868	2.868	0.684	0.132	0.344	2.000	0.000	22.000	41.900	52.375
LC2 -LS - 2	49.800	2.868	2.868	0.684	0.132	0.344	2.250	0.000	18.650	41.900	52.375
LC2 -LS - 3	60.600	2.868	2.868	0.684	0.132	0.344	2.250	0.000	17.600	41.900	52.375

TABLE B11
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985)
FROM PEKOZ (1987), TABLE 3.3-3

Specimen	Length	a	b	c	t	radius	ex	ey	Ptest	Fyield	Fultimate
LC3 -LS - 1	52.000	2.900	1.600	0.700	0.073	0.237	0.000	-1.450	8.900	40.900	51.125
LC3 -LS - 2	39.100	2.927	1.552	0.713	0.073	0.234	0.000	-2.000	7.800	39.100	48.875
LC3 -LS - 3	51.100	2.927	1.552	0.713	0.073	0.234	0.000	-2.000	7.200	39.100	48.875
LC3 -LS - 4	63.400	2.927	1.552	0.713	0.073	0.234	0.000	-2.000	7.100	39.100	48.875
LC4 -LS - 1	39.100	2.910	1.566	0.705	0.090	0.235	0.000	-2.500	11.600	59.400	74.250
LC4 -LS - 2	51.200	2.910	1.566	0.705	0.090	0.235	0.000	-2.500	10.500	59.400	74.250
LC5 -LS - 1	51.200	2.868	2.868	0.684	0.132	0.352	0.000	-2.030	19.000	47.500	59.375
LC5 -LS - 2	69.200	2.868	2.868	0.684	0.132	0.352	0.000	-2.000	17.200	47.500	59.375
LC6 -LS - 1	51.500	2.925	2.925	0.712	0.075	0.289	0.000	-2.380	10.300	39.300	49.125
LC6 -LS - 2	63.500	2.925	2.925	0.712	0.075	0.289	0.000	-2.130	10.500	39.300	49.125
LC7 -LS - 1	50.200	3.868	2.868	0.684	0.132	0.340	0.000	-2.250	23.400	37.400	46.750
LC7 -LS - 2	69.000	2.868	2.868	0.684	0.132	0.340	0.000	-2.220	21.700	37.400	46.750
LC8 -LS - 1	40.100	3.923	2.923	0.711	0.077	0.313	0.000	-1.500	16.800	41.600	52.000
LC8 -LS - 2	51.100	3.923	2.923	0.711	0.077	0.313	0.000	-1.500	16.200	41.600	52.000
LC8 -LS - 3	63.800	3.923	2.923	0.711	0.077	0.313	0.000	-1.500	15.500	41.600	52.000
LC8 -LS - 4	75.600	3.924	2.924	0.712	0.076	0.312	0.000	-1.660	13.800	42.500	53.125
LC8 -LS - 5	87.600	3.924	2.924	0.712	0.076	0.312	0.000	-2.000	12.300	42.500	53.125

TABLE B12
LIPPED CHANNEL SECTIONS FROM LOH AND PEKOZ (1985)
FROM PEKOZ (1987), TABLE 3.3-4

Specimen	Length	a	b	c	t	radius	ex	ey	Ptest	Fyield	Fultimate
LC9 -LS - 1	39.500	3.396	2.334	0.604	0.104	0.305	-1.500	-2.000	11.500	58.200	72.750
LC9 -LS - 2	52.800	3.396	2.334	0.604	0.104	0.305	-1.500	-2.000	11.150	58.200	72.750
LC9 -LS - 3	64.800	3.396	2.334	0.604	0.104	0.305	-1.500	-2.000	9.950	58.200	72.750
LC10 -LS - 3	63.200	3.899	2.899	0.949	0.101	0.336	2.000	-2.500	16.400	54.900	68.625
LC11 -LS - 1	39.000	2.924	2.924	0.712	0.076	0.281	-2.000	-2.500	7.900	48.800	61.000
LC11 -LS - 2	49.500	2.924	2.924	0.712	0.076	0.281	-2.500	-2.000	7.400	48.800	61.000
LC11 -LS - 3	61.300	2.924	2.924	0.712	0.076	0.281	-2.000	-2.500	6.800	48.800	61.000

TABLE B13
LIPPED CHANNEL SECTIONS OF THOMASSON (1978)
FROM PEKOZ (1987), TABLE 7.3-2

Specimen	Length	a	b	c	t	radius	ex	ey	Ptest	Fyield	Fultimate
A71	105.900	11.775	3.949	0.771	0.025	0.100	0.000	0.000	3.600	56.700	70.875
A74	105.900	11.795	3.965	0.811	0.025	0.100	0.000	0.000	3.640	57.300	71.625
A75	105.900	11.775	3.957	0.787	0.025	0.100	0.000	0.000	3.480	57.700	72.125
A76	105.900	11.814	3.944	0.795	0.026	0.104	0.000	0.000	3.260	41.800	52.250
A101	105.900	11.803	3.957	0.795	0.037	0.148	0.000	0.000	8.300	67.300	84.125
A102	105.900	11.803	3.957	0.787	0.037	0.148	0.000	0.000	7.870	66.700	83.375
A103	105.900	11.783	3.961	0.771	0.037	0.148	0.000	0.000	8.340	66.700	83.375
A104	105.900	11.742	9.921	0.768	0.038	0.152	0.000	0.000	7.760	68.900	86.125
A151	105.900	11.783	3.937	0.799	0.057	0.228	0.000	0.000	17.200	55.400	69.250
A152	105.900	11.814	3.937	0.795	0.056	0.224	0.000	0.000	15.700	55.000	68.750
A153	105.900	11.806	3.929	0.819	0.054	0.216	0.000	0.000	16.000	57.300	71.625
A154	105.900	11.835	3.952	0.921	0.055	0.220	0.000	0.000	16.400	57.000	71.250
A156	105.900	11.785	3.926	0.803	0.055	0.220	0.000	0.000	15.500	55.300	69.125

TABLE B14
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985)
FROM PEKOZ (1987), TABLE 7.3-3

Specimen	Length	a	b	c	t	radius	ex	ey	Ptest	Fyield	Fultimate
LC1 -LU - 1	76.000	6.870	2.461	0.710	0.073	0.313	0.000	-2.100	18.740	55.900	69.875
LC1 -LU - 2	76.000	6.870	2.461	0.710	0.073	0.313	0.000	-12.000	6.800	55.900	69.875
LC1 -LU - 3	76.000	6.870	2.461	0.710	0.073	0.313	0.000	-6.000	12.320	55.900	69.875
LC2 -LU - 1	99.900	9.086	3.136	0.684	0.050	0.178	0.000	-6.000	5.760	35.100	43.875
LC2 -LU - 2	99.900	9.071	3.129	0.717	0.050	0.178	0.000	-9.000	4.290	35.800	44.750
LC3 -LU - 1	99.900	7.958	3.900	0.624	0.058	0.156	0.000	-4.000	8.000	43.400	54.250
LC3 -LU - 2	99.900	8.001	3.919	0.620	0.058	0.156	0.000	-8.000	6.350	44.400	55.500
LC3 -LU - 3	99.900	7.930	3.927	0.631	0.058	0.156	0.000	-4.000	8.500	43.200	54.000
LC4 -LU - 1	99.900	8.881	3.379	1.023	0.061	0.344	0.000	-12.000	7.720	62.100	77.625
LC4 -LU - 2	99.900	8.881	3.379	1.023	0.061	0.344	0.000	-18.000	5.180	62.100	77.625
LC4 -LU - 3	99.900	8.873	3.383	1.026	0.058	0.359	0.000	-6.000	10.660	62.900	78.625
LC5 -LU - 1	99.900	7.882	3.399	1.028	0.061	0.344	0.000	-4.000	13.690	58.500	73.125
LC5 -LU - 2	99.900	7.882	3.399	1.028	0.061	0.344	0.000	-8.000	9.320	58.500	73.125
LC5 -LU - 3	99.800	7.884	3.394	1.032	0.062	0.359	0.000	-6.000	11.780	58.600	73.250
LC5 -LU - 4	99.800	7.884	3.394	1.032	0.062	0.359	0.000	-10.000	7.990	58.600	73.250
LC6 -LU - 1	99.900	9.351	3.436	1.222	0.090	0.359	0.000	-5.000	28.750	71.700	89.625
LC6 -LU - 2	99.800	9.351	3.436	1.222	0.090	0.359	0.000	-10.000	19.490	71.700	89.625
LC10 -LU - 1	98.900	9.375	3.439	1.221	0.089	0.375	0.000	-5.500	24.800	70.600	88.250
LC10 -LU - 2	98.900	9.375	3.439	1.221	0.089	0.375	0.000	-5.500	25.000	70.600	88.250

TABLE B15
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985)
FROM PEKOZ (1987), TABLE 7.3-4

Specimen	Length	a	b	c	t	radius	ex	ey	Ptest	Fyield	Fultimate
LC7 -LU - 1	37.400	6.090	1.642	0.571	0.077	0.285	1.500	-3.500	6.500	50.300	62.875
LC7 -LU - 2	49.400	6.090	1.642	0.571	0.077	0.285	1.500	-3.500	5.800	50.300	62.875
LC7 -LU - 3	61.400	6.090	1.642	0.571	0.077	0.285	1.500	-3.500	5.350	50.300	62.875
LC8 -LU - 1	98.900	8.887	3.379	1.031	0.060	0.344	1.000	-2.000	11.850	61.200	76.500
LC8 -LU - 2	99.200	8.887	3.379	1.031	0.060	0.344	1.000	-2.000	12.000	61.200	76.500
LC8 -LU - 3	98.900	8.886	3.374	1.029	0.061	0.359	1.000	-4.000	10.750	62.900	78.625
LC8 -LU - 4	98.900	8.886	3.374	1.029	0.061	0.359	1.000	-4.000	10.550	62.900	78.625
LC8 -LU - 5	99.100	8.879	3.375	1.021	0.060	0.359	1.000	-6.000	8.900	63.200	79.000
LC8 -LU - 6	98.700	8.879	3.375	1.021	0.060	0.359	1.000	-6.000	9.350	63.200	79.000
LC9 -LU - 1	93.400	7.874	3.400	1.031	0.062	0.344	-0.380	-3.940	14.000	69.900	87.375
LC9 -LU - 2	93.100	7.874	3.400	1.031	0.062	0.344	-0.380	-6.000	10.100	69.900	87.375
LC9 -LU - 3	93.100	7.885	3.404	1.031	0.062	0.313	-0.380	-6.000	10.600	70.300	87.875
LC9 -LU - 4	93.100	7.885	3.404	1.031	0.062	0.313	-0.630	-3.940	11.700	70.300	87.875

TABLE B16
LOCALLY STABLE BEAM-COLUMNS
HAT SECTIONS OF LOH AND PEKOZ (1985)

Specimen	Length	a	b	c	T	outr	ex	ey	Ptest	Fyield
LH1 -LU - 1	63	4.126	6.623	1.241	.105	.251	0.10	0	40.60	38.7
LH1 -LU - 2	63	4.162	6.568	1.281	.107	.258	0.50	0	53.60	42.1
LH2 -LU - 1	69	2.024	4.074	.770	.046	.141	0.00	0	8.00	31.5
LH2 -LU - 2	69	2.085	4.043	.764	.046	.156	0.75	0	6.00	33.4
LH2 -LU - 3	69	2.080	4.045	.789	.046	.149	1.50	0	4.00	33.9
LH3 -LU - 1	69	2.635	5.013	.801	.046	.172	0.00	0	7.55	32.5
LH3 -LU - 2	69	2.627	5.029	.795	.046	.172	0.00	0	7.90	33.7
LH3 -LU - 3	69	2.592	5.025	.793	.046	.172	0.00	0	8.30	33.0
LH4 -LU - 1	67.1	2.098	4.031	.613	.030	.180	0.00	0	2.60	22.3
LH4 -LU - 2	69	2.075	4.028	.610	.030	.180	0.00	0	2.30	21.5
LH4 -LU - 3	69	2.088	4.067	.590	.030	.180	0.00	0	2.90	22.5
LH5 -LU - 1	69	2.321	5.556	.654	.039	.145	0.00	0	5.30	30.0
LH5 -LU - 2	69	2.325	5.544	.664	.039	.137	0.00	0	5.65	30.1
LH5 -LU - 3	69	2.314	5.562	.666	.039	.137	0.00	0	6.00	31.3
LH5 -LU - 4	69	2.347	5.544	.655	.040	.148	0.00	0	5.90	35.2

TABLE B17
LIPPED CHANNEL SECTIONS OF LOUGHLAN (1979)
FROM PEKOZ (1987), TABLE 7.3-5

Specimen	Length	a	b	c	t	radius	ex	ey	Ptest	Fyield	Fultimate
L1	75.000	3.998	1.991	0.742	0.032	0.128	0.290	0.000	3.120	35.100	43.875
L2	51.000	3.981	1.988	0.757	0.032	0.128	0.290	0.000	3.600	35.100	43.875
L3	75.000	4.045	2.471	1.001	0.032	0.128	0.400	0.000	3.520	35.100	43.875
L4	63.000	4.014	2.472	1.000	0.032	0.128	0.400	0.000	3.780	35.100	43.875
L5	51.000	4.001	2.480	1.013	0.032	0.128	0.410	0.000	4.100	35.100	43.875
L6	75.000	5.034	1.992	0.735	0.032	0.128	0.070	0.000	3.800	35.100	43.875
L7	63.000	4.976	1.987	0.742	0.032	0.128	0.070	0.000	3.970	35.100	43.875
L8	51.000	4.980	1.991	0.753	0.032	0.128	0.070	0.000	4.310	35.100	43.875
L9	75.000	5.031	2.469	1.000	0.032	0.128	0.180	0.000	4.340	35.100	43.875
L10	63.000	5.015	2.481	1.004	0.032	0.128	0.190	0.000	4.570	35.100	43.875
L11	51.000	4.990	2.477	1.007	0.032	0.128	0.190	0.000	4.650	35.100	43.875
L12	75.000	5.981	1.998	0.746	0.032	0.128	0.180	0.000	3.350	35.100	43.875
L13	63.000	5.992	1.992	0.774	0.032	0.128	0.180	0.000	3.530	35.100	43.875
L14	51.000	5.974	1.987	0.749	0.032	0.128	0.180	0.000	3.850	35.100	43.875
L15	75.000	6.061	2.472	0.998	0.032	0.128	0.000	0.000	4.900	35.100	43.875
L16	63.000	6.061	2.476	1.008	0.032	0.128	0.000	0.000	5.180	35.100	43.875
L17	51.000	5.985	2.480	1.006	0.032	0.128	0.000	0.000	5.310	35.100	43.875
L18	75.000	7.009	1.976	0.742	0.032	0.128	0.220	0.000	3.130	35.100	43.875
L19	63.000	6.976	1.987	0.745	0.032	0.128	0.220	0.000	3.390	35.100	43.875
L20	51.000	6.995	1.988	0.771	0.032	0.128	0.220	0.000	3.670	35.100	43.875

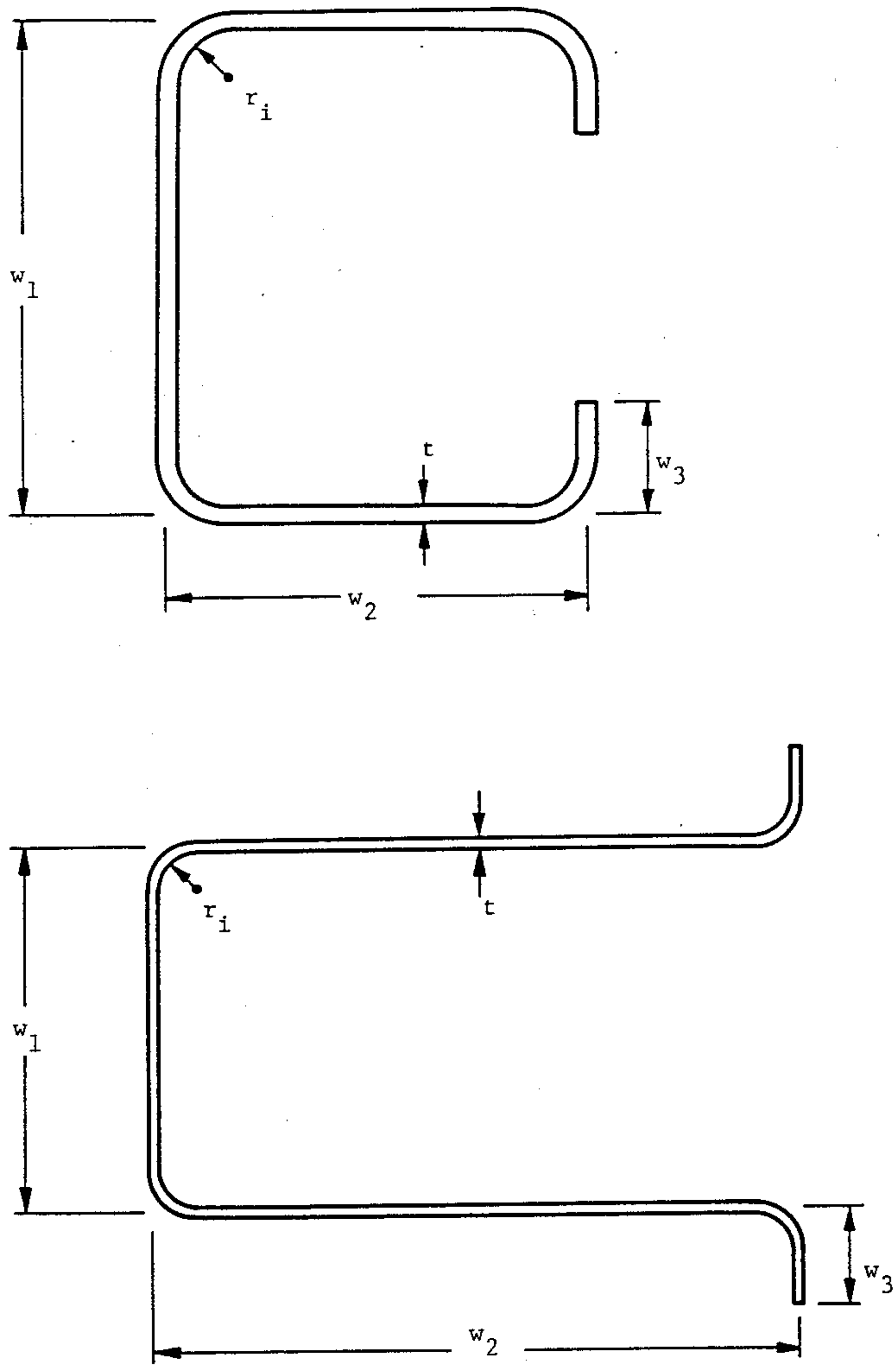


FIG. B1 NOTATION FOR SECTION DIMENSIONS ARE THE SAME FOR ALL SECTIONS EXCEPT AS NOTED ON FIGS. B2 AND B3

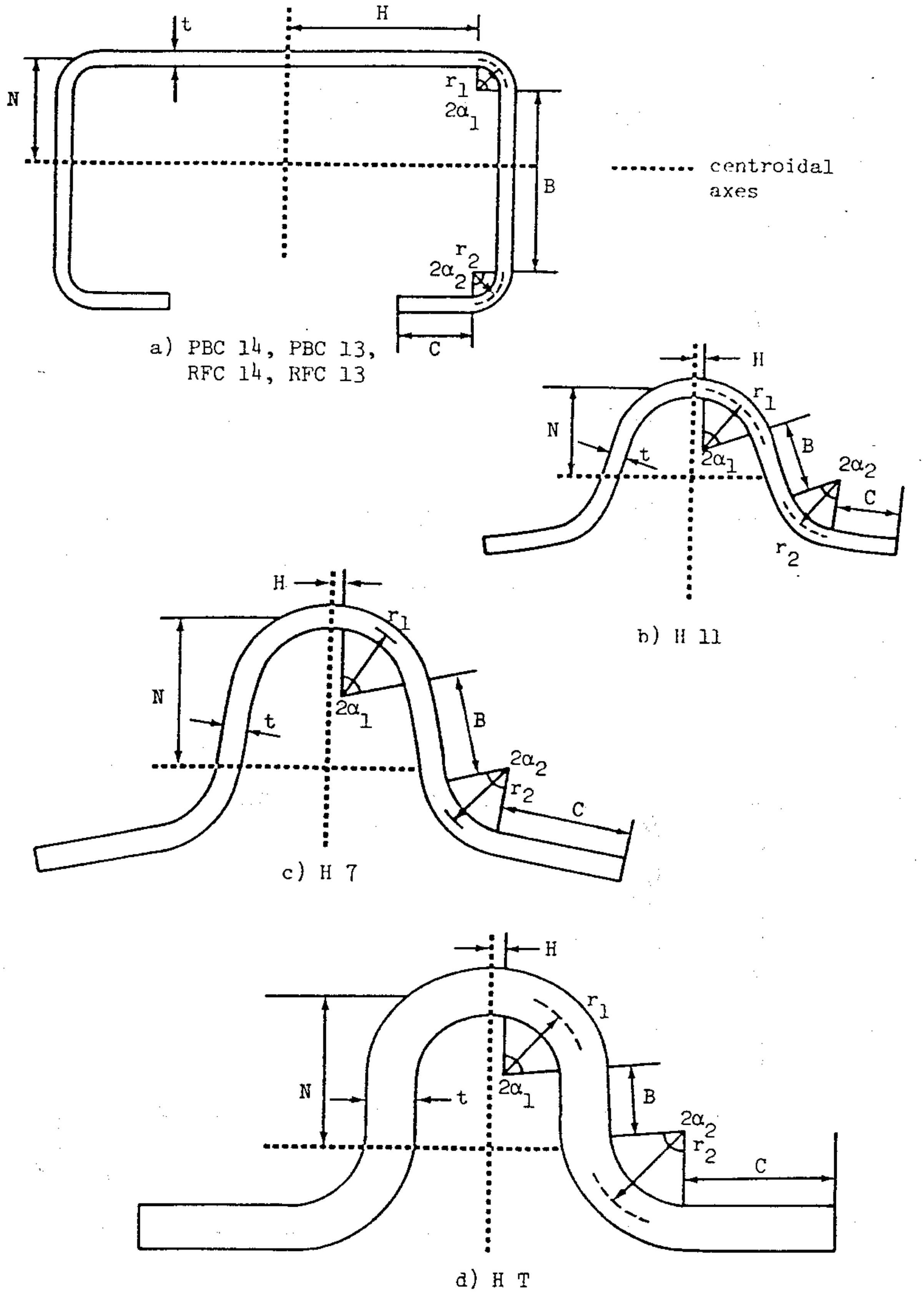
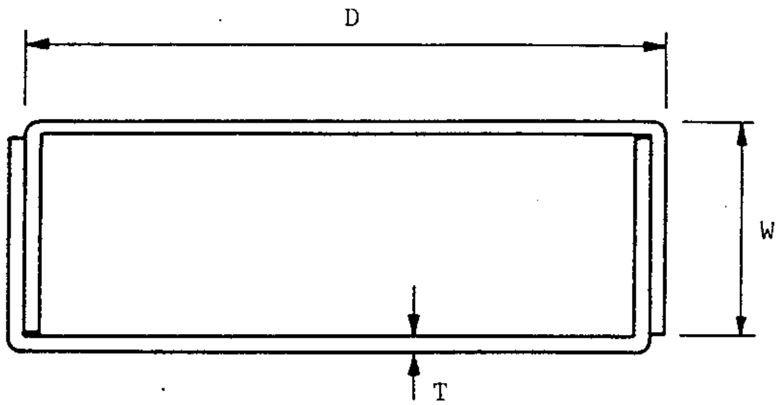
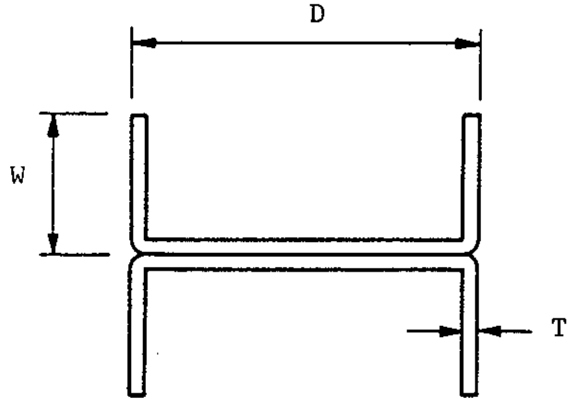


FIG. B2 NOTATION FOR SECTIONS OF DAT AND PEKOZ (1980)



S-Section



U-Section

FIG. B3 NOTATION FOR BOX SECTIONS AND BACK TO BACK CHANNELS

APPENDIX C - CORRELATION USING AISI BEAM COLUMN INTERACTION EQUATIONS

TABLE C1
BOX SECTIONS OF DEWOLF, PEKOZ AND WINTER (1973)

(Using yield stress of flats)

Specimen	wmax/t	Ptest	rc	ra
S1	58.345	34.830	1.150	1.149
S1	58.345	32.164	1.144	1.110
S1	58.345	29.756	1.252	1.150
S1	58.345	17.974	1.158	1.016
S2	84.207	34.917	1.126	1.123
S2	84.207	28.016	1.115	1.034
S2	84.207	21.424	1.151	1.011
S2	84.207	17.716	1.210	1.085
S3	118.690	36.918	1.173	1.168
S3	118.690	35.028	1.149	1.131
S3	118.690	19.530	1.104	0.974
S3	118.690	19.026	1.075	0.948
S3	118.690	18.144	1.025	0.904
S4	153.172	36.654	1.154	1.149
S4	153.172	33.674	1.147	1.109
S4	153.172	29.204	1.121	1.043
S4	153.172	17.582	1.044	0.929
S4	153.172	13.708	1.052	0.951
Mean			1.131	1.055
c.o.v.			0.050	0.082
I			1.036	0.945
FS			1.481	1.622

TABLE C2
BACK TO BACK CHANNELS OF DEWOLF, PEKOZ AND WINTER (1973)

(Using yield stress of flats)

Specimen	wmax/t	Ptest	rc	ra
U1	16.241	24.747	1.175	1.171
U1	16.241	21.413	1.188	1.118
U1	16.241	20.453	1.467	1.294
U1	16.241	12.204	1.194	1.040
U2	20.552	26.166	1.215	1.212
U2	20.552	25.418	1.181	1.177
U2	20.552	24.048	1.282	1.215
U2	20.552	20.434	1.377	1.226
U2	20.552	15.014	1.267	1.105
U3	24.862	26.968	1.233	1.230
U3	24.862	23.563	1.174	1.134
U3	24.862	22.745	1.410	1.275
U3	24.862	17.978	1.302	1.145
U4	29.172	27.491	1.243	1.242
U4	29.172	23.426	1.166	1.123
U4	29.172	20.101	1.393	1.232
Mean			1.267	1.184
c.o.v.			0.076	0.058
I			1.141	1.080
FS			1.344	1.420

TABLE C3
TEST RESULTS OF KALYANARAMAN, PEKOZ AND WINTER (1972)

(Using yield stress of flats)

Specimen	wmax/t	Ptest	rc	ra
LC-I 1	57.609	14.960	0.942	0.908
LC-I 2	57.313	14.070	0.977	0.909
LC-I 3	57.934	11.000	0.916	0.822
LC-II 1	49.813	16.170	1.064	1.023
LC-II 2	50.355	13.160	1.021	0.936
LC-II 3	50.309	9.950	1.021	0.907
LC-III 1	41.860	16.490	1.081	1.029
LC-III 2	42.892	11.660	1.008	0.899
LC-III 3	42.566	8.830	1.121	0.981
LC-IV 1	35.772	12.190	1.092	1.024
LC-IV 2	34.735	11.290	1.194	1.071
LC-IV 3	34.407	8.960	1.146	1.005
LC-V 1	29.429	14.630	1.249	1.156
LC-V 2	29.528	12.650	1.269	1.146
LC-V 3	29.346	10.750	1.343	1.175
Mean			1.096	0.999
c.o.v.			0.114	0.105
I			0.954	0.877
FS			1.608	1.748

TABLE C4

TEST RESULTS OF WENG AND PEKOZ (1987)

(Using yield stress of flats)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
RFC11 #1	21.908	0.000	0.000	32.300	1.072	1.026
RFC11 #2	21.840	0.000	0.000	30.300	1.144	1.051
RFC11 #3	21.790	0.000	0.000	28.500	1.255	1.106
RFC11 #4	21.891	0.000	0.000	19.700	1.082	0.924
RFC13 #1	26.771	0.000	0.000	30.200	0.999	0.947
RFC13 #2	26.688	0.000	0.000	29.200	1.122	1.014
RFC13 #3	26.698	0.000	0.000	23.800	1.140	0.984
RFC13 #4	26.635	0.000	0.000	17.000	1.069	0.918
RFC14 #1	31.987	0.000	0.000	25.300	0.980	0.945
RFC14 #2	32.133	0.000	0.000	22.300	0.983	0.895
RFC14 #3	32.000	0.000	0.000	16.400	0.880	0.766
RFC14 #4	32.107	0.000	0.000	12.700	0.866	0.739
RFC14 #5	31.907	0.000	0.000	9.700	0.921	0.808
PBC13 #1	29.103	0.000	0.000	18.000	0.886	0.850
PBC13 #2	29.253	0.000	0.000	17.500	0.965	0.890
PBC13 #3	29.184	0.000	0.000	16.000	1.046	0.922
PBC14 #1	35.873	0.000	0.000	16.100	1.005	0.967
PBC14 #2	35.789	0.000	0.000	15.600	1.092	1.012
PBC14 #3	35.817	0.000	0.000	13.000	1.048	0.933
PBC14 #4	35.389	0.000	0.000	11.200	1.079	0.927
PBC14 #5	35.972	0.000	0.000	9.700	1.181	1.013
R13 #1	27.884	0.000	0.000	26.200	1.043	0.989
R13 #2	27.860	0.000	0.000	23.800	1.113	1.005
R13 #3	27.953	0.000	0.000	17.800	1.019	0.880
R13 #4	27.965	0.000	0.000	13.200	1.009	0.867
R13 #5	27.907	0.000	0.000	10.100	1.007	0.883
R14 #1	32.413	0.000	0.000	23.200	1.050	0.997
R14 #2	32.267	0.000	0.000	19.400	1.009	0.916
R14 #3	32.373	0.000	0.000	15.400	0.982	0.852
R14 #4	32.413	0.000	0.000	11.600	0.959	0.820
R14 #5	32.280	0.000	0.000	8.500	0.942	0.827
P11 #1	38.517	0.000	0.000	34.200	1.005	0.950
P11 #2	38.568	0.000	0.000	30.400	1.017	0.923
P11 #3	37.603	0.000	0.000	27.800	0.978	0.852
P11 #4	37.570	0.000	0.000	22.300	0.975	0.832
P16 #1	36.391	0.000	0.000	11.200	0.996	0.938
P16 #2	36.469	0.000	0.000	10.400	1.040	0.944
P16 #3	36.484	0.000	0.000	8.000	0.982	0.858
P16 #4	36.297	0.000	0.000	6.900	0.996	0.850
P16 #5	36.328	0.000	0.000	6.200	1.044	0.899
Mean					1.025	0.918
c.o.v.					0.078	0.086
I					0.922	0.820
F. S.					1.663	1.869

TABLE C5
TEST RESULTS OF WENG AND PEKOZ (1987)

(Using calculated average yield stress - all sections)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
RFC11 #1	21.908	0.000	0.000	32.300	0.978	0.933
RFC11 #2	21.840	0.000	0.000	30.300	1.058	0.965
RFC11 #3	21.790	0.000	0.000	28.500	1.182	1.032
RFC11 #4	21.891	0.000	0.000	19.700	1.043	0.890
RFC13 #1	26.771	0.000	0.000	30.200	0.999	0.947
RFC13 #2	26.688	0.000	0.000	29.200	1.122	1.014
RFC13 #3	26.698	0.000	0.000	23.800	1.140	0.984
RFC13 #4	26.635	0.000	0.000	17.000	1.069	0.918
RFC14 #1	31.987	0.000	0.000	25.300	0.924	0.891
RFC14 #2	32.133	0.000	0.000	22.300	0.921	0.851
RFC14 #3	32.000	0.000	0.000	16.400	0.840	0.726
RFC14 #4	32.107	0.000	0.000	12.700	0.846	0.725
RFC14 #5	31.907	0.000	0.000	9.700	0.921	0.808
PBC13 #1	29.103	0.000	0.000	18.000	0.822	0.785
PBC13 #2	29.253	0.000	0.000	17.500	0.905	0.829
PBC13 #3	29.184	0.000	0.000	16.000	0.994	0.871
PBC14 #1	35.873	0.000	0.000	16.100	0.933	0.895
PBC14 #2	35.789	0.000	0.000	15.600	1.024	0.943
PBC14 #3	35.817	0.000	0.000	13.000	0.995	0.880
PBC14 #4	35.389	0.000	0.000	11.200	1.041	0.891
PBC14 #5	35.972	0.000	0.000	9.700	1.162	1.006
R13 #1	27.884	0.000	0.000	26.200	0.950	0.896
R13 #2	27.860	0.000	0.000	23.800	1.032	0.923
R13 #3	27.953	0.000	0.000	17.800	0.968	0.831
R13 #4	27.965	0.000	0.000	13.200	0.991	0.864
R13 #5	27.907	0.000	0.000	10.100	1.007	0.883
R14 #1	32.413	0.000	0.000	23.200	0.974	0.936
R14 #2	32.267	0.000	0.000	19.400	0.944	0.850
R14 #3	32.373	0.000	0.000	15.400	0.937	0.807
R14 #4	32.413	0.000	0.000	11.600	0.939	0.810
R14 #5	32.280	0.000	0.000	8.500	0.942	0.827
P11 #1	38.517	0.000	0.000	34.200	0.920	0.865
P11 #2	38.568	0.000	0.000	30.400	0.945	0.850
P11 #3	37.603	0.000	0.000	27.800	0.930	0.805
P11 #4	37.570	0.000	0.000	22.300	0.948	0.810
P16 #1	36.391	0.000	0.000	11.200	0.996	0.938
P16 #2	36.469	0.000	0.000	10.400	1.040	0.944
P16 #3	36.484	0.000	0.000	8.000	0.941	0.816
P16 #4	36.297	0.000	0.000	6.900	0.996	0.850
P16 #5	36.328	0.000	0.000	6.200	1.044	0.899
Mean					0.984	0.880
c.o.v.					0.082	0.081
I					0.882	0.789
F. S.					1.738	1.943

TABLE C6
TEST RESULTS OF WENG AND PEKOZ (1987)

(Using calculated average yield stress)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
RFC11 #1	21.908	0.000	0.000	32.300	0.978	0.933
RFC11 #2	21.840	0.000	0.000	30.300	1.058	0.965
RFC11 #3	21.790	0.000	0.000	28.500	1.182	1.032
RFC11 #4	21.891	0.000	0.000	19.700	1.043	0.890
RFC13 #1	26.771	0.000	0.000	30.200	0.999	0.947
RFC13 #2	26.688	0.000	0.000	29.200	1.122	1.014
RFC13 #3	26.698	0.000	0.000	23.800	1.140	0.984
RFC13 #4	26.635	0.000	0.000	17.000	1.069	0.918
RFC14 #1	31.987	0.000	0.000	25.300	0.980	0.945
RFC14 #2	32.133	0.000	0.000	22.300	0.921	0.851
RFC14 #3	32.000	0.000	0.000	16.400	0.840	0.700
RFC14 #4	32.107	0.000	0.000	12.700	0.846	0.721
RFC14 #5	31.907	0.000	0.000	9.700	0.921	0.808
PBC13 #1	29.103	0.000	0.000	18.000	0.822	0.743
PBC13 #2	29.253	0.000	0.000	17.500	0.905	0.789
PBC13 #3	29.184	0.000	0.000	16.000	0.994	0.838
PBC14 #1	35.873	0.000	0.000	16.100	0.933	0.854
PBC14 #2	35.789	0.000	0.000	15.600	1.024	0.895
PBC14 #3	35.817	0.000	0.000	13.000	0.995	0.842
PBC14 #4	35.389	0.000	0.000	11.200	1.041	0.867
PBC14 #5	35.972	0.000	0.000	9.700	1.162	1.006
R13 #1	27.884	0.000	0.000	26.200	0.950	0.836
R13 #2	27.860	0.000	0.000	23.800	1.032	0.872
R13 #3	27.953	0.000	0.000	17.800	0.968	0.802
R13 #4	27.965	0.000	0.000	13.200	0.991	0.864
R13 #5	27.907	0.000	0.000	10.100	1.007	0.883
R14 #1	32.413	0.000	0.000	23.200	0.974	0.936
R14 #2	32.267	0.000	0.000	19.400	0.944	0.810
R14 #3	32.373	0.000	0.000	15.400	0.937	0.779
R14 #4	32.413	0.000	0.000	11.600	0.939	0.809
R14 #5	32.280	0.000	0.000	8.500	0.942	0.827
P11 #1	38.517	0.000	0.000	34.200	0.920	0.803
P11 #2	38.568	0.000	0.000	30.400	0.945	0.795
P11 #3	37.603	0.000	0.000	27.800	0.930	0.771
P11 #4	37.570	0.000	0.000	22.300	0.948	0.801
P16 #1	36.391	0.000	0.000	11.200	0.996	0.938
P16 #2	36.469	0.000	0.000	10.400	1.040	0.944
P16 #3	36.484	0.000	0.000	8.000	0.941	0.787
P16 #4	36.297	0.000	0.000	6.900	0.996	0.850
P16 #5	36.328	0.000	0.000	6.200	1.044	0.899
Mean					0.985	0.864
c.o.v.					0.081	0.094
I					0.884	0.767
F. S.					1.734	2.000

TABLE C7
HAT SECTIONS OF DAT AND PEKOZ (1980)

(Using yield stress of flats)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
H11 -E1	3.917	0.000	0.000	18.500	1.148	1.081
H11 -E3	3.917	0.000	0.000	18.200	1.345	1.203
H11 -E4	3.917	0.000	0.000	11.800	1.197	1.022
H11 -E5	3.917	0.000	0.000	7.000	1.124	0.986
H11 -E2	3.917	0.000	0.000	15.700	1.040	0.959
H7 -F1	4.804	0.000	0.000	45.000	1.229	1.148
H7 -F2	4.804	0.000	0.000	41.800	1.273	1.151
H7 -F3	4.804	0.000	0.000	39.600	1.272	1.134
H7 -F4	4.804	0.000	0.000	39.400	1.323	1.167
H7 -F5	4.804	0.000	0.000	30.900	1.160	1.003
HT -G1	3.333	0.000	0.000	97.400	1.040	0.967
HT -G1	3.333	0.000	0.000	78.000	1.007	0.889
HT -G3	3.333	0.000	0.000	65.800	1.120	0.956
HT -G4	3.333	0.000	0.000	42.750	1.115	0.978
HT -G5	3.333	0.000	0.000	35.400	1.089	0.954
Mean					1.165	1.040
c.o.v.					0.090	0.094
I					1.038	0.922
F. S.					1.477	1.662

TABLE C8
HAT SECTIONS OF DAT AND PEKOZ (1980)

(Using calculated average yield stress - all sections)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
H11 -E1	3.917	0.000	0.000	18.500	0.985	0.917
H11 -E3	3.917	0.000	0.000	18.200	1.197	1.053
H11 -E4	3.917	0.000	0.000	11.800	1.136	0.975
H11 -E5	3.917	0.000	0.000	7.000	1.124	0.986
H11 -E2	3.917	0.000	0.000	15.700	0.904	0.822
H7 -F1	4.804	0.000	0.000	45.000	1.042	0.960
H7 -F2	4.804	0.000	0.000	41.800	1.107	0.983
H7 -F3	4.804	0.000	0.000	39.600	1.120	0.980
H7 -F4	4.804	0.000	0.000	39.400	1.176	1.020
H7 -F5	4.804	0.000	0.000	30.900	1.059	0.904
HT -G1	3.333	0.000	0.000	97.400	1.003	0.930
HT -G1	3.333	0.000	0.000	78.000	0.980	0.862
HT -G3	3.333	0.000	0.000	65.800	1.104	0.942
HT -G4	3.333	0.000	0.000	42.750	1.115	0.978
HT -G5	3.333	0.000	0.000	35.400	1.089	0.954
Mean					1.076	0.951
c.o.v.					0.074	0.062
I					0.971	0.866
F. S.					1.580	1.772

TABLE C9
HAT SECTIONS OF DAT AND PEKOZ (1980)

(Using calculated average yield stress)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
H11 -E1	3.917	0.000	0.000	18.500	0.985	0.917
H11 -E3	3.917	0.000	0.000	18.200	1.197	1.053
H11 -E4	3.917	0.000	0.000	11.800	1.136	0.975
H11 -E5	3.917	0.000	0.000	7.000	1.124	0.986
H11 -E2	3.917	0.000	0.000	15.700	0.904	0.822
H7 -F1	4.804	0.000	0.000	45.000	1.042	0.960
H7 -F2	4.804	0.000	0.000	41.800	1.107	0.983
H7 -F3	4.804	0.000	0.000	39.600	1.120	0.980
H7 -F4	4.804	0.000	0.000	39.400	1.176	1.020
H7 -F5	4.804	0.000	0.000	30.900	1.059	0.904
HT -G1	3.333	0.000	0.000	97.400	1.003	0.930
HT -G1	3.333	0.000	0.000	78.000	0.980	0.862
HT -G3	3.333	0.000	0.000	65.800	1.104	0.942
HT -G4	3.333	0.000	0.000	42.750	1.115	0.978
HT -G5	3.333	0.000	0.000	35.400	1.089	0.954
Mean					1.076	0.951
c.o.v.					0.074	0.062
I					0.971	0.866
F. S.					1.580	1.772

TABLE C10
LIPPED CHANNELS OF DAT AND PEKOZ (1980)

(Using yield stress of flats)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
PBC14 -A3	34.247	0.000	0.000	20.200	1.065	1.025
PBC14 -A5	34.247	0.000	0.000	19.300	1.137	1.053
PBC14 -A9	34.247	0.000	0.000	13.950	1.044	0.911
PBC14 -A11	34.247	0.000	0.000	11.200	1.034	0.883
PBC14 -A13	34.247	0.000	0.000	10.500	1.165	1.011
PBC14 -A14	34.247	0.000	0.000	8.200	1.171	1.028
PBC14 -A1	34.247	0.000	0.000	19.000	1.963	0.940
PBC14 -A2	34.247	0.000	0.000	16.900	0.891	0.857
PBC14 -A4	34.247	0.000	0.000	16.300	0.904	0.854
PBC14 -A6	34.247	0.000	0.000	14.400	0.848	0.786
PBC14 -A7	34.247	0.000	0.000	13.500	0.853	0.774
PBC14 -A8	34.247	0.000	0.000	13.660	0.934	0.830
PBC14 -A10	34.247	0.000	0.000	10.450	0.864	0.743
PBC14 -A12	34.247	0.000	0.000	9.500	0.990	0.849
RFC14 -B2	34.247	0.000	0.000	19.500	0.945	0.906
RFC14 -B4	34.247	0.000	0.000	18.000	0.984	0.906
RFC14 -B5	34.247	0.000	0.000	16.000	1.032	0.909
RFC14 -B6	34.247	0.000	0.000	15.500	0.999	0.881
RFC14 -B9	34.247	0.000	0.000	8.800	1.028	0.903
RFC14 -B10	34.247	0.000	0.000	8.000	0.935	0.821
RFC14 -B11	34.247	0.000	0.000	9.050	1.177	1.032
RFC14 -B1	34.247	0.000	0.000	18.500	0.896	0.860
RFC14 -B3	34.247	0.000	0.000	16.300	0.891	0.820
RFC14 -B7	34.247	0.000	0.000	14.000	0.903	0.795
RFC14 -B8	34.247	0.000	0.000	11.500	0.914	0.781
PBC13 -C3	27.778	0.000	0.000	26.400	1.321	1.229
PBC13 -C4	27.778	0.000	0.000	21.600	1.244	1.112
PBC13 -C5	27.778	0.000	0.000	15.850	1.091	0.941
PBC13 -C6	27.778	0.000	0.000	9.950	0.979	0.854
PBC13 -C7	27.778	0.000	0.000	7.700	1.121	0.982
PBC13 -C1	27.778	0.000	0.000	35.000	1.580	1.523
PBC13 -C2	27.778	0.000	0.000	23.000	1.056	1.017
RFC13 -D6	27.778	0.000	0.000	29.500	1.467	1.364
RFC13 -D7	27.778	0.000	0.000	24.500	1.302	1.186
RFC13 -D8	27.778	0.000	0.000	23.000	1.318	1.177
RFC13 -D9	27.778	0.000	0.000	20.000	1.248	1.093
RFC13 -D10	27.778	0.000	0.000	16.000	1.097	0.946
RFC13 -D11	27.778	0.000	0.000	13.350	1.015	0.867
RFC13 -D12	27.778	0.000	0.000	12.200	1.039	0.889
RFC13 -D13	27.778	0.000	0.000	9.030	0.994	0.872
RFC13 -D1	27.778	0.000	0.000	34.200	1.463	1.435
RFC13 -D2	27.778	0.000	0.000	17.000	0.734	0.718
RFC13 -D3	27.778	0.000	0.000	35.000	1.569	1.513
RFC13 -D4	27.778	0.000	0.000	22.300	1.000	0.964
RFC13 -D5	27.778	0.000	0.000	34.500	1.621	1.537
Mean					1.085	0.986
c.o.v.					0.193	0.213
I					0.848	0.746
F. S.					1.809	2.057

TABLE C11
LIPPED CHANNELS OF DAT AND PEKOZ (1980)

(Using calculated average yield stress - all sections)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
PBC14 -A3	34.247	0.000	0.000	20.200	0.942	0.902
PBC14 -A5	34.247	0.000	0.000	19.300	1.022	0.937
PBC14 -A9	34.247	0.000	0.000	13.950	0.973	0.839
PBC14 -A11	34.247	0.000	0.000	11.200	0.994	0.851
PBC14 -A13	34.247	0.000	0.000	10.500	1.153	1.011
PBC14 -A14	34.247	0.000	0.000	8.200	1.171	1.028
PBC14 -A1	34.247	0.000	0.000	19.000	0.847	0.826
PBC14 -A2	34.247	0.000	0.000	16.900	0.788	0.755
PBC14 -A4	34.247	0.000	0.000	16.300	0.805	0.755
PBC14 -A6	34.247	0.000	0.000	14.400	0.762	0.699
PBC14 -A7	34.247	0.000	0.000	13.500	0.774	0.694
PBC14 -A8	34.247	0.000	0.000	13.660	0.859	0.754
PBC14 -A10	34.247	0.000	0.000	10.450	0.817	0.698
PBC14 -A12	34.247	0.000	0.000	9.500	0.967	0.845
RFC14 -B2	34.247	0.000	0.000	19.500	0.888	0.852
RFC14 -B4	34.247	0.000	0.000	18.000	0.931	0.852
RFC14 -B5	34.247	0.000	0.000	16.000	0.988	0.866
RFC14 -B6	34.247	0.000	0.000	15.500	0.957	0.839
RFC14 -B9	34.247	0.000	0.000	8.800	1.028	0.903
RFC14 -B10	34.247	0.000	0.000	8.000	0.935	0.821
RFC14 -B11	34.247	0.000	0.000	9.050	1.177	1.032
RFC14 -B1	34.247	0.000	0.000	18.500	0.842	0.809
RFC14 -B3	34.247	0.000	0.000	16.300	0.843	0.772
RFC14 -B7	34.247	0.000	0.000	14.000	0.865	0.758
RFC14 -B8	34.247	0.000	0.000	11.500	0.889	0.759
PBC13 -C3	27.778	0.000	0.000	26.400	1.173	1.080
PBC13 -C4	27.778	0.000	0.000	21.600	1.130	0.997
PBC13 -C5	27.778	0.000	0.000	15.850	1.020	0.872
PBC13 -C6	27.778	0.000	0.000	9.950	0.974	0.854
PBC13 -C7	27.778	0.000	0.000	7.700	1.121	0.982
PBC13 -C1	27.778	0.000	0.000	35.000	1.380	1.323
PBC13 -C2	27.778	0.000	0.000	23.380	0.922	0.884
RFC13 -D6	27.778	0.000	0.000	29.500	1.311	1.207
RFC13 -D7	27.778	0.000	0.000	24.500	1.174	1.058
RFC13 -D8	27.778	0.000	0.000	23.000	1.204	1.061
RFC13 -D9	27.778	0.000	0.000	20.000	1.154	0.999
RFC13 -D10	27.778	0.000	0.000	16.000	1.030	0.881
RFC13 -D11	27.778	0.000	0.000	13.350	0.969	0.827
RFC13 -D12	27.778	0.000	0.000	12.200	1.009	0.876
RFC13 -D13	27.778	0.000	0.000	9.030	0.994	0.872
RFC13 -D1	27.778	0.000	0.000	34.200	1.277	1.249
RFC13 -D2	27.778	0.000	0.000	17.000	0.641	0.625
RFC13 -D3	27.778	0.000	0.000	35.000	1.379	1.322
RFC13 -D4	27.778	0.000	0.000	22.300	0.879	0.842
RFC13 -D5	27.778	0.000	0.000	34.500	1.436	1.350
Mean					1.009	0.912
c.o.v.					0.178	0.188
I					0.807	0.717
F. S.					1.901	2.138

TABLE C12
LIPPED CHANNELS OF DAT AND PEKOZ (1980)

(Using calculated average yield stress)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
PBC14 -A3	34.247	0.000	0.000	20.200	0.942	0.902
PBC14 -A5	34.247	0.000	0.000	19.300	1.022	0.937
PBC14 -A9	34.247	0.000	0.000	13.950	0.973	0.839
PBC14 -A11	34.247	0.000	0.000	11.200	0.994	0.851
PBC14 -A13	34.247	0.000	0.000	10.500	1.153	1.011
PBC14 -A14	34.247	0.000	0.000	8.200	1.171	1.028
PBC14 -A1	34.247	0.000	0.000	19.000	0.847	0.826
PBC14 -A2	34.247	0.000	0.000	16.900	0.788	0.755
PBC14 -A4	34.247	0.000	0.000	16.300	0.805	0.755
PBC14 -A6	34.247	0.000	0.000	14.400	0.762	0.699
PBC14 -A7	34.247	0.000	0.000	13.500	0.774	0.694
PBC14 -A8	34.247	0.000	0.000	13.660	0.859	0.754
PBC14 -A10	34.247	0.000	0.000	10.450	0.817	0.698
PBC14 -A12	34.247	0.000	0.000	9.500	0.967	0.845
RFC14 -B2	34.247	0.000	0.000	19.500	0.888	0.852
RFC14 -B4	34.247	0.000	0.000	18.000	0.931	0.852
RFC14 -B5	34.247	0.000	0.000	16.000	0.988	0.866
RFC14 -B6	34.247	0.000	0.000	15.500	0.957	0.839
RFC14 -B9	34.247	0.000	0.000	8.800	1.028	0.903
RFC14 -B10	34.247	0.000	0.000	8.000	0.935	0.821
RFC14 -B11	34.247	0.000	0.000	9.050	1.177	1.032
RFC14 -B1	34.247	0.000	0.000	18.500	0.842	0.809
RFC14 -B3	34.247	0.000	0.000	16.300	0.843	0.772
RFC14 -B7	34.247	0.000	0.000	14.000	0.865	0.758
RFC14 -B8	34.247	0.000	0.000	11.500	0.889	0.759
PBC13 -C3	27.778	0.000	0.000	26.400	1.173	1.080
PBC13 -C4	27.778	0.000	0.000	21.600	1.130	0.997
PBC13 -C5	27.778	0.000	0.000	15.850	1.020	0.872
PBC13 -C6	27.778	0.000	0.000	9.950	0.974	0.854
PBC13 -C7	27.778	0.000	0.000	7.700	1.121	0.982
PBC13 -C1	27.778	0.000	0.000	35.000	1.380	1.323
PBC13 -C2	27.778	0.000	0.000	23.380	0.922	0.884
RFC13 -D6	27.778	0.000	0.000	29.500	1.311	1.207
RFC13 -D7	27.778	0.000	0.000	24.500	1.174	1.058
RFC13 -D8	27.778	0.000	0.000	23.000	1.204	1.061
RFC13 -D9	27.778	0.000	0.000	20.000	1.154	0.999
RFC13 -D10	27.778	0.000	0.000	16.000	1.030	0.881
RFC13 -D11	27.778	0.000	0.000	13.350	0.969	0.827
RFC13 -D12	27.778	0.000	0.000	12.200	1.009	0.876
RFC13 -D13	27.778	0.000	0.000	9.030	0.994	0.872
RFC13 -D1	27.778	0.000	0.000	34.200	1.277	1.249
RFC13 -D2	27.778	0.000	0.000	17.000	0.641	0.625
RFC13 -D3	27.778	0.000	0.000	35.000	1.379	1.322
RFC13 -D4	27.778	0.000	0.000	22.300	0.879	0.842
RFC13 -D5	27.778	0.000	0.000	34.500	1.436	1.350
Mean					1.009	0.912
c.o.v.					0.178	0.188
I					0.807	0.717
F. S.					1.901	2.138

TABLE C13
TEST RESULTS OF MULLIGAN AND PEKOZ (1983)
ECCENTRICALLY LOADED COLUMNS

(Using yield stress of flats)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
C1.1	121.500	-0.203	0.000	8.000	1.044	1.028
C2.1	124.170	-0.536	0.000	10.300	1.272	1.242
C2.2	121.708	-0.534	0.000	8.750	1.023	0.999
C2.3	121.167	0.982	0.000	6.750	1.313	1.288
C2.4	121.083	-0.212	0.000	12.400	1.115	1.080
C2.1	184.417	-0.424	0.000	10.400	1.011	0.959
C2.2	183.125	-0.397	0.000	10.000	0.911	0.845
C2.1	175.313	-0.521	0.000	12.500	1.166	1.138
C2.2	175.458	-0.515	0.000	8.750	0.801	0.782
Mean					1.073	1.040
c.o.v.					0.153	0.162
I					0.889	0.852
F. S.					1.724	1.800

TABLE C14
TEST RESULTS OF MULLIGAN AND PEKOZ (1983)
ECCENTRICALLY LOADED COLUMNS

(Using calculated average yield stress - all sections)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
C1.1	121.500	-0.203	0.000	8.000	1.023	1.006
C2.1	124.170	-0.536	0.000	10.300	1.258	1.228
C2.2	121.708	-0.534	0.000	8.750	1.012	0.988
C2.3	121.167	0.982	0.000	6.750	1.296	1.266
C2.4	121.083	-0.212	0.000	12.400	1.105	1.070
C2.1	184.417	-0.424	0.000	10.400	1.005	0.952
C2.2	183.125	-0.397	0.000	10.000	0.904	0.838
C2.1	175.313	-0.521	0.000	12.500	1.158	1.131
C2.2	175.458	-0.515	0.000	8.750	0.797	0.777
Mean					1.062	1.028
c.o.v.					0.151	0.160
I					0.882	0.844
F. S.					1.738	1.816

TABLE C15
TEST RESULTS OF MULLIGAN AND PEKOZ (1983)
ECCENTRICALLY LOADED COLUMNS

(Using calculated average yield stress)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
C1.1	121.500	-0.203	0.000	8.000	1.044	1.028
C2.1	124.170	-0.536	0.000	10.300	1.272	1.242
C2.2	121.708	-0.534	0.000	8.750	1.023	0.999
C2.3	121.167	0.982	0.000	6.750	1.313	1.288
C2.4	121.003	-0.212	0.000	12.400	1.115	1.080
C2.1	184.417	-0.424	0.000	10.400	1.011	0.959
C2.2	183.125	-0.397	0.000	10.000	0.911	0.845
C2.1	175.313	-0.521	0.000	12.500	1.166	1.138
C2.2	175.458	-0.515	0.000	8.750	0.801	0.782
Mean					1.073	1.040
c.o.v.					0.153	0.162
I					0.889	0.852
F. S.					1.724	1.800

TABLE C16
TEST RESULTS OF MULLIGAN AND PEKOZ (1983)
CONCENTRICALLY LOADED COLUMNS

(Using yield stress of flats)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
C1	130.133	0.000	0.000	9.800	1.137	1.106
C2	129.711	0.000	0.000	10.400	1.231	1.182
C3	127.652	0.000	0.000	8.200	1.176	1.090
C4	129.000	0.000	0.000	8.400	1.261	1.180
C5	121.583	0.000	0.000	11.800	1.257	1.208
C1	195.844	0.000	0.000	9.600	1.265	1.221
C2	196.022	0.000	0.000	8.750	1.279	1.217
C3	200.932	0.000	0.000	7.600	1.304	1.228
C4	182.292	0.000	0.000	10.800	1.395	1.330
C1	87.167	0.000	0.000	11.000	1.001	0.958
C1	175.375	0.000	0.000	12.300	1.142	1.117
C2	175.854	0.000	0.000	12.100	1.091	1.045
C3	175.708	0.000	0.000	11.800	1.080	1.035
Mean					1.201	1.147
c.o.v.					0.090	0.087
I					1.070	1.024
F. S.					1.433	1.497

TABLE C17
TEST RESULTS OF MULLIGAN AND PEKOZ (1983)
CONCENTRICALLY LOADED COLUMNS

(Using calculated average yield stress - all sections)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
C1	130.133	0.000	0.000	9.800	1.121	1.091
C2	129.711	0.000	0.000	10.400	1.216	1.166
C3	127.652	0.000	0.000	8.200	1.166	1.080
C4	129.000	0.000	0.000	8.400	1.250	1.168
C5	121.583	0.000	0.000	11.800	1.241	1.192
C1	195.844	0.000	0.000	9.600	1.252	1.209
C2	196.022	0.000	0.000	8.750	1.268	1.205
C3	200.932	0.000	0.000	7.600	1.295	1.218
C4	182.292	0.000	0.000	10.800	1.383	1.315
C1	87.167	0.000	0.000	11.000	0.995	0.952
C1	175.375	0.000	0.000	12.300	1.130	1.105
C2	175.854	0.000	0.000	12.100	1.081	1.035
C3	175.708	0.000	0.000	11.800	1.070	1.024
Mean					1.190	1.135
c.o.v.					0.090	0.087
I					1.059	1.014
F. S.					1.447	1.512

TABLE C18
TEST RESULTS OF MULLIGAN AND PEKOZ (1983)
CONCENTRICALLY LOADED COLUMNS

(Using calculated average yield stress)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
C1	130.133	0.000	0.000	9.800	1.137	1.106
C2	129.711	0.000	0.000	10.400	1.231	1.182
C3	127.652	0.000	0.000	8.200	1.176	1.090
C4	129.000	0.000	0.000	8.400	1.261	1.180
C5	121.583	0.000	0.000	11.800	1.257	1.208
C1	195.844	0.000	0.000	9.600	1.265	1.221
C2	196.022	0.000	0.000	8.750	1.279	1.217
C3	200.932	0.000	0.000	7.600	1.304	1.228
C4	182.292	0.000	0.000	10.800	1.395	1.330
C1	87.167	0.000	0.000	11.000	1.001	0.958
C1	175.375	0.000	0.000	12.300	1.142	1.117
C2	175.854	0.000	0.000	12.100	1.091	1.045
C3	175.708	0.000	0.000	11.800	1.080	1.035
Mean					1.201	1.147
c.o.v.					0.090	0.087
I					1.070	1.024
F. S.					1.433	1.497

TABLE C19
HAT SECTIONS OF PEKOZ AND WINTER (1967)
FROM PEKOZ (1987), TABLE 3.3-1

(Using yield stress of flats)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LH1 -LS - 1	20.448	0.100	0.000	3.990	1.500	1.334
LH1 -LS - 2	20.448	0.900	0.000	2.210	1.249	1.163
LH1 -LS - 3	20.448	1.400	0.000	1.570	1.061	1.000
LH2 -LS - 1	25.190	0.000	0.000	3.730	1.381	1.211
LH2 -LS - 2	25.190	1.330	0.000	1.830	1.116	1.034
LH2 -LS - 3	25.190	1.860	0.000	1.290	0.902	0.849
LH3 -LS - 1	17.000	0.000	0.000	3.220	1.400	1.229
LH3 -LS - 2	17.000	0.760	0.000	1.780	1.211	1.127
LH3 -LS - 3	17.000	1.260	0.000	1.280	1.058	0.992
LH4 -LS - 1	27.813	0.000	0.000	4.000	1.550	1.361
LH4 -LS - 2	27.813	0.950	0.000	1.810	1.138	1.058
LH4 -LS - 3	27.813	1.450	0.000	1.550	1.157	1.084
LH5 -LS - 1	33.021	0.000	0.000	3.060	1.569	1.378
LH5 -LS - 2	33.021	1.020	0.000	1.520	1.094	1.000
LH5 -LS - 3	33.021	1.520	0.000	1.270	1.033	0.955
LH6 -LS - 1	22.917	0.000	0.000	2.840	1.578	1.379
LH6 -LS - 2	22.917	0.760	0.000	1.470	1.195	1.105
LH6 -LS - 3	22.917	1.270	0.000	1.140	1.107	1.036
Mean					1.239	1.127
c.o.v.					0.167	0.140
I					1.007	0.951
F. S.					1.523	1.613

TABLE C20
HAT SECTIONS OF PEKOZ AND WINTER (1967)
FROM PEKOZ (1987), TABLE 3.3-1

(Using calculated average yield stress - all sections)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LH1 -LS - 1	20.448	0.100	0.000	3.990	1.494	1.326
LH1 -LS - 2	20.448	0.900	0.000	2.210	1.221	1.133
LH1 -LS - 3	20.448	1.400	0.000	1.570	1.026	0.963
LH2 -LS - 1	25.190	0.000	0.000	3.730	1.381	1.211
LH2 -LS - 2	25.190	1.330	0.000	1.830	1.089	1.011
LH2 -LS - 3	25.190	1.860	0.000	1.290	0.878	0.822
LH3 -LS - 1	17.000	0.000	0.000	3.220	1.400	1.229
LH3 -LS - 2	17.000	0.760	0.000	1.780	1.179	1.099
LH3 -LS - 3	17.000	1.260	0.000	1.280	1.024	0.962
LH4 -LS - 1	27.813	0.000	0.000	4.000	1.550	1.361
LH4 -LS - 2	27.813	0.950	0.000	1.810	1.117	1.034
LH4 -LS - 3	27.813	1.450	0.000	1.550	1.131	1.062
LH5 -LS - 1	33.021	0.000	0.000	3.060	1.569	1.378
LH5 LS - 2	33.021	1.020	0.000	1.520	1.078	0.981
LH5 -LS - 3	33.021	1.520	0.000	1.270	1.016	0.941
LH6 -LS - 1	22.917	0.000	0.000	2.840	1.578	1.379
LH6 -LS - 2	22.917	0.760	0.000	1.470	1.176	1.081
LH6 -LS - 3	22.917	1.270	0.000	1.140	1.075	1.009
Mean					1.221	1.110
c.o.v.					0.178	0.151
I					0.976	0.922
F. S.					1.571	1.663

TABLE C21
HAT SECTIONS OF PEKOZ AND WINTER (1967)
FROM PEKOZ (1987), TABLE 3.3-1

(Using calculated average yield stress)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LH1 -LS - 1	20.448	0.100	0.000	3.990	1.494	1.326
LH1 -LS - 2	20.448	0.900	0.000	2.210	1.221	1.133
LH1 -LS - 3	20.448	1.400	0.000	1.570	1.026	0.963
LH2 -LS - 1	25.190	0.000	0.000	3.730	1.381	1.211
LH2 -LS - 2	25.190	1.330	0.000	1.830	1.089	1.011
LH2 -LS - 3	25.190	1.860	0.000	1.290	0.878	0.822
LH3 -LS - 1	17.000	0.000	0.000	3.220	1.400	1.229
LH3 -LS - 2	17.000	0.760	0.000	1.780	1.179	1.099
LH3 -LS - 3	17.000	1.260	0.000	1.280	1.024	0.962
LH4 -LS - 1	27.813	0.000	0.000	4.000	1.550	1.361
LH4 -LS - 2	27.813	0.950	0.000	1.810	1.117	1.034
LH4 -LS - 3	27.813	1.450	0.000	1.550	1.131	1.062
LH5 -LS - 1	33.021	0.000	0.000	3.060	1.569	1.378
LH5 -LS - 2	33.021	1.020	0.000	1.520	1.078	0.981
LH5 -LS - 3	33.021	1.520	0.000	1.270	1.016	0.941
LH6 -LS - 1	22.917	0.000	0.000	2.840	1.578	1.379
LH6 -LS - 2	22.917	0.760	0.000	1.470	1.176	1.081
LH6 -LS - 3	22.917	1.270	0.000	1.140	1.075	1.009
Mean					1.221	1.110
c.o.v.					0.178	0.151
I					0.976	0.922
F. S.					1.571	1.663

TABLE C22
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985)
FROM PEKOZ (1987), TABLE3.3-2

(Using yield stress of flats)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC1 -LS - 1	31.744	-1.500	0.000	12.750	1.369	1.358
LC1 -LS - 2	31.744	-1.500	0.000	11.250	1.270	1.254
LC1 -LS - 3	31.744	-1.500	0.000	9.450	1.134	1.114
LC2 -LS - 1	16.515	2.000	0.000	22.000	1.950	1.933
LC2 -LS - 2	16.515	2.250	0.000	18.650	1.878	1.854
LC2 -LS - 3	16.515	2.250	0.000	17.600	1.849	1.814
Mean					1.575	1.554
c.o.v.					0.227	0.227
I					1.163	1.147
F. S.					1.318	1.336

TABLE C23
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985)
FROM PEKOZ (1987), TABLE3.3-2

(Using calculated average yield stress - all sections)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC1 -LS - 1	31.744	-1.500	0.000	12.750	1.321	1.309
LC1 -LS - 2	31.744	-1.500	0.000	11.250	1.228	1.212
LC1 -LS - 3	31.744	-1.500	0.000	9.450	1.099	1.080
LC2 -LS - 1	16.515	2.000	0.000	22.000	1.809	1.797
LC2 -LS - 2	16.515	2.250	0.000	18.650	1.750	1.724
LC2 -LS - 3	16.515	2.250	0.000	17.600	1.725	1.692
Mean					1.489	1.469
c.o.v.					0.207	0.208
I					1.137	1.121
F. S.					1.349	1.368

TABLE C24
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985)
FROM PEKOZ (1987), TABLE3.3-2

(Using calculated average yield stress)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC1 -LS - 1	31.744	-1.500	0.000	12.750	1.321	1.309
LC1 -LS - 2	31.744	-1.500	0.000	11.250	1.228	1.212
LC1 -LS - 3	31.744	-1.500	0.000	9.450	1.099	1.080
LC2 -LS - 1	16.515	2.000	0.000	22.000	1.809	1.797
LC2 -LS - 2	16.515	2.250	0.000	18.650	1.750	1.724
LC2 -LS - 3	16.515	2.250	0.000	17.600	1.725	1.692
Mean					1.489	1.469
c.o.v.					0.207	0.208
I					1.137	1.121
F. S.					1.349	1.368

TABLE C25
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985)
FROM PEKOZ (1987), TABLE3.3-3

(Using yield stress of flats)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC3 -LS - 1	33.233	0.000	-1.450	8.900	1.365	1.320
LC3 -LS - 2	33.685	0.000	-2.000	7.800	1.418	1.395
LC3 -LS - 3	33.685	0.000	-2.000	7.200	1.387	1.353
LC3 -LS - 4	33.685	0.000	-2.000	7.100	1.473	1.423
LC4 -LS - 1	27.111	0.000	-2.500	11.600	1.393	1.365
LC4 -LS - 2	27.111	0.000	-2.500	10.500	1.365	1.324
LC5 -LS - 1	16.394	0.000	-2.030	19.000	1.252	1.212
LC5 -LS - 2	16.394	0.000	-2.000	17.200	1.274	1.212
LC6 -LS - 1	31.293	0.000	-2.380	10.300	1.530	1.508
LC6 -LS - 2	31.293	0.000	-2.130	10.500	1.535	1.489
LC7 -LS - 1	24.152	0.000	-2.250	23.400	1.422	1.397
LC7 -LS - 2	16.576	0.000	-2.220	21.700	2.015	1.936
LC8 -LS - 1	42.818	0.000	-1.500	16.800	1.303	1.291
LC8 -LS - 2	42.818	0.000	-1.500	16.200	1.291	1.273
LC8 -LS - 3	42.818	0.000	-1.500	15.500	1.283	1.257
LC8 -LS - 4	43.421	0.000	-1.660	13.800	1.264	1.230
LC8 -LS - 5	43.421	0.000	-2.000	12.300	1.313	1.262
Mean					1.405	1.367
c.o.v.					0.128	0.126
I					1.202	1.174
F. S.					1.276	1.307

TABLE C26
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985)
FROM PEKOZ (1987), TABLE3.3-3

(Using calculated average yield stress - all sections)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC3 -LS - 1	33.233	0.000	-1.450	8.900	1.297	1.254
LC3 -LS - 2	33.685	0.000	-2.000	7.800	1.340	1.320
LC3 -LS - 3	33.685	0.000	-2.000	7.200	1.319	1.283
LC3 -LS - 4	33.685	0.000	-2.000	7.100	1.406	1.355
LC4 -LS - 1	27.111	0.000	-2.500	11.600	1.306	1.280
LC4 -LS - 2	27.111	0.000	-2.500	10.500	1.290	1.248
LC5 -LS - 1	16.394	0.000	-2.030	19.000	1.176	1.140
LC5 -LS - 2	16.394	0.000	-2.000	17.200	1.210	1.148
LC6 -LS - 1	31.293	0.000	-2.380	10.300	1.493	1.471
LC6 -LS - 2	31.293	0.000	-2.130	10.500	1.496	1.454
LC7 -LS - 1	24.152	0.000	-2.250	23.400	1.333	1.308
LC7 -LS - 2	16.576	0.000	-2.220	21.700	1.895	1.816
LC8 -LS - 1	42.818	0.000	-1.500	16.800	1.271	1.259
LC8 -LS - 2	42.818	0.000	-1.500	16.200	1.260	1.242
LC8 -LS - 3	42.818	0.000	-1.500	15.500	1.255	1.228
LC8 -LS - 4	43.421	0.000	-1.660	13.800	1.237	1.204
LC8 -LS - 5	43.421	0.000	-2.000	12.300	1.284	1.235
Mean					1.345	1.309
c.o.v.					0.124	0.121
I					1.157	1.129
F. S.					1.325	1.358

TABLE C27

LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985)

FROM PEKOZ (1987), TABLE3.3-3

(Using calculated average yield stress)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC3 -LS - 1	33.233	0.000	-1.450	8.900	1.297	1.254
LC3 -LS - 2	33.685	0.000	-2.000	7.800	1.340	1.320
LC3 -LS - 3	33.685	0.000	-2.000	7.200	1.319	1.283
LC3 -LS - 4	33.685	0.000	-2.000	7.100	1.406	1.355
LC4 -LS - 1	27.111	0.000	-2.500	11.600	1.306	1.280
LC4 -LS - 2	27.111	0.000	-2.500	10.500	1.290	1.248
LC5 -LS - 1	16.394	0.000	-2.030	19.000	1.176	1.140
LC5 -LS - 2	16.394	0.000	-2.000	17.200	1.210	1.148
LC6 -LS - 1	31.293	0.000	-2.380	10.300	1.493	1.471
LC6 -LS - 2	31.293	0.000	-2.130	10.500	1.496	1.454
LC7 -LS - 1	24.152	0.000	-2.250	23.400	1.333	1.308
LC7 -LS - 2	16.576	0.000	-2.220	21.700	1.895	1.816
LC8 -LS - 1	42.818	0.000	-1.500	16.800	1.271	1.259
LC8 -LS - 2	42.818	0.000	-1.500	16.200	1.260	1.242
LC8 -LS - 3	42.818	0.000	-1.500	15.500	1.255	1.228
LC8 -LS - 4	43.421	0.000	-1.660	13.800	1.237	1.204
LC8 -LS - 5	43.421	0.000	-2.000	12.300	1.284	1.235
Mean					1.345	1.309
c.o.v.					0.124	0.121
I					1.157	1.129
F. S.					1.325	1.358

TABLE C28
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985)
FROM PEKOZ (1987), TABLE 3.3-4

(Using yield stress of flats)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC9 -LS - 1	26.788	-1.500	-2.000	11.500	1.480	1.467
LC9 -LS - 2	26.788	-1.500	-2.000	11.150	1.542	1.517
LC9 -LS - 3	26.788	-1.500	-2.000	9.950	1.498	1.459
LC10 -LS - 3	31.950	2.000	-2.500	16.400	1.830	1.800
LC11 -LS - 1	31.079	-2.000	-2.500	7.900	1.699	1.688
LC11 -LS - 2	31.079	-2.500	-2.000	7.400	1.678	1.663
LC11 -LS - 3	31.079	-2.000	-2.500	6.800	1.581	1.560
Mean					1.615	1.593
c.o.v.					0.078	0.080
I					1.453	1.431
F. S.					1.055	1.071

TABLE C29
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985)
FROM PEKOZ (1987), TABLE 3.3-4

(Using calculated average yield stress - all sections)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC9 -LS - 1	26.788	-1.500	-2.000	11.500	1.397	1.381
LC9 -LS - 2	26.788	-1.500	-2.000	11.150	1.459	1.437
LC9 -LS - 3	26.788	-1.500	-2.000	9.950	1.425	1.388
LC10 -LS - 3	31.950	2.000	-2.500	16.400	1.748	1.721
LC11 -LS - 1	31.079	-2.000	-2.500	7.900	1.609	1.599
LC11 -LS - 2	31.079	-2.500	-2.000	7.400	1.623	1.605
LC11 -LS - 3	31.079	-2.000	-2.500	6.800	1.535	1.514
Mean					1.542	1.521
c.o.v.					0.082	0.084
I					1.383	1.361
F. S.					1.108	1.126

TABLE C30
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985)
FROM PEKOZ (1987), TABLE 3.3-4

(Using calculated average yield stress)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC9 -LS - 1	26.788	-1.500	-2.000	11.500	1.397	1.381
LC9 -LS - 2	26.788	-1.500	-2.000	11.150	1.459	1.437
LC9 -LS - 3	26.788	-1.500	-2.000	9.950	1.425	1.388
LC10 -LS - 3	31.950	2.000	-2.500	16.400	1.748	1.721
LC11 -LS - 1	31.079	-2.000	-2.500	7.900	1.609	1.599
LC11 -LS - 2	31.079	-2.500	-2.000	7.400	1.623	1.605
LC11 -LS - 3	31.079	-2.000	-2.500	6.800	1.535	1.514
Mean					1.542	1.521
c.o.v.					0.082	0.084
I					1.383	1.361
F. S.					1.108	1.126

TABLE C31
LIPPED CHANNEL SECTIONS OF THOMASSON (1978)
FROM PEKOZ (1987), TABLE 7.3-2

(Using yield stress of flats)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
A71	463.000	0.000	0.000	3.600	1.026	0.968
A74	463.800	0.000	0.000	3.640	1.025	0.968
A75	463.000	0.000	0.000	3.480	0.983	0.926
A76	446.385	0.000	0.000	3.260	0.967	0.921
A101	311.000	0.000	0.000	8.300	1.086	1.022
A102	311.000	0.000	0.000	7.870	1.037	0.975
A103	310.459	0.000	0.000	8.340	1.103	1.037
A104	301.000	0.000	0.000	7.760	0.753	0.740
A151	198.719	0.000	0.000	17.200	1.114	1.029
A152	202.964	0.000	0.000	15.700	1.054	0.974
A153	210.630	0.000	0.000	16.000	1.137	1.055
A154	207.182	0.000	0.000	16.400	1.150	1.077
A156	206.273	0.000	0.000	15.500	1.078	0.998
Mean					1.039	0.976
c.o.v.					0.099	0.087
I					0.918	0.871
F. S.					1.670	1.760

TABLE C32
LIPPED CHANNEL SECTIONS OF THOMASSON (1978)
FROM PEKOZ (1987), TABLE 7.3-2

(Using calculated average yield stress - all sections)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
A71	463.000	0.000	0.000	3.600	1.023	0.965
A74	463.800	0.000	0.000	3.640	1.022	0.966
A75	463.000	0.000	0.000	3.480	0.980	0.923
A76	446.385	0.000	0.000	3.260	0.962	0.918
A101	311.000	0.000	0.000	8.300	1.082	1.017
A102	311.000	0.000	0.000	7.870	1.033	0.970
A103	310.459	0.000	0.000	8.340	1.099	1.032
A104	301.000	0.000	0.000	7.760	0.750	0.737
A151	198.719	0.000	0.000	17.200	1.106	1.020
A152	202.964	0.000	0.000	15.700	1.046	0.966
A153	210.630	0.000	0.000	16.000	1.130	1.046
A154	207.182	0.000	0.000	16.400	1.141	1.068
A156	206.273	0.000	0.000	15.500	1.070	0.990
Mean					1.034	0.971
c.o.v.					0.098	0.086
I					0.914	0.867
F. S.					1.677	1.768

TABLE C33
LIPPED CHANNEL SECTIONS OF THOMASSON (1978)
FROM PEKOZ (1987), TABLE 7.3-2

(Using calculated average yield stress)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
A71	463.000	0.000	0.000	3.600	1.026	0.968
A74	463.800	0.000	0.000	3.640	1.025	0.968
A75	463.000	0.000	0.000	3.480	0.983	0.926
A76	446.385	0.000	0.000	3.260	0.967	0.921
A101	311.000	0.000	0.000	8.300	1.086	1.022
A102	311.000	0.000	0.000	7.870	1.037	0.975
A103	310.459	0.000	0.000	8.340	1.103	1.037
A104	301.000	0.000	0.000	7.760	0.753	0.740
A151	198.719	0.000	0.000	17.200	1.114	1.029
A152	202.964	0.000	0.000	15.700	1.054	0.974
A153	210.630	0.000	0.000	16.000	1.137	1.055
A154	207.182	0.000	0.000	16.400	1.150	1.077
A156	206.273	0.000	0.000	15.500	1.078	0.998
Mean					1.039	0.976
c.o.v.					0.099	0.087
I					0.918	0.871
F. S.					1.670	1.760

TABLE C34
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985)
FROM PEKOZ (1987), TABLE 7.3-3

(Using yield stress of flats)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC1 -LU - 1	85.534	0.000	-2.100	18.740	1.227	1.189
LC1 -LU - 2	85.534	0.000	-12.000	6.800	1.193	1.179
LC1 -LU - 3	85.534	0.000	-6.000	12.320	1.342	1.318
LC2 -LU - 1	174.600	0.000	-6.000	5.760	1.136	1.121
LC2 -LU - 2	174.300	0.000	-9.000	4.290	1.039	1.029
LC3 -LU - 1	131.828	0.000	-4.000	8.000	0.965	0.952
LC3 -LU - 2	132.569	0.000	-8.000	6.350	1.110	1.099
LC3 -LU - 3	131.345	0.000	-4.000	8.500	1.024	1.011
LC4 -LU - 1	134.311	0.000	-12.000	7.720	1.059	1.045
LC4 -LU - 2	134.311	0.000	-18.000	5.180	0.949	0.940
LC4 -LU - 3	140.603	0.000	-6.000	10.660	1.037	1.017
LC5 -LU - 1	117.934	0.000	-4.000	13.690	1.118	1.090
LC5 -LU - 2	117.934	0.000	-8.000	9.320	1.095	1.076
LC5 -LU - 3	115.581	0.000	-6.000	11.780	1.144	1.121
LC5 -LU - 4	115.581	0.000	-10.000	7.990	1.057	1.040
LC6 -LU - 1	95.922	0.000	-5.000	28.750	1.152	1.126
LC6 -LU - 2	95.922	0.000	-10.000	19.490	1.144	1.127
LC10 -LU - 1	96.910	0.000	-5.500	24.800	1.062	1.040
LC10 -LU - 2	96.910	0.000	-5.500	25.000	1.071	1.048
Mean					1.101	1.083
c.o.v.					0.083	0.081
I					0.986	0.971
F. S.					1.555	1.579

TABLE C35
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985)
FROM PEKOZ (1987), TABLE 7.3-3

(Using calculated average yield stress - all sections)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC1 -LU - 1	85.534	0.000	-2.100	18.740	1.197	1.158
LC1 -LU - 2	85.534	0.000	-12.000	6.800	1.164	1.151
LC1 -LU - 3	85.534	0.000	-6.000	12.320	1.311	1.285
LC2 -LU - 1	174.600	0.000	-6.000	5.760	1.125	1.108
LC2 -LU - 2	174.300	0.000	-9.000	4.290	1.029	1.017
LC3 -LU - 1	131.828	0.000	-4.000	8.000	0.956	0.943
LC3 -LU - 2	132.569	0.000	-8.000	6.350	1.099	1.089
LC3 -LU - 3	131.345	0.000	-4.000	8.500	1.016	1.001
LC4 -LU - 1	134.311	0.000	-12.000	7.720	1.046	1.032
LC4 -LU - 2	134.311	0.000	-18.000	5.180	0.937	0.928
LC4 -LU - 3	140.603	0.000	-6.000	10.660	1.025	1.005
LC5 -LU - 1	117.934	0.000	-4.000	13.690	1.103	1.075
LC5 -LU - 2	117.934	0.000	-8.000	9.320	1.081	1.063
LC5 -LU - 3	115.581	0.000	-6.000	11.780	1.126	1.103
LC5 -LU - 4	115.581	0.000	-10.000	7.990	1.039	1.023
LC6 -LU - 1	95.922	0.000	-5.000	28.750	1.129	1.102
LC6 -LU - 2	95.922	0.000	-10.000	19.490	1.120	1.102
LC10 -LU - 1	96.910	0.000	-5.500	24.800	1.040	1.018
LC10 -LU - 2	96.910	0.000	-5.500	25.000	1.049	1.026
Mean					1.084	1.065
c.o.v.					0.080	0.077
I					0.974	0.958
F. S.					1.575	1.600

TABLE C36
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985)
FROM PEKOZ (1987), TABLE 7.3-3

(Using calculated average yield stress)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC1 -LU - 1	85.534	0.000	-2.100	18.740	1.227	1.189
LC1 -LU - 2	85.534	0.000	-12.000	6.800	1.164	1.128
LC1 -LU - 3	85.534	0.000	-6.000	12.320	1.342	1.318
LC2 -LU - 1	174.600	0.000	-6.000	5.760	1.136	1.121
LC2 -LU - 2	174.300	0.000	-9.000	4.290	1.039	1.029
LC3 -LU - 1	131.828	0.000	-4.000	8.000	0.965	0.952
LC3 -LU - 2	132.569	0.000	-8.000	6.350	1.110	1.099
LC3 -LU - 3	131.345	0.000	-4.000	8.500	1.024	1.011
LC4 -LU - 1	134.311	0.000	-12.000	7.720	1.059	1.045
LC4 -LU - 2	134.311	0.000	-18.000	5.180	0.949	0.940
LC4 -LU - 3	140.603	0.000	-6.000	10.660	1.037	1.017
LC5 -LU - 1	117.934	0.000	-4.000	13.690	1.118	1.090
LC5 -LU - 2	117.934	0.000	-8.000	9.320	1.095	1.076
LC5 -LU - 3	115.581	0.000	-6.000	11.780	1.144	1.121
LC5 -LU - 4	115.581	0.000	-10.000	7.990	1.057	1.040
LC6 -LU - 1	95.922	0.000	-5.000	28.750	1.152	1.126
LC6 -LU - 2	95.922	0.000	-10.000	19.490	1.144	1.127
LC10 -LU - 1	96.910	0.000	-5.500	24.800	1.062	1.040
LC10 -LU - 2	96.910	0.000	-5.500	25.000	1.071	1.048
Mean					1.100	1.080
c.o.v.					0.082	0.079
I					0.986	0.970
F. S.					1.555	1.580

TABLE C37
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985)
FROM PEKOZ (1987), TABLE 7.3-4

(Using yield stress of flats)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC7 -LU - 1	71.688	1.500	-3.500	6.500	1.811	1.796
LC7 -LU - 2	71.688	1.500	-3.500	5.800	1.726	1.701
LC7 -LU - 3	71.688	1.500	-3.500	5.350	1.737	1.704
LC8 -LU - 1	136.650	1.000	-2.000	11.850	1.276	1.228
LC8 -LU - 2	136.650	1.000	-2.000	12.000	1.293	1.246
LC8 -LU - 3	133.902	1.000	-4.000	10.750	1.272	1.229
LC8 -LU - 4	133.902	1.000	-4.000	10.550	1.249	1.206
LC8 -LU - 5	136.017	1.000	-6.000	8.900	1.214	1.177
LC8 -LU - 6	136.017	1.000	-6.000	9.350	1.274	1.233
LC9 -LU - 1	115.903	-0.380	-3.940	14.000	1.052	1.011
LC9 -LU - 2	115.903	-0.380	-6.000	10.100	0.927	0.898
LC9 -LU - 3	117.081	-0.380	-6.000	10.600	0.958	0.928
LC9 -LU - 4	117.081	-0.630	-3.940	11.700	0.942	0.911
Mean					1.287	1.251
c.o.v.					0.234	0.244
I					0.938	0.897
F. S.					1.634	1.709

TABLE C38
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985)
FROM PEKOZ (1987), TABLE 7.3-4

(Using calculated average yield stress - all sections)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC7 -LU - 1	71.688	1.500	-3.500	6.500	1.747	1.729
LC7 -LU - 2	71.688	1.500	-3.500	5.800	1.667	1.643
LC7 -LU - 3	71.688	1.500	-3.500	5.350	1.682	1.656
LC8 -LU - 1	136.650	1.000	-2.000	11.850	1.261	1.214
LC8 -LU - 2	136.650	1.000	-2.000	12.000	1.279	1.231
LC8 -LU - 3	133.902	1.000	-4.000	10.750	1.257	1.213
LC8 -LU - 4	133.902	1.000	-4.000	10.550	1.234	1.191
LC8 -LU - 5	136.017	1.000	-6.000	8.900	1.201	1.163
LC8 -LU - 6	136.017	1.000	-6.000	9.350	1.260	1.221
LC9 -LU - 1	115.903	-0.380	-3.940	14.000	1.042	1.002
LC9 -LU - 2	115.903	-0.380	-6.000	10.100	0.919	0.890
LC9 -LU - 3	117.081	-0.380	-6.000	10.600	0.949	0.920
LC9 -LU - 4	117.081	-0.630	-3.940	11.700	0.934	0.903
Mean					1.264	1.229
c.o.v.					0.223	0.232
I					0.940	0.899
F. S.					1.631	1.706

TABLE C39
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985)
FROM PEKOZ (1987), TABLE 7.3-4

(Using calculated average yield stress)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC7 -LU - 1	71.688	1.500	-3.500	6.500	1.747	1.729
LC7 -LU - 2	71.688	1.500	-3.500	5.800	1.667	1.643
LC7 -LU - 3	71.688	1.500	-3.500	5.350	1.682	1.656
LC8 -LU - 1	136.650	1.000	-2.000	11.850	1.276	1.228
LC8 -LU - 2	136.650	1.000	-2.000	12.000	1.293	1.246
LC8 -LU - 3	133.902	1.000	-4.000	10.750	1.272	1.229
LC8 -LU - 4	133.902	1.000	-4.000	10.550	1.249	1.206
LC8 -LU - 5	136.017	1.000	-6.000	8.900	1.214	1.177
LC8 -LU - 6	136.017	1.000	-6.000	9.350	1.274	1.233
LC9 -LU - 1	115.903	-0.380	-3.940	14.000	1.052	1.011
LC9 -LU - 2	115.903	-0.380	-6.000	10.100	0.927	0.898
LC9 -LU - 3	117.081	-0.380	-6.000	10.600	0.958	0.928
LC9 -LU - 4	117.081	-0.630	-3.940	11.700	0.942	0.911
Mean					1.273	1.238
c.o.v.					0.219	0.228
I					0.954	0.913
F. S.					1.607	1.680

TABLE C40
LIPPED CHANNEL SECTIONS OF LOUGHLAN (1979)
FROM PEKOZ (1987), TABLE 7.3-5

(Using yield stress of flats)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
L1	116.937	0.290	0.000	3.120	1.095	1.047
L2	116.406	0.290	0.000	3.600	1.062	1.034
L3	118.406	0.400	0.000	3.520	0.967	0.934
L4	117.437	0.400	0.000	3.780	0.979	0.952
L5	117.031	0.410	0.000	4.100	1.015	0.995
L6	149.312	0.070	0.000	3.800	1.155	1.098
L7	147.500	0.070	0.000	3.970	1.097	1.050
L8	147.625	0.070	0.000	4.310	1.094	1.059
L9	149.219	0.180	0.000	4.340	1.072	1.028
L10	148.719	0.190	0.000	4.570	1.070	1.036
L11	147.937	0.190	0.000	4.650	1.038	1.015
L12	178.906	0.180	0.000	3.350	1.147	1.098
L13	179.250	0.180	0.000	3.530	1.100	1.060
L14	178.687	0.180	0.000	3.850	1.129	1.097
L15	181.406	0.000	0.000	4.900	1.109	1.058
L16	181.406	0.000	0.000	5.180	1.104	1.066
L17	179.031	0.000	0.000	5.310	1.077	1.051
L18	211.031	0.220	0.000	3.130	1.155	1.106
L19	210.000	0.220	0.000	3.390	1.141	1.101
L20	210.594	0.220	0.000	3.670	1.136	1.105
Mean					1.087	1.049
c.o.v.					0.050	0.046
I					0.996	0.963
F. S.					1.540	1.592

TABLE C41
LIPPED CHANNEL SECTIONS OF LOUGHLAN (1979)
FROM PEKOZ (1987), TABLE 7.3-5

(Using calculated average yield stress - all sections)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
L1	116.937	0.290	0.000	3.120	1.083	1.037
L2	116.406	0.290	0.000	3.600	1.047	1.020
L3	118.406	0.400	0.000	3.520	0.959	0.924
L4	117.437	0.400	0.000	3.780	0.972	0.943
L5	117.031	0.410	0.000	4.100	1.005	0.983
L6	149.312	0.070	0.000	3.800	1.145	1.089
L7	147.500	0.070	0.000	3.970	1.085	1.039
L8	147.625	0.070	0.000	4.310	1.083	1.049
L9	149.219	0.180	0.000	4.340	1.064	1.021
L10	148.719	0.190	0.000	4.570	1.060	1.027
L11	147.937	0.190	0.000	4.650	1.029	1.006
L12	178.906	0.180	0.000	3.350	1.139	1.088
L13	179.250	0.180	0.000	3.530	1.090	1.047
L14	178.687	0.180	0.000	3.850	1.116	1.088
L15	181.406	0.000	0.000	4.900	1.101	1.051
L16	181.406	0.000	0.000	5.180	1.095	1.057
L17	179.031	0.000	0.000	5.310	1.068	1.041
L18	211.031	0.220	0.000	3.130	1.147	1.094
L19	210.000	0.220	0.000	3.390	1.130	1.090
L20	210.594	0.220	0.000	3.670	1.126	1.096
Mean					1.077	1.040
c.o.v.					0.050	0.046
I					0.987	0.954
F. S.					1.554	1.607

TABLE C42
LIPPED CHANNEL SECTIONS OF LOUGHLAN (1979)
FROM PEKOZ (1987), TABLE 7.3-5

(Using calculated average yield stress)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
L1	116.937	0.290	0.000	3.120	1.095	1.047
L2	116.406	0.290	0.000	3.600	1.062	1.034
L3	118.406	0.400	0.000	3.520	0.967	0.934
L4	117.437	0.400	0.000	3.780	0.979	0.952
L5	117.031	0.410	0.000	4.100	1.015	0.995
L6	149.312	0.070	0.000	3.800	1.155	1.098
L7	147.500	0.070	0.000	3.970	1.097	1.050
L8	147.625	0.070	0.000	4.310	1.094	1.059
L9	149.219	0.180	0.000	4.340	1.072	1.028
L10	148.719	0.190	0.000	4.570	1.070	1.036
L11	147.937	0.190	0.000	4.650	1.038	1.015
L12	178.906	0.180	0.000	3.350	1.147	1.098
L13	179.250	0.180	0.000	3.530	1.100	1.060
L14	178.687	0.180	0.000	3.850	1.129	1.097
L15	181.406	0.000	0.000	4.900	1.109	1.058
L16	181.406	0.000	0.000	5.180	1.104	1.066
L17	179.031	0.000	0.000	5.310	1.077	1.051
L18	211.031	0.220	0.000	3.130	1.155	1.106
L19	210.000	0.220	0.000	3.390	1.141	1.101
L20	210.594	0.220	0.000	3.670	1.136	1.105
Mean					1.087	1.049
c.o.v.					0.050	0.046
I					0.996	0.963
F. S.					1.540	1.592

TABLE C43
HAT SECTIONS OF LOH AND PEKOZ (1985)

(Using yield stress of flats)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LH1 -LU - 1	58.295	-0.100	0.000	40.600	1.147	1.122
LH1 -LU - 2	56.561	-0.500	0.000	53.600	1.545	1.512
LH2 -LU - 1	82.435	0.000	0.000	8.000	1.207	1.072
LH2 -LU - 2	81.109	-0.750	0.000	6.000	1.224	1.130
LH2 -LU - 3	81.457	-1.500	0.000	4.000	1.023	0.962
LH3 -LU - 1	101.500	0.000	0.000	7.550	0.896	0.845
LH3 -LU - 2	101.848	0.000	0.000	7.900	0.945	0.892
LH3 -LU - 3	101.761	0.000	0.000	8.300	1.012	0.955
LH4 -LU - 1	122.367	0.000	0.000	2.600	0.818	0.747
LH4 -LU - 2	122.267	0.000	0.000	2.300	0.757	0.689
LH4 -LU - 3	123.567	0.000	0.000	2.900	0.993	0.929
LH5 -LU - 1	135.026	0.000	0.000	5.300	1.106	1.045
LH5 -LU - 2	135.128	0.000	0.000	5.650	1.135	1.072
LH5 -LU - 3	135.590	0.000	0.000	6.000	1.190	1.124
LH5 -LU - 4	131.200	0.000	0.000	5.900	1.143	1.077
Mean					1.076	1.012
c.o.v.					0.179	0.192
I					0.860	0.791
F. S.					1.784	1.939

TABLE C44
HAT SECTIONS OF LOH AND PEKOZ (1985)

(Using calculated average yield stress - all sections)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LH1 -LU - 1	58.295	-0.100	0.000	40.600	1.131	1.105
LH1 -LU - 2	56.561	-0.500	0.000	53.600	1.521	1.487
LH2 -LU - 1	82.435	0.000	0.000	8.000	1.201	1.070
LH2 -LU - 2	81.109	-0.750	0.000	6.000	1.215	1.121
LH2 -LU - 3	81.457	-1.500	0.000	4.000	1.015	0.955
LH3 -LU - 1	101.500	0.000	0.000	7.550	0.890	0.841
LH3 -LU - 2	101.848	0.000	0.000	7.900	0.940	0.887
LH3 -LU - 3	101.761	0.000	0.000	8.300	1.006	0.949
LH4 -LU - 1	122.367	0.000	0.000	2.600	0.813	0.745
LH4 -LU - 2	122.267	0.000	0.000	2.300	0.752	0.687
LH4 -LU - 3	123.567	0.000	0.000	2.900	0.990	0.927
LH5 -LU - 1	135.026	0.000	0.000	5.300	1.102	1.039
LH5 -LU - 2	135.128	0.000	0.000	5.650	1.128	1.066
LH5 -LU - 3	135.590	0.000	0.000	6.000	1.186	1.117
LH5 -LU - 4	131.200	0.000	0.000	5.900	1.139	1.073
Mean					1.069	1.005
c.o.v.					0.176	0.189
I					0.856	0.790
F. S.					1.790	1.941

TABLE C45
HAT SECTIONS OF LOH AND PEKOZ (1985)

(Using calculated average yield stress)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LH1 -LU - 1	58.295	-0.100	0.000	40.600	1.147	1.122
LH1 -LU - 2	56.561	-0.500	0.000	53.600	1.545	1.512
LH2 -LU - 1	82.435	0.000	0.000	8.000	1.207	1.072
LH2 -LU - 2	81.109	-0.750	0.000	6.000	1.224	1.130
LH2 -LU - 3	81.457	-1.500	0.000	4.000	1.023	0.962
LH3 -LU - 1	101.500	0.000	0.000	7.550	0.896	0.845
LH3 -LU - 2	101.848	0.000	0.000	7.900	0.945	0.892
LH3 -LU - 3	101.761	0.000	0.000	8.300	1.012	0.955
LH4 -LU - 1	122.367	0.000	0.000	2.600	0.818	0.747
LH4 -LU - 2	122.267	0.000	0.000	2.300	0.757	0.689
LH4 -LU - 3	123.567	0.000	0.000	2.900	0.993	0.929
LH5 -LU - 1	135.026	0.000	0.000	5.300	1.106	1.045
LH5 -LU - 2	135.128	0.000	0.000	5.650	1.135	1.072
LH5 -LU - 3	135.590	0.000	0.000	6.000	1.190	1.124
LH5 -LU - 4	131.200	0.000	0.000	5.900	1.143	1.077
Mean					1.076	1.012
c.o.v.					0.179	0.192
I					0.860	0.791
F. S.					1.784	1.939

TABLE C46
ALL TEST RESULTS
FROM PEKOZ (1987), TABLES 3.3-2 ; 3.3-3 ; 3.3-4

(Using yield stress of flats)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC1 -LS - 1	31.744	-1.500	0.000	12.750	1.369	1.358
LC1 -LS - 2	31.744	-1.500	0.000	11.250	1.270	1.254
LC1 -LS - 3	31.744	-1.500	0.000	9.450	1.134	1.114
LC2 -LS - 1	16.515	2.000	0.000	22.000	1.950	1.933
LC2 -LS - 2	16.515	2.250	0.000	18.650	1.878	1.854
LC2 -LS - 3	16.515	2.250	0.000	17.600	1.849	1.814
LC3 -LS - 1	33.233	0.000	-1.450	8.900	1.365	1.320
LC3 -LS - 2	33.685	0.000	-2.000	7.800	1.418	1.395
LC3 -LS - 3	33.685	0.000	-2.000	7.200	1.387	1.353
LC3 -LS - 4	33.685	0.000	-2.000	7.100	1.473	1.423
LC4 -LS - 1	27.111	0.000	-2.500	11.600	1.393	1.365
LC4 -LS - 2	27.111	0.000	-2.500	10.500	1.365	1.324
LC5 -LS - 1	16.394	0.000	-2.030	19.000	1.252	1.212
LC5 -LS - 2	16.394	0.000	-2.000	17.200	1.274	1.212
LC6 -LS - 1	31.293	0.000	-2.380	10.300	1.530	1.508
LC6 -LS - 2	31.293	0.000	-2.130	10.500	1.535	1.489
LC7 -LS - 1	24.152	0.000	-2.250	23.400	1.422	1.397
LC7 -LS - 2	16.576	0.000	-2.220	21.700	2.015	1.936
LC8 -LS - 1	42.818	0.000	-1.500	16.800	1.303	1.291
LC8 -LS - 2	42.818	0.000	-1.500	16.200	1.291	1.273
LC8 -LS - 3	42.818	0.000	-1.500	15.500	1.283	1.257
LC8 -LS - 4	43.421	0.000	-1.660	13.800	1.264	1.230
LC8 -LS - 5	43.421	0.000	-2.000	12.300	1.313	1.262
LC9 -LS - 1	26.788	-1.500	-2.000	11.500	1.480	1.467
LC9 -LS - 2	26.788	-1.500	-2.000	11.150	1.542	1.517
LC9 -LS - 3	26.788	-1.500	-2.000	9.950	1.498	1.459
LC10 -LS - 3	31.950	2.000	-2.500	16.400	1.830	1.800
LC11 -LS - 1	31.079	-2.000	-2.500	7.900	1.699	1.688
LC11 -LS - 2	31.079	-2.500	-2.000	7.400	1.678	1.663
LC11 -LS - 3	31.079	-2.000	-2.500	6.800	1.581	1.560
Mean					1.488	1.458
c.o.v.					0.154	0.157
I					1.231	1.202
F. S.					1.246	1.276

TABLE C47
ALL TEST RESULTS
FROM PEKOZ (1987), TABLES 3.3-2 ; 3.3-3 ; 3.3-4

(Using calculated average yield stress - all sections)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC1 -LS - 1	31.744	-1.500	0.000	12.750	1.321	1.309
LC1 -LS - 2	31.744	-1.500	0.000	11.250	1.228	1.212
LC1 -LS - 3	31.744	-1.500	0.000	9.450	1.099	1.080
LC2 -LS - 1	16.515	2.000	0.000	22.000	1.809	1.797
LC2 -LS - 2	16.515	2.250	0.000	18.650	1.750	1.724
LC2 -LS - 3	16.515	2.250	0.000	17.600	1.725	1.692
LC3 -LS - 1	33.233	0.000	-1.450	8.900	1.297	1.254
LC3 -LS - 2	33.685	0.000	-2.000	7.800	1.340	1.320
LC3 -LS - 3	33.685	0.000	-2.000	7.200	1.319	1.283
LC3 -LS - 4	33.685	0.000	-2.000	7.100	1.406	1.355
LC4 -LS - 1	27.111	0.000	-2.500	11.600	1.306	1.280
LC4 -LS - 2	27.111	0.000	-2.500	10.500	1.290	1.248
LC5 -LS - 1	16.394	0.000	-2.030	19.000	1.176	1.140
LC5 -LS - 2	16.394	0.000	-2.000	17.200	1.210	1.148
LC6 -LS - 1	31.293	0.000	-2.380	10.300	1.493	1.471
LC6 -LS - 2	31.293	0.000	-2.130	10.500	1.496	1.454
LC7 -LS - 1	24.152	0.000	-2.250	23.400	1.333	1.308
LC7 -LS - 2	16.576	0.000	-2.220	21.700	1.895	1.816
LC8 -LS - 1	42.818	0.000	-1.500	16.800	1.271	1.259
LC8 -LS - 2	42.818	0.000	-1.500	16.200	1.260	1.242
LC8 -LS - 3	42.818	0.000	-1.500	15.500	1.255	1.228
LC8 -LS - 4	43.421	0.000	-1.660	13.800	1.237	1.204
LC8 -LS - 5	43.421	0.000	-2.000	12.300	1.284	1.235
LC9 -LS - 1	26.788	-1.500	-2.000	11.500	1.397	1.381
LC9 -LS - 2	26.788	-1.500	-2.000	11.150	1.459	1.437
LC9 -LS - 3	26.788	-1.500	-2.000	9.950	1.425	1.388
LC10 -LS - 3	31.950	2.000	-2.500	16.400	1.748	1.721
LC11 -LS - 1	31.079	-2.000	-2.500	7.900	1.609	1.599
LC11 -LS - 2	31.079	-2.500	-2.000	7.400	1.623	1.605
LC11 -LS - 3	31.079	-2.000	-2.500	6.800	1.535	1.514
Mean					1.420	1.390
c.o.v.					0.146	0.148
I					1.188	1.160
F. S.					1.290	1.322

TABLE C48
ALL TEST RESULTS
FROM PEKOZ (1987), TABLES 3.3-2 ; 3.3-3 ; 3.3-4

(Using calculated average yield stress)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC1 -LS - 1	31.744	-1.500	0.000	12.750	1.321	1.309
LC1 -LS - 2	31.744	-1.500	0.000	11.250	1.228	1.212
LC1 -LS - 3	31.744	-1.500	0.000	9.450	1.099	1.080
LC2 -LS - 1	16.515	2.000	0.000	22.000	1.809	1.797
LC2 -LS - 2	16.515	2.250	0.000	18.650	1.750	1.724
LC2 -LS - 3	16.515	2.250	0.000	17.600	1.725	1.692
LC3 -LS - 1	33.233	0.000	-1.450	8.900	1.297	1.254
LC3 -LS - 2	33.685	0.000	-2.000	7.800	1.340	1.320
LC3 -LS - 3	33.685	0.000	-2.000	7.200	1.319	1.283
LC3 -LS - 4	33.685	0.000	-2.000	7.100	1.406	1.355
LC4 -LS - 1	27.111	0.000	-2.500	11.600	1.306	1.280
LC4 -LS - 2	27.111	0.000	-2.500	10.500	1.290	1.248
LC5 -LS - 1	16.394	0.000	-2.030	19.000	1.176	1.140
LC5 -LS - 2	16.394	0.000	-2.000	17.200	1.210	1.148
LC6 -LS - 1	31.293	0.000	-2.380	10.300	1.493	1.471
LC6 -LS - 2	31.293	0.000	-2.130	10.500	1.496	1.454
LC7 -LS - 1	24.152	0.000	-2.250	23.400	1.333	1.308
LC7 -LS - 2	16.576	0.000	-2.220	21.700	1.895	1.816
LC8 -LS - 1	42.818	0.000	-1.500	16.800	1.271	1.259
LC8 -LS - 2	42.818	0.000	-1.500	16.200	1.260	1.242
LC8 -LS - 3	42.818	0.000	-1.500	15.500	1.255	1.228
LC8 -LS - 4	43.421	0.000	-1.660	13.800	1.237	1.204
LC8 -LS - 5	43.421	0.000	-2.000	12.300	1.284	1.235
LC9 -LS - 1	26.788	-1.500	-2.000	11.500	1.397	1.381
LC9 -LS - 2	26.788	-1.500	-2.000	11.150	1.459	1.437
LC9 -LS - 3	26.788	-1.500	-2.000	9.950	1.425	1.388
LC10 -LS - 3	31.950	2.000	-2.500	16.400	1.748	1.721
LC11 -LS - 1	31.079	-2.000	-2.500	7.900	1.609	1.599
LC11 -LS - 2	31.079	-2.500	-2.000	7.400	1.623	1.605
LC11 -LS - 3	31.079	-2.000	-2.500	6.800	1.535	1.514
Mean					1.420	1.390
c.o.v.					0.146	0.148
I					1.188	1.160
F. S.					1.290	1.322

TABLE C49
ALL TEST RESULTS
FROM PEKOZ (1987), TABLES 7.3-3, 7.3-4

(Using yield stress of flats)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC1 -LU - 1	85.534	0.000	-2.100	18.740	1.227	1.189
LC1 -LU - 2	85.534	0.000	-12.000	6.800	1.193	1.179
LC1 -LU - 3	85.534	0.000	-6.000	12.320	1.342	1.318
LC2 -LU - 1	174.600	0.000	-6.000	5.760	1.136	1.121
LC2 -LU - 2	174.300	0.000	-9.000	4.290	1.039	1.029
LC3 -LU - 1	131.828	0.000	-4.000	8.000	0.965	0.952
LC3 -LU - 2	132.569	0.000	-8.000	6.350	1.110	1.099
LC3 -LU - 3	131.345	0.000	-4.000	8.500	1.024	1.011
LC4 -LU - 1	134.311	0.000	-12.000	7.720	1.059	1.045
LC4 -LU - 2	134.311	0.000	-18.000	5.180	0.949	0.940
LC4 -LU - 3	140.603	0.000	-6.000	10.660	1.037	1.017
LC5 -LU - 1	117.934	0.000	-4.000	13.690	1.118	1.090
LC5 -LU - 2	117.934	0.000	-8.000	9.320	1.095	1.076
LC5 -LU - 3	115.581	0.000	-6.000	11.780	1.144	1.121
LC5 -LU - 4	115.581	0.000	-10.000	7.990	1.057	1.040
LC6 -LU - 1	95.922	0.000	-5.000	28.750	1.152	1.126
LC6 -LU - 2	95.922	0.000	-10.000	19.490	1.144	1.127
LC10 -LU - 1	96.910	0.000	-5.500	24.800	1.062	1.040
LC10 -LU - 2	96.910	0.000	-5.500	25.000	1.071	1.048
LC7 -LU - 1	71.688	1.500	-3.500	6.500	1.811	1.796
LC7 -LU - 2	71.688	1.500	-3.500	5.800	1.726	1.701
LC7 -LU - 3	71.688	1.500	-3.500	5.350	1.737	1.704
LC8 -LU - 1	136.650	1.000	-2.000	11.850	1.276	1.228
LC8 -LU - 2	136.650	1.000	-2.000	12.000	1.293	1.246
LC8 -LU - 3	133.902	1.000	-4.000	10.750	1.272	1.229
LC8 -LU - 4	133.902	1.000	-4.000	10.550	1.249	1.206
LC8 -LU - 5	136.017	1.000	-6.000	8.900	1.214	1.177
LC8 -LU - 6	136.017	1.000	-6.000	9.350	1.274	1.233
LC9 -LU - 1	115.903	-0.380	-3.940	14.000	1.052	1.011
LC9 -LU - 2	115.903	-0.380	-6.000	10.100	0.927	0.898
LC9 -LU - 3	117.081	-0.380	-6.000	10.600	0.958	0.928
LC9 -LU - 4	117.081	-0.630	-3.940	11.700	0.942	0.911
Mean					1.177	1.151
c.o.v.					0.187	0.189
I					0.927	0.904
F. S.					1.653	1.696

TABLE C50
ALL TEST RESULTS
FROM PEKOZ (1987), TABLES 7.3-3, 7.3-4

(Using calculated average yield stress - all sections)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC1 -LU - 1	85.534	0.000	-2.100	18.740	1.197	1.158
LC1 -LU - 2	85.534	0.000	-12.000	6.800	1.164	1.151
LC1 -LU - 3	85.534	0.000	-6.000	12.320	1.311	1.285
LC2 -LU - 1	174.600	0.000	-6.000	5.760	1.125	1.108
LC2 -LU - 2	174.300	0.000	-9.000	4.290	1.029	1.017
LC3 -LU - 1	131.828	0.000	-4.000	8.000	0.956	0.943
LC3 -LU - 2	132.569	0.000	-8.000	6.350	1.099	1.089
LC3 -LU - 3	131.345	0.000	-4.000	8.500	1.016	1.001
LC4 -LU - 1	134.311	0.000	-12.000	7.720	1.046	1.032
LC4 -LU - 2	134.311	0.000	-18.000	5.180	0.937	0.928
LC4 -LU - 3	140.603	0.000	-6.000	10.660	1.025	1.005
LC5 -LU - 1	117.934	0.000	-4.000	13.690	1.103	1.075
LC5 -LU - 2	117.934	0.000	-8.000	9.320	1.081	1.063
LC5 -LU - 3	115.581	0.000	-6.000	11.780	1.126	1.103
LC5 -LU - 4	115.581	0.000	-10.000	7.990	1.039	1.023
LC6 -LU - 1	95.922	0.000	-5.000	28.750	1.129	1.102
LC6 -LU - 2	95.922	0.000	-10.000	19.490	1.120	1.102
LC10 -LU - 1	96.910	0.000	-5.500	24.800	1.040	1.018
LC10 -LU - 2	96.910	0.000	-5.500	25.000	1.049	1.026
LC7 -LU - 1	71.688	1.500	-3.500	6.500	1.747	1.729
LC7 -LU - 2	71.688	1.500	-3.500	5.800	1.667	1.643
LC7 -LU - 3	71.688	1.500	-3.500	5.350	1.682	1.656
LC8 -LU - 1	136.650	1.000	-2.000	11.850	1.261	1.214
LC8 -LU - 2	136.650	1.000	-2.000	12.000	1.279	1.231
LC8 -LU - 3	133.902	1.000	-4.000	10.750	1.257	1.213
LC8 -LU - 4	133.902	1.000	-4.000	10.550	1.234	1.191
LC8 -LU - 5	136.017	1.000	-6.000	8.900	1.201	1.163
LC8 -LU - 6	136.017	1.000	-6.000	9.350	1.260	1.221
LC9 -LU - 1	115.903	-0.380	-3.940	14.000	1.042	1.002
LC9 -LU - 2	115.903	-0.380	-6.000	10.100	0.919	0.890
LC9 -LU - 3	117.081	-0.380	-6.000	10.600	0.949	0.920
LC9 -LU - 4	117.081	-0.630	-3.940	11.700	0.934	0.903
Mean					1.157	1.131
c.o.v.					0.179	0.182
I					0.923	0.900
F. S.					1.661	1.704

TABLE C51
ALL TEST RESULTS
FROM PEKOZ (1987), TABLES 7.3-3, 7.3-4

(Using calculated average yield stress)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC1 -LU - 1	85.534	0.000	-2.100	18.740	1.227	1.189
LC1 -LU - 2	85.534	0.000	-12.000	6.800	1.164	1.128
LC1 -LU - 3	85.534	0.000	-6.000	12.320	1.342	1.318
LC2 -LU - 1	174.600	0.000	-6.000	5.760	1.136	1.121
LC2 -LU - 2	174.300	0.000	-9.000	4.290	1.039	1.029
LC3 -LU - 1	131.828	0.000	-4.000	8.000	0.965	0.952
LC3 -LU - 2	132.569	0.000	-8.000	6.350	1.110	1.099
LC3 -LU - 3	131.345	0.000	-4.000	8.500	1.024	1.011
LC4 -LU - 1	134.311	0.000	-12.000	7.720	1.059	1.045
LC4 -LU - 2	134.311	0.000	-18.000	5.180	0.949	0.940
LC4 -LU - 3	140.603	0.000	-6.000	10.660	1.037	1.017
LC5 -LU - 1	117.934	0.000	-4.000	13.690	1.118	1.090
LC5 -LU - 2	117.934	0.000	-8.000	9.320	1.095	1.076
LC5 -LU - 3	115.581	0.000	-6.000	11.780	1.144	1.121
LC5 -LU - 4	115.581	0.000	-10.000	7.990	1.057	1.040
LC6 -LU - 1	95.922	0.000	-5.000	28.750	1.152	1.126
LC6 -LU - 2	95.922	0.000	-10.000	19.490	1.144	1.127
LC10 -LU - 1	96.910	0.000	-5.500	24.800	1.062	1.040
LC10 -LU - 2	96.910	0.000	-5.500	25.000	1.071	1.048
LC7 -LU - 1	71.688	1.500	-3.500	6.500	1.747	1.729
LC7 -LU - 2	71.688	1.500	-3.500	5.800	1.667	1.643
LC7 -LU - 3	71.688	1.500	-3.500	5.350	1.682	1.656
LC8 -LU - 1	136.650	1.000	-2.000	11.850	1.276	1.228
LC8 -LU - 2	136.650	1.000	-2.000	12.000	1.293	1.246
LC8 -LU - 3	133.902	1.000	-4.000	10.750	1.272	1.229
LC8 -LU - 4	133.902	1.000	-4.000	10.550	1.249	1.206
LC8 -LU - 5	136.017	1.000	-6.000	8.900	1.214	1.177
LC8 -LU - 6	136.017	1.000	-6.000	9.350	1.274	1.233
LC9 -LU - 1	115.903	-0.380	-3.940	14.000	1.052	1.011
LC9 -LU - 2	115.903	-0.380	-6.000	10.100	0.927	0.898
LC9 -LU - 3	117.081	-0.380	-6.000	10.600	0.958	0.928
LC9 -LU - 4	117.081	-0.630	-3.940	11.700	0.942	0.911
Mean					1.170	1.144
c.o.v.					0.176	0.178
I					0.939	0.915
F. S.					1.633	1.675

TABLE C52
ALL TEST RESULTS
FROM PEKOZ (1987), TABLES 3.3-2 , 3.3-3 , 3.3-4 , 7.3-2 , 7.3-3 , 7.3-4 , 7.3-5

(Using yield stress of flats)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC1 -LS - 1	31.744	-1.500	0.000	12.750	1.502	1.502
LC1 -LS - 2	31.744	-1.500	0.000	11.250	1.370	1.372
LC1 -LS - 3	31.744	-1.500	0.000	9.450	1.199	1.202
LC2 -LS - 1	16.515	2.000	0.000	22.000	1.950	1.933
LC2 -LS - 2	16.515	2.250	0.000	18.650	1.878	1.854
LC2 -LS - 3	16.515	2.250	0.000	17.600	1.849	1.814
LC3 -LS - 1	33.233	0.000	-1.450	8.900	1.365	1.320
LC3 -LS - 2	33.685	0.000	-2.000	7.800	1.418	1.395
LC3 -LS - 3	33.685	0.000	-2.000	7.200	1.387	1.353
LC3 -LS - 4	33.685	0.000	-2.000	7.100	1.473	1.423
LC4 -LS - 1	27.111	0.000	-2.500	11.600	1.393	1.365
LC4 -LS - 2	27.111	0.000	-2.500	10.500	1.365	1.324
LC5 -LS - 1	16.394	0.000	-2.030	19.000	1.252	1.212
LC5 -LS - 2	16.394	0.000	-2.000	17.200	1.274	1.212
LC6 -LS - 1	31.293	0.000	-2.380	10.300	1.589	1.589
LC6 -LS - 2	31.293	0.000	-2.130	10.500	1.579	1.551
LC7 -LS - 1	24.152	0.000	-2.250	23.400	1.422	1.397
LC7 -LS - 2	16.576	0.000	-2.220	21.700	2.015	1.936
LC8 -LS - 1	42.818	0.000	-1.500	16.800	1.413	1.412
LC8 -LS - 2	42.818	0.000	-1.500	16.200	1.383	1.380
LC8 -LS - 3	42.818	0.000	-1.500	15.500	1.353	1.348
LC8 -LS - 4	43.421	0.000	-1.660	13.800	1.313	1.303
LC8 -LS - 5	43.421	0.000	-2.000	12.300	1.353	1.310
LC9 -LS - 1	26.788	-1.500	-2.000	11.500	1.497	1.492
LC9 -LS - 2	26.788	-1.500	-2.000	11.150	1.542	1.529
LC9 -LS - 3	26.788	-1.500	-2.000	9.950	1.498	1.459
LC10 -LS - 3	31.950	2.000	-2.500	16.400	1.830	1.800
LC11 -LS - 1	31.079	-2.000	-2.500	7.900	1.783	1.779
LC11 -LS - 2	31.079	-2.500	-2.000	7.400	1.741	1.737
LC11 -LS - 3	31.079	-2.000	-2.500	6.800	1.623	1.619
LC1 -LU - 1	85.534	0.000	-2.100	18.740	1.227	1.189
LC1 -LU - 2	85.534	0.000	-12.000	6.800	1.193	1.179
LC1 -LU - 3	85.534	0.000	-6.000	12.320	1.342	1.318
LC2 -LU - 1	174.600	0.000	-6.000	5.760	1.136	1.121
LC2 -LU - 2	174.300	0.000	-9.000	4.290	1.039	1.029
LC3 -LU - 1	131.828	0.000	-4.000	8.000	0.965	0.952
LC3 -LU - 2	132.569	0.000	-8.000	6.350	1.110	1.099
LC3 -LU - 3	131.345	0.000	-4.000	8.500	1.024	1.011
LC4 -LU - 1	134.311	0.000	-12.000	7.720	1.059	1.045
LC4 -LU - 2	134.311	0.000	-18.000	5.180	0.949	0.940
LC4 -LU - 3	140.603	0.000	-6.000	10.660	1.037	1.017
LC5 -LU - 1	117.934	0.000	-4.000	13.690	1.118	1.090
LC5 -LU - 2	117.934	0.000	-8.000	9.320	1.095	1.076
LC5 -LU - 3	115.581	0.000	-6.000	11.780	1.144	1.121
LC5 -LU - 4	115.581	0.000	-10.000	7.990	1.057	1.040
LC6 -LU - 1	95.922	0.000	-5.000	28.750	1.152	1.126
LC6 -LU - 2	95.922	0.000	-10.000	19.490	1.144	1.127
LC10 -LU - 1	96.910	0.000	-5.500	24.800	1.062	1.040
LC10 -LU - 2	96.910	0.000	-5.500	25.000	1.071	1.048
LC7 -LU - 1	71.688	1.500	-3.500	6.500	1.811	1.796
LC7 -LU - 2	71.688	1.500	-3.500	5.800	1.726	1.701
LC7 -LU - 3	71.688	1.500	-3.500	5.350	1.737	1.704
LC8 -LU - 1	136.650	1.000	-2.000	11.850	1.276	1.228
LC8 -LU - 2	136.650	1.000	-2.000	12.000	1.293	1.246
LC8 -LU - 3	133.902	1.000	-4.000	10.750	1.272	1.229
LC8 -LU - 4	133.902	1.000	-4.000	10.550	1.249	1.206
LC8 -LU - 5	136.017	1.000	-6.000	8.900	1.214	1.177
LC8 -LU - 6	136.017	1.000	-6.000	9.350	1.274	1.233
LC9 -LU - 1	115.903	-0.380	-3.940	14.000	1.052	1.011
LC9 -LU - 2	115.903	-0.380	-6.000	10.100	0.927	0.898
LC9 -LU - 3	117.081	-0.380	-6.000	10.600	0.958	0.928
LC9 -LU - 4	117.081	-0.630	-3.940	11.700	0.942	0.911
A71	463.000	0.000	0.000	3.600	1.026	0.968
A74	463.800	0.000	0.000	3.640	1.025	0.968

TABLE C52 (CONT.)
ALL TEST RESULTS
FROM PEKOZ (1987), TABLES 3.3-2 , 3.3-3 , 3.3-4 , 7.3-2 , 7.3-3 , 7.3-4 , 7.3-5

Specimen	wmax/t	ex	ey	Ptest	rc	ra
A75	463.000	0.000	0.000	3.480	0.983	0.926
A76	446.385	0.000	0.000	3.260	0.967	0.921
A101	311.000	0.000	0.000	8.300	1.086	1.022
A102	311.000	0.000	0.000	7.870	1.037	0.975
A103	310.459	0.000	0.000	8.340	1.103	1.037
A104	301.000	0.000	0.000	7.760	0.753	0.740
A151	198.719	0.000	0.000	17.200	1.114	1.029
A152	202.964	0.000	0.000	15.700	1.054	0.974
A153	210.630	0.000	0.000	16.000	1.137	1.055
A154	207.182	0.000	0.000	16.400	1.150	1.077
A156	206.273	0.000	0.000	15.500	1.078	0.998
L1	116.937	0.290	0.000	3.120	1.095	1.047
L2	116.406	0.290	0.000	3.600	1.062	1.034
L3	118.406	0.400	0.000	3.520	0.967	0.934
L4	117.437	0.400	0.000	3.780	0.979	0.952
L5	117.031	0.410	0.000	4.100	1.015	0.995
L6	149.312	0.070	0.000	3.800	1.155	1.098
L7	147.500	0.070	0.000	3.970	1.097	1.050
L8	147.625	0.070	0.000	4.310	1.094	1.059
L9	149.219	0.180	0.000	4.340	1.072	1.028
L10	148.719	0.190	0.000	4.570	1.070	1.036
L11	147.937	0.190	0.000	4.650	1.038	1.015
L12	178.906	0.180	0.000	3.350	1.147	1.098
L13	179.250	0.180	0.000	3.530	1.100	1.060
L14	178.687	0.180	0.000	3.850	1.129	1.097
L15	181.406	0.000	0.000	4.900	1.109	1.058
L16	181.406	0.000	0.000	5.180	1.104	1.066
L17	179.031	0.000	0.000	5.310	1.077	1.051
L18	211.031	0.220	0.000	3.130	1.155	1.106
L19	210.000	0.220	0.000	3.390	1.141	1.101
L20	210.594	0.220	0.000	3.670	1.136	1.105
Mean					1.248	1.215
c.o.v.					0.212	0.221
I					0.946	0.906
F. S.					1.622	1.692

TABLE C53
ALL TEST RESULTS
FROM PEKOZ (1987), TABLES 3.3-2 , 3.3-3 , 3.3-4 , 7.3-2 , 7.3-3 , 7.3-4 , 7.3-5

(Using calculated average yield stress - all sections)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC1 -LS - 1	31.744	-1.500	0.000	12.750	1.459	1.460
LC1 -LS - 2	31.744	-1.500	0.000	11.250	1.333	1.335
LC1 -LS - 3	31.744	-1.500	0.000	9.450	1.168	1.171
LC2 -LS - 1	16.515	2.000	0.000	22.000	1.809	1.787
LC2 -LS - 2	16.515	2.250	0.000	18.650	1.750	1.724
LC2 -LS - 3	16.515	2.250	0.000	17.600	1.725	1.692
LC3 -LS - 1	33.233	0.000	-1.450	8.900	1.297	1.254
LC3 -LS - 2	33.685	0.000	-2.000	7.800	1.340	1.320
LC3 -LS - 3	33.685	0.000	-2.000	7.200	1.319	1.283
LC3 -LS - 4	33.685	0.000	-2.000	7.100	1.406	1.355
LC4 -LS - 1	27.111	0.000	-2.500	11.600	1.306	1.280
LC4 -LS - 2	27.111	0.000	-2.500	10.500	1.290	1.248
LC5 -LS - 1	16.394	0.000	-2.030	19.000	1.176	1.144
LC5 -LS - 2	16.394	0.000	-2.000	17.200	1.210	1.148
LC6 -LS - 1	31.293	0.000	-2.380	10.300	1.558	1.556
LC6 -LS - 2	31.293	0.000	-2.130	10.500	1.542	1.522
LC7 -LS - 1	24.152	0.000	-2.250	23.400	1.333	1.308
LC7 -LS - 2	16.576	0.000	-2.220	21.700	1.895	1.816
LC8 -LS - 1	42.818	0.000	-1.500	16.800	1.387	1.385
LC8 -LS - 2	42.818	0.000	-1.500	16.200	1.359	1.356
LC8 -LS - 3	42.818	0.000	-1.500	15.500	1.330	1.325
LC8 -LS - 4	43.421	0.000	-1.660	13.800	1.290	1.281
LC8 -LS - 5	43.421	0.000	-2.000	12.300	1.324	1.288
LC9 -LS - 1	26.788	-1.500	-2.000	11.500	1.418	1.409
LC9 -LS - 2	26.788	-1.500	-2.000	11.150	1.459	1.456
LC9 -LS - 3	26.788	-1.500	-2.000	9.950	1.425	1.388
LC10 -LS - 3	31.950	2.000	-2.500	16.400	1.748	1.717
LC11 -LS - 1	31.079	-2.000	-2.500	7.900	1.692	1.692
LC11 -LS - 2	31.079	-2.500	-2.000	7.400	1.686	1.686
LC11 -LS - 3	31.079	-2.000	-2.500	6.800	1.578	1.574
LC1 -LU - 1	85.534	0.000	-2.100	18.740	1.197	1.158
LC1 -LU - 2	85.534	0.000	-12.000	6.800	1.164	1.151
LC1 -LU - 3	85.534	0.000	-6.000	12.320	1.311	1.285
LC2 -LU - 1	174.600	0.000	-6.000	5.760	1.125	1.108
LC2 -LU - 2	174.300	0.000	-9.000	4.290	1.029	1.017
LC3 -LU - 1	131.828	0.000	-4.000	8.000	0.956	0.943
LC3 -LU - 2	132.569	0.000	-8.000	6.350	1.099	1.089
LC3 -LU - 3	131.345	0.000	-4.000	8.500	1.016	1.001
LC4 -LU - 1	134.311	0.000	-12.000	7.720	1.046	1.032
LC4 -LU - 2	134.311	0.000	-18.000	5.180	0.937	0.928
LC4 -LU - 3	140.603	0.000	-6.000	10.660	1.025	1.005
LC5 -LU - 1	117.934	0.000	-4.000	13.690	1.103	1.075
LC5 -LU - 2	117.934	0.000	-8.000	9.320	1.081	1.063
LC5 -LU - 3	115.581	0.000	-6.000	11.780	1.126	1.103
LC5 -LU - 4	115.581	0.000	-10.000	7.990	1.039	1.023
LC6 -LU - 1	95.922	0.000	-5.000	28.750	1.129	1.102
LC6 -LU - 2	95.922	0.000	-10.000	19.490	1.120	1.102
LC10 -LU - 1	96.910	0.000	-5.500	24.800	1.040	1.018
LC10 -LU - 2	96.910	0.000	-5.500	25.000	1.049	1.026
LC7 -LU - 1	71.688	1.500	-3.500	6.500	1.747	1.729
LC7 -LU - 2	71.688	1.500	-3.500	5.800	1.667	1.643
LC7 -LU - 3	71.688	1.500	-3.500	5.350	1.682	1.656
LC8 -LU - 1	136.650	1.000	-2.000	11.850	1.261	1.214
LC8 -LU - 2	136.650	1.000	-2.000	12.000	1.279	1.231
LC8 -LU - 3	133.902	1.000	-4.000	10.750	1.257	1.213
LC8 -LU - 4	133.902	1.000	-4.000	10.550	1.234	1.191
LC8 -LU - 5	136.017	1.000	-6.000	8.900	1.201	1.163
LC8 -LU - 6	136.017	1.000	-6.000	9.350	1.260	1.221
LC9 -LU - 1	115.903	-0.380	-3.940	14.000	1.042	1.002
LC9 -LU - 2	115.903	-0.380	-6.000	10.100	0.919	0.890
LC9 -LU - 3	117.081	-0.380	-6.000	10.600	0.949	0.920
LC9 -LU - 4	117.081	-0.630	-3.940	11.700	0.934	0.903
A71	463.000	0.000	0.000	3.600	1.023	0.965

TABLE 53(CONT.)
ALL TEST RESULTS
FROM PEKOZ (1987), TABLES 3.3-2 , 3.3-3 , 3.3-4 , 7.3-2 , 7.3-3 , 7.3-4 , 7.3-5

Specimen	wmax/t	ex	ey	Ptest	rc	ra
A74	463.800	0.000	0.000	3.640	1.022	0.966
A75	463.000	0.000	0.000	3.480	0.980	0.923
A76	446.385	0.000	0.000	3.260	0.962	0.918
A101	311.000	0.000	0.000	8.300	1.082	1.017
A102	311.000	0.000	0.000	7.870	1.033	0.970
A103	310.459	0.000	0.000	8.340	1.099	1.032
A104	301.000	0.000	0.000	7.760	0.750	0.737
A151	198.719	0.000	0.000	17.200	1.106	1.020
A152	202.964	0.000	0.000	15.700	1.046	0.966
A153	210.630	0.000	0.000	16.000	1.130	1.046
A154	207.182	0.000	0.000	16.400	1.141	1.068
A156	206.273	0.000	0.000	15.500	1.070	0.990
L1	116.937	0.290	0.000	3.120	1.083	1.037
L2	116.406	0.290	0.000	3.600	1.047	1.020
L3	118.406	0.400	0.000	3.520	0.959	0.924
L4	117.437	0.400	0.000	3.780	0.972	0.943
L5	117.031	0.410	0.000	4.100	1.005	0.983
L6	149.312	0.070	0.000	3.800	1.145	1.089
L7	147.500	0.070	0.000	3.970	1.085	1.039
L8	147.625	0.070	0.000	4.310	1.083	1.049
L9	149.219	0.180	0.000	4.340	1.064	1.021
L10	148.719	0.190	0.000	4.570	1.060	1.027
L11	147.937	0.190	0.000	4.650	1.029	1.006
L12	178.906	0.180	0.000	3.350	1.139	1.088
L13	179.250	0.180	0.000	3.530	1.090	1.047
L14	178.687	0.180	0.000	3.850	1.116	1.088
L15	181.406	0.000	0.000	4.900	1.101	1.051
L16	181.406	0.000	0.000	5.180	1.095	1.057
L17	179.031	0.000	0.000	5.310	1.068	1.041
L18	211.031	0.220	0.000	3.130	1.147	1.094
L19	210.000	0.220	0.000	3.390	1.130	1.090
L20	210.594	0.220	0.000	3.670	1.126	1.096
Mean					1.217	1.185
c.o.v.					0.195	0.204
I					0.948	0.909
F. S.					1.617	1.687

TABLE C54
ALL TEST RESULTS
FROM PEKOZ (1987), TABLES 3.3-2 , 3.3-3 , 3.3-4 , 7.3-2 , 7.3-3 , 7.3-4 , 7.3-5

(Using calculated average yield stress)

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC1 -LS - 1	31.744	-1.500	0.000	12.750	1.459	1.460
LC1 -LS - 2	31.744	-1.500	0.000	11.250	1.333	1.335
LC1 -LS - 3	31.744	-1.500	0.000	9.450	1.168	1.171
LC2 -LS - 1	16.515	2.000	0.000	22.000	1.809	1.787
LC2 -LS - 2	16.515	2.250	0.000	18.650	1.750	1.724
LC2 -LS - 3	16.515	2.250	0.000	17.600	1.725	1.692
LC3 -LS - 1	33.233	0.000	-1.450	8.900	1.297	1.254
LC3 -LS - 2	33.685	0.000	-2.000	7.800	1.340	1.320
LC3 -LS - 3	33.685	0.000	-2.000	7.200	1.319	1.283
LC3 -LS - 4	33.685	0.000	-2.000	7.100	1.406	1.355
LC4 -LS - 1	27.111	0.000	-2.500	11.600	1.306	1.280
LC4 -LS - 2	27.111	0.000	-2.500	10.500	1.290	1.248
LC5 -LS - 1	16.394	0.000	-2.030	19.000	1.176	1.145
LC5 -LS - 2	16.394	0.000	-2.000	17.200	1.210	1.148
LC6 -LS - 1	31.293	0.000	-2.380	10.300	1.558	1.556
LC6 -LS - 2	31.293	0.000	-2.130	10.500	1.542	1.522
LC7 -LS - 1	24.152	0.000	-2.250	23.400	1.333	1.308
LC7 -LS - 2	16.576	0.000	-2.220	21.700	1.895	1.816
LC8 -LS - 1	42.818	0.000	-1.500	16.800	1.387	1.385
LC8 -LS - 2	42.818	0.000	-1.500	16.200	1.359	1.356
LC8 -LS - 3	42.818	0.000	-1.500	15.500	1.330	1.325
LC8 -LS - 4	43.421	0.000	-1.660	13.800	1.290	1.281
LC8 -LS - 5	43.421	0.000	-2.000	12.300	1.324	1.288
LC9 -LS - 1	26.788	-1.500	-2.000	11.500	1.418	1.409
LC9 -LS - 2	26.788	-1.500	-2.000	11.150	1.459	1.456
LC9 -LS - 3	26.788	-1.500	-2.000	9.950	1.425	1.388
LC10 -LS - 3	31.950	2.000	-2.500	16.400	1.748	1.717
LC11 -LS - 1	31.079	-2.000	-2.500	7.900	1.692	1.692
LC11 -LS - 2	31.079	-2.500	-2.000	7.400	1.686	1.686
LC11 -LS - 3	31.079	-2.000	-2.500	6.800	1.578	1.574
LC1 -LU - 1	85.534	0.000	-2.100	18.740	1.227	1.189
LC1 -LU - 2	85.534	0.000	-12.000	6.800	1.164	1.128
LC1 -LU - 3	85.534	0.000	-6.000	12.320	1.342	1.318
LC2 -LU - 1	174.600	0.000	-6.000	5.760	1.136	1.121
LC2 -LU - 2	174.300	0.000	-9.000	4.290	1.039	1.029
LC3 -LU - 1	131.828	0.000	-4.000	8.000	0.965	0.952
LC3 -LU - 2	132.569	0.000	-8.000	6.350	1.110	1.099
LC3 -LU - 3	131.345	0.000	-4.000	8.500	1.024	1.011
LC4 -LU - 1	134.311	0.000	-12.000	7.720	1.059	1.045
LC4 -LU - 2	134.311	0.000	-18.000	5.180	0.949	0.940
LC4 -LU - 3	140.603	0.000	-6.000	10.660	1.037	1.017
LC5 -LU - 1	117.934	0.000	-4.000	13.690	1.118	1.090
LC5 -LU - 2	117.934	0.000	-8.000	9.320	1.095	1.076
LC5 -LU - 3	115.581	0.000	-6.000	11.780	1.144	1.121
LC5 -LU - 4	115.581	0.000	-10.000	7.990	1.057	1.040
LC6 -LU - 1	95.922	0.000	-5.000	28.750	1.152	1.126
LC6 -LU - 2	95.922	0.000	-10.000	19.490	1.144	1.127
LC10 -LU - 1	96.910	0.000	-5.500	24.800	1.062	1.040
LC10 -LU - 2	96.910	0.000	-5.500	25.000	1.071	1.048
LC7 -LU - 1	71.688	1.500	-3.500	6.500	1.747	1.729
LC7 -LU - 2	71.688	1.500	-3.500	5.800	1.667	1.643
LC7 -LU - 3	71.688	1.500	-3.500	5.350	1.682	1.656
LC8 -LU - 1	136.650	1.000	-2.000	11.850	1.276	1.228
LC8 -LU - 2	136.650	1.000	-2.000	12.000	1.293	1.246
LC8 -LU - 3	133.902	1.000	-4.000	10.750	1.272	1.229
LC8 -LU - 4	133.902	1.000	-4.000	10.550	1.249	1.206
LC8 -LU - 5	136.017	1.000	-6.000	8.900	1.214	1.177
LC8 -LU - 6	136.017	1.000	-6.000	9.350	1.274	1.233
LC9 -LU - 1	115.903	-0.380	-3.940	14.000	1.052	1.011
LC9 -LU - 2	115.903	-0.380	-6.000	10.100	0.927	0.898
LC9 -LU - 3	117.081	-0.380	-6.000	10.600	0.958	0.928
LC9 -LU - 4	117.081	-0.630	-3.940	11.700	0.942	0.911
A71	463.000	0.000	0.000	3.600	1.026	0.968

TABLE C54(CONT)
ALL TEST RESULTS
FROM PEKOZ (1987), TABLES 3.3-2 , 3.3-3 , 3.3-4 , 7.3-2 , 7.3-3 , 7.3-4 , 7.3-5

Specimen	wmax/t	ex	ey	Ptest	rc	ra
A74	463.800	0.000	0.000	3.640	1.025	0.968
A75	463.000	0.000	0.000	3.480	0.983	0.926
A76	446.385	0.000	0.000	3.260	0.967	0.921
A101	311.000	0.000	0.000	8.300	1.086	1.022
A102	311.000	0.000	0.000	7.870	1.037	0.975
A103	310.459	0.000	0.000	8.340	1.103	1.037
A104	301.000	0.000	0.000	7.760	0.753	0.740
A151	198.719	0.000	0.000	17.200	1.114	1.029
A152	202.964	0.000	0.000	15.700	1.054	0.974
A153	210.630	0.000	0.000	16.000	1.137	1.055
A154	207.182	0.000	0.000	16.400	1.150	1.077
A156	206.273	0.000	0.000	15.500	1.078	0.998
L1	116.937	0.290	0.000	3.120	1.095	1.047
L2	116.406	0.290	0.000	3.600	1.062	1.034
L3	118.406	0.400	0.000	3.520	0.967	0.934
L4	117.437	0.400	0.000	3.780	0.979	0.952
L5	117.031	0.410	0.000	4.100	1.015	0.995
L6	149.312	0.070	0.000	3.800	1.155	1.098
L7	147.500	0.070	0.000	3.970	1.097	1.050
L8	147.625	0.070	0.000	4.310	1.094	1.059
L9	149.219	0.180	0.000	4.340	1.072	1.028
L10	148.719	0.190	0.000	4.570	1.070	1.036
L11	147.937	0.190	0.000	4.650	1.038	1.015
L12	178.906	0.180	0.000	3.350	1.147	1.098
L13	179.250	0.180	0.000	3.530	1.100	1.060
L14	178.687	0.180	0.000	3.850	1.129	1.097
L15	181.406	0.000	0.000	4.900	1.109	1.058
L16	181.406	0.000	0.000	5.180	1.104	1.066
L17	179.031	0.000	0.000	5.310	1.077	1.051
L18	211.031	0.220	0.000	3.130	1.155	1.106
L19	210.000	0.220	0.000	3.390	1.141	1.101
L20	210.594	0.220	0.000	3.670	1.136	1.105
Mean					1.224	1.192
c.o.v.					0.191	0.200
I					0.960	0.921
F. S.					1.597	1.666

APPENDIX D - CORRELATION USING AISC-LRFD BEAM COLUMN INTERACTION EQUATIONS

TABLE D1
BOX SECTIONS OF DEWOLF, PEKOZ AND WINTE)
USING LRFD BEAM COLUMN EQUATION
(Using yield stress of flats))
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	Ptest	rc
S1	58.345	34.830	1.150
S1	58.345	32.164	1.144
S1	58.345	29.756	1.252
S1	58.345	17.974	1.158
S2	84.207	34.917	1.126
S2	84.207	28.016	1.115
S2	84.207	21.424	1.151
S2	84.207	17.716	1.210
S3	118.690	36.918	1.173
S3	118.690	35.028	1.149
S3	118.690	19.530	1.104
S3	118.690	19.026	1.075
S3	118.690	18.144	1.025
S4	153.172	36.654	1.154
S4	153.172	33.674	1.147
S4	153.172	29.204	1.121
S4	153.172	17.582	1.044
S4	153.172	13.708	1.052
Mean			1.131
c.o.v.			0.050
I			1.036
FS			1.481

TABLE D2
BACK TO BACK CHANNELS OF DEWOLF, PEKOZ AND WINTER (1973)
USING LRFD INTERACTION EQUATIONS
(Using yield stress of flats)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	Ptest	rc
U1	16.241	24.747	1.175
U1	16.241	21.413	1.188
U1	16.241	20.453	1.467
U1	16.241	12.204	1.194
U2	20.552	26.166	1.215
U2	20.552	25.418	1.181
U2	20.552	24.048	1.282
U2	20.552	20.434	1.377
U2	20.552	15.014	1.267
U3	24.862	26.968	1.233
U3	24.862	23.563	1.174
U3	24.862	22.745	1.410
U3	24.862	17.978	1.302
U4	29.172	27.491	1.243
U4	29.172	23.426	1.166
U4	29.172	20.101	1.393
Mean			1.267
c.o.v.			0.076
I			1.141
FS			1.344

TABLE D3
TEST RESULTS OF WENG AND PEKOZ (1987)

(Using yield stress of flats)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
RFC11 #1	21.908	0.000	0.000	32.300	1.072	1.026
RFC11 #2	21.840	0.000	0.000	30.300	1.144	1.051
RFC11 #3	21.790	0.000	0.000	28.500	1.255	1.106
RFC11 #4	21.891	0.000	0.000	19.700	1.082	0.924
RFC13 #1	26.771	0.000	0.000	30.200	0.999	0.947
RFC13 #2	26.688	0.000	0.000	29.200	1.122	1.014
RFC13 #3	26.698	0.000	0.000	23.800	1.140	0.984
RFC13 #4	26.635	0.000	0.000	17.000	1.069	0.918
RFC14 #1	31.987	0.000	0.000	25.300	0.979	0.944
RFC14 #2	32.133	0.000	0.000	22.300	0.983	0.895
RFC14 #3	32.000	0.000	0.000	16.400	0.880	0.766
RFC14 #4	32.107	0.000	0.000	12.700	0.866	0.739
RFC14 #5	31.907	0.000	0.000	9.700	0.921	0.808
PBC13 #1	29.103	0.000	0.000	18.000	0.886	0.850
PBC13 #2	29.253	0.000	0.000	17.500	0.965	0.890
PBC13 #3	29.184	0.000	0.000	16.000	1.046	0.922
PBC14 #1	35.873	0.000	0.000	16.100	1.005	0.967
PBC14 #2	35.789	0.000	0.000	15.600	1.092	1.012
PBC14 #3	35.817	0.000	0.000	13.000	1.048	0.933
PBC14 #4	35.389	0.000	0.000	11.200	1.079	0.927
PBC14 #5	35.972	0.000	0.000	9.700	1.181	1.013
R13 #1	27.884	0.000	0.000	26.200	1.043	0.989
R13 #2	27.860	0.000	0.000	23.800	1.113	1.005
R13 #3	27.953	0.000	0.000	17.800	1.019	0.880
R13 #4	27.965	0.000	0.000	13.200	1.009	0.867
R13 #5	27.907	0.000	0.000	10.100	1.007	0.883
R14 #1	32.413	0.000	0.000	23.200	1.050	0.997
R14 #2	32.267	0.000	0.000	19.400	1.009	0.916
R14 #3	32.373	0.000	0.000	15.400	0.982	0.852
R14 #4	32.413	0.000	0.000	11.600	0.959	0.820
R14 #5	32.280	0.000	0.000	8.500	0.942	0.827
P11 #1	38.517	0.000	0.000	34.200	1.005	0.950
P11 #2	38.568	0.000	0.000	30.400	1.017	0.923
P11 #3	37.603	0.000	0.000	27.800	0.978	0.852
P11 #4	37.570	0.000	0.000	22.300	0.975	0.832
P16 #1	36.391	0.000	0.000	11.200	0.996	0.938
P16 #2	36.469	0.000	0.000	10.400	1.040	0.944
P16 #3	36.484	0.000	0.000	8.000	0.982	0.858
P16 #4	36.297	0.000	0.000	6.900	0.996	0.850
P16 #5	36.328	0.000	0.000	6.200	1.044	0.899
Mean					1.024	0.918
c.o.v.					0.078	0.086
I					0.922	0.820
FS					1.663	1.869

TABLE D4
TEST RESULTS OF WENG AND PEKOZ (1987)

(Using calculated average yield stress - all sections)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
RFC11 #1	21.908	0.000	0.000	32.300	0.978	0.933
RFC11 #2	21.840	0.000	0.000	30.300	1.058	0.965
RFC11 #3	21.790	0.000	0.000	28.500	1.182	1.032
RFC11 #4	21.891	0.000	0.000	19.700	1.043	0.890
RFC13 #1	26.771	0.000	0.000	30.200	0.999	0.947
RFC13 #2	26.688	0.000	0.000	29.200	1.122	1.014
RFC13 #3	26.698	0.000	0.000	23.800	1.140	0.984
RFC13 #4	26.635	0.000	0.000	17.000	1.069	0.918
RFC14 #1	31.987	0.000	0.000	25.300	0.923	0.888
RFC14 #2	32.133	0.000	0.000	22.300	0.921	0.850
RFC14 #3	32.000	0.000	0.000	16.400	0.840	0.726
RFC14 #4	32.107	0.000	0.000	12.700	0.846	0.725
RFC14 #5	31.907	0.000	0.000	9.700	0.921	0.808
PBC13 #1	29.103	0.000	0.000	18.000	0.822	0.785
PBC13 #2	29.253	0.000	0.000	17.500	0.905	0.829
PBC13 #3	29.184	0.000	0.000	16.000	0.994	0.871
PBC14 #1	35.873	0.000	0.000	16.100	0.933	0.895
PBC14 #2	35.789	0.000	0.000	15.600	1.024	0.943
PBC14 #3	35.817	0.000	0.000	13.000	0.995	0.880
PBC14 #4	35.389	0.000	0.000	11.200	1.041	0.891
PBC14 #5	35.972	0.000	0.000	9.700	1.162	1.006
R13 #1	27.884	0.000	0.000	26.200	0.950	0.896
R13 #2	27.860	0.000	0.000	23.800	1.032	0.923
R13 #3	27.953	0.000	0.000	17.800	0.968	0.831
R13 #4	27.965	0.000	0.000	13.200	0.991	0.864
R13 #5	27.907	0.000	0.000	10.100	1.007	0.883
R14 #1	32.413	0.000	0.000	23.200	0.973	0.934
R14 #2	32.267	0.000	0.000	19.400	0.944	0.850
R14 #3	32.373	0.000	0.000	15.400	0.937	0.807
R14 #4	32.413	0.000	0.000	11.600	0.939	0.810
R14 #5	32.280	0.000	0.000	8.500	0.942	0.827
P11 #1	38.517	0.000	0.000	34.200	0.920	0.865
P11 #2	38.568	0.000	0.000	30.400	0.945	0.850
P11 #3	37.603	0.000	0.000	27.800	0.930	0.805
P11 #4	37.570	0.000	0.000	22.300	0.948	0.810
P16 #1	36.391	0.000	0.000	11.200	0.996	0.938
P16 #2	36.469	0.000	0.000	10.400	1.040	0.944
P16 #3	36.484	0.000	0.000	8.000	0.941	0.816
P16 #4	36.297	0.000	0.000	6.900	0.996	0.850
P16 #5	36.328	0.000	0.000	6.200	1.044	0.899
Mean					0.984	0.880
c.o.v.					0.082	0.081
I					0.882	0.789
FS					1.738	1.943

TABLE D5
TEST RESULTS OF WENG AND PEKOZ (1987)

(Using calculated average yield stress)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
RFC11 #1	21.908	0.000	0.000	32.300	0.978	0.933
RFC11 #2	21.840	0.000	0.000	30.300	1.058	0.965
RFC11 #3	21.790	0.000	0.000	28.500	1.182	1.032
RFC11 #4	21.891	0.000	0.000	19.700	1.043	0.890
RFC13 #1	26.771	0.000	0.000	30.200	0.999	0.947
RFC13 #2	26.688	0.000	0.000	29.200	1.122	1.014
RFC13 #3	26.698	0.000	0.000	23.800	1.140	0.984
RFC13 #4	26.635	0.000	0.000	17.000	1.069	0.918
RFC14 #1	31.987	0.000	0.000	25.300	0.979	0.944
RFC14 #2	32.133	0.000	0.000	22.300	0.921	0.850
RFC14 #3	32.000	0.000	0.000	16.400	0.840	0.700
RFC14 #4	32.107	0.000	0.000	12.700	0.846	0.721
RFC14 #5	31.907	0.000	0.000	9.700	0.921	0.808
PBC13 #1	29.103	0.000	0.000	18.000	0.822	0.743
PBC13 #2	29.253	0.000	0.000	17.500	0.905	0.789
PBC13 #3	29.184	0.000	0.000	16.000	0.994	0.838
PBC14 #1	35.873	0.000	0.000	16.100	0.933	0.853
PBC14 #2	35.789	0.000	0.000	15.600	1.024	0.895
PBC14 #3	35.817	0.000	0.000	13.000	0.995	0.842
PBC14 #4	35.389	0.000	0.000	11.200	1.041	0.867
PBC14 #5	35.972	0.000	0.000	9.700	1.162	1.006
R13 #1	27.884	0.000	0.000	26.200	0.950	0.836
R13 #2	27.860	0.000	0.000	23.800	1.032	0.872
R13 #3	27.953	0.000	0.000	17.800	0.968	0.802
R13 #4	27.965	0.000	0.000	13.200	0.991	0.864
R13 #5	27.907	0.000	0.000	10.100	1.007	0.883
R14 #1	32.413	0.000	0.000	23.200	0.973	0.934
R14 #2	32.267	0.000	0.000	19.400	0.944	0.810
R14 #3	32.373	0.000	0.000	15.400	0.937	0.779
R14 #4	32.413	0.000	0.000	11.600	0.939	0.809
R14 #5	32.280	0.000	0.000	8.500	0.942	0.827
P11 #1	38.517	0.000	0.000	34.200	0.920	0.803
P11 #2	38.568	0.000	0.000	30.400	0.945	0.795
P11 #3	37.603	0.000	0.000	27.800	0.930	0.771
P11 #4	37.570	0.000	0.000	22.300	0.948	0.801
P16 #1	36.391	0.000	0.000	11.200	0.996	0.938
P16 #2	36.469	0.000	0.000	10.400	1.040	0.944
P16 #3	36.484	0.000	0.000	8.000	0.941	0.787
P16 #4	36.297	0.000	0.000	6.900	0.996	0.850
P16 #5	36.328	0.000	0.000	6.200	1.044	0.899
Mean					0.985	0.864
c.o.v.					0.081	0.094
I					0.884	0.766
FS					1.734	2.001

TABLE D6
HAT SECTIONS OF DAT AND PEKOZ (1980)

(Using yield stress of flats)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
H11 -E1	3.917	0.000	0.000	18.500	1.148	1.081
H11 -E3	3.917	0.000	0.000	18.200	1.345	1.203
H11 -E4	3.917	0.000	0.000	11.800	1.197	1.022
H11 -E5	3.917	0.000	0.000	7.000	1.124	0.986
H11 -E2	3.917	0.000	0.000	15.700	1.040	0.959
H7 -F1	4.804	0.000	0.000	45.000	1.229	1.148
H7 -F2	4.804	0.000	0.000	41.800	1.273	1.151
H7 -F3	4.804	0.000	0.000	39.600	1.272	1.134
H7 -F4	4.804	0.000	0.000	39.400	1.323	1.167
H7 -F5	4.804	0.000	0.000	30.900	1.160	1.003
HT -G1	3.333	0.000	0.000	97.400	1.040	0.967
HT -G1	3.333	0.000	0.000	78.000	1.007	0.889
HT -G3	3.333	0.000	0.000	65.800	1.120	0.956
HT -G4	3.333	0.000	0.000	42.750	1.115	0.978
HT -G5	3.333	0.000	0.000	35.400	1.089	0.954
Mean					1.165	1.040
c.o.v.					0.090	0.094
I					1.038	0.922
FS					1.477	1.662

TABLE D7
HAT SECTIONS OF DAT AND PEKOZ (1980)

(Using calculated average yield stress - all sectio)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
H11 -E1	3.917	0.000	0.000	18.500	1.148	1.081
H11 -E3	3.917	0.000	0.000	18.200	1.345	1.203
H11 -E4	3.917	0.000	0.000	11.800	1.197	1.022
H11 -E5	3.917	0.000	0.000	7.000	1.124	0.986
H11 -E2	3.917	0.000	0.000	15.700	1.040	0.959
H7 -F1	4.804	0.000	0.000	45.000	1.229	1.148
H7 -F2	4.804	0.000	0.000	41.800	1.273	1.151
H7 -F3	4.804	0.000	0.000	39.600	1.272	1.134
H7 -F4	4.804	0.000	0.000	39.400	1.323	1.167
H7 -F5	4.804	0.000	0.000	30.900	1.160	1.003
HT -G1	3.333	0.000	0.000	97.400	1.040	0.967
HT -G1	3.333	0.000	0.000	78.000	1.007	0.889
HT -G3	3.333	0.000	0.000	65.800	1.120	0.956
HT -G4	3.333	0.000	0.000	42.750	1.115	0.978
HT -G5	3.333	0.000	0.000	35.400	1.089	0.954
Mean					1.165	1.040
c.o.v.					0.090	0.094
I					1.038	0.922
FS					1.477	1.662

TABLE D8
HAT SECTIONS OF DAT AND PEKOZ (1980)

(Using calculated average yield stress)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
H11 -E1	3.917	0.000	0.000	18.500	0.985	0.917
H11 -E3	3.917	0.000	0.000	18.200	1.197	1.053
H11 -E4	3.917	0.000	0.000	11.800	1.136	0.975
H11 -E5	3.917	0.000	0.000	7.000	1.124	0.986
H11 -E2	3.917	0.000	0.000	15.700	0.904	0.822
H7 -F1	4.804	0.000	0.000	45.000	1.042	0.960
H7 -F2	4.804	0.000	0.000	41.800	1.107	0.983
H7 -F3	4.804	0.000	0.000	39.600	1.120	0.980
H7 -F4	4.804	0.000	0.000	39.400	1.176	1.020
H7 -F5	4.804	0.000	0.000	30.900	1.059	0.904
HT -G1	3.333	0.000	0.000	97.400	1.003	0.930
HT -G1	3.333	0.000	0.000	78.000	0.980	0.862
HT -G3	3.333	0.000	0.000	65.800	1.104	0.942
HT -G4	3.333	0.000	0.000	42.750	1.115	0.978
HT -G5	3.333	0.000	0.000	35.400	1.089	0.954
Mean					1.076	0.951
c.o.v.					0.074	0.062
I					0.971	0.866
FS					1.580	1.772

TABLE D9
LIPPED CHANNELS OF DAT AND PEKOZ (1980)

(Using yield stress of flats)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
PBC14 -A3	34.247	0.000	0.000	20.200	1.065	1.025
PBC14 -A5	34.247	0.000	0.000	19.300	1.137	1.053
PBC14 -A9	34.247	0.000	0.000	13.950	1.044	0.911
PBC14 -A11	34.247	0.000	0.000	11.200	1.034	0.883
PBC14 -A13	34.247	0.000	0.000	10.500	1.165	1.011
PBC14 -A14	34.247	0.000	0.000	8.200	1.171	1.028
PBC14 -A1	34.247	0.000	0.000	19.000	0.963	0.940
PBC14 -A2	34.247	0.000	0.000	16.900	0.891	0.857
PBC14 -A4	34.247	0.000	0.000	16.300	0.904	0.854
PBC14 -A6	34.247	0.000	0.000	14.400	0.848	0.786
PBC14 -A7	34.247	0.000	0.000	13.500	0.853	0.774
PBC14 -A8	34.247	0.000	0.000	13.660	0.934	0.830
PBC14 -A10	34.247	0.000	0.000	10.450	0.864	0.743
PBC14 -A12	34.247	0.000	0.000	9.500	0.990	0.849
RFC14 -B2	34.247	0.000	0.000	19.500	0.945	0.906
RFC14 -B4	34.247	0.000	0.000	18.000	0.984	0.906
RFC14 -B5	34.247	0.000	0.000	16.000	1.032	0.909
RFC14 -B6	34.247	0.000	0.000	15.500	0.999	0.881
RFC14 -B9	34.247	0.000	0.000	8.800	1.028	0.903
RFC14 -B10	34.247	0.000	0.000	8.000	0.935	0.821
RFC14 -B11	34.247	0.000	0.000	9.050	1.177	1.032
RFC14 -B1	34.247	0.000	0.000	18.500	0.896	0.860
RFC14 -B3	34.247	0.000	0.000	16.300	0.891	0.820
RFC14 -B7	34.247	0.000	0.000	14.000	0.903	0.795
RFC14 -B8	34.247	0.000	0.000	11.500	0.914	0.781
PBC13 -C3	27.778	0.000	0.000	26.400	1.321	1.229
PBC13 -C4	27.778	0.000	0.000	21.600	1.244	1.112
PBC13 -C5	27.778	0.000	0.000	15.850	1.091	0.941
PBC13 -C6	27.778	0.000	0.000	9.950	0.979	0.854
PBC13 -C7	27.778	0.000	0.000	7.700	1.121	0.982
PBC13 -C1	27.778	0.000	0.000	35.000	1.580	1.523
PBC13 -C2	27.778	0.000	0.000	23.380	1.056	1.017
RFC13 -D6	27.778	0.000	0.000	29.500	1.467	1.364
RFC13 -D7	27.778	0.000	0.000	24.500	1.302	1.186
RFC13 -D8	27.778	0.000	0.000	23.000	1.318	1.177
RFC13 -D9	27.778	0.000	0.000	20.000	1.248	1.093
RFC13 -D10	27.778	0.000	0.000	16.000	1.097	0.946
RFC13 -D11	27.778	0.000	0.000	13.350	1.015	0.867
RFC13 -D12	27.778	0.000	0.000	12.200	1.039	0.889
RFC13 -D13	27.778	0.000	0.000	9.030	0.994	0.872
RFC13 -D1	27.778	0.000	0.000	34.200	1.463	1.435
RFC13 -D2	27.778	0.000	0.000	17.000	0.734	0.718
RFC13 -D3	27.778	0.000	0.000	35.000	1.569	1.513
RFC13 -D4	27.778	0.000	0.000	22.300	1.000	0.964
RFC13 -D5	27.778	0.000	0.000	34.500	1.621	1.537
Mean					1.085	0.986
c.o.v.					0.193	0.213
I					0.848	0.746
FS					1.809	2.057

TABLE D10
LIPPED CHANNELS OF DAT AND PEKOZ (1980)

(Using calculated average yield stress - all sectio)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
PBC14 -A3	34.247	0.000	0.000	20.200	1.065	1.025
PBC14 -A5	34.247	0.000	0.000	19.300	1.137	1.053
PBC14 -A9	34.247	0.000	0.000	13.950	1.044	0.911
PBC14 -A11	34.247	0.000	0.000	11.200	1.034	0.883
PBC14 -A13	34.247	0.000	0.000	10.500	1.165	1.011
PBC14 -A14	34.247	0.000	0.000	8.200	1.171	1.028
PBC14 -A1	34.247	0.000	0.000	19.000	0.963	0.940
PBC14 -A2	34.247	0.000	0.000	16.900	0.891	0.857
PBC14 -A4	34.247	0.000	0.000	16.300	0.904	0.854
PBC14 -A6	34.247	0.000	0.000	14.400	0.848	0.786
PBC14 -A7	34.247	0.000	0.000	13.500	0.853	0.774
PBC14 -A8	34.247	0.000	0.000	13.660	0.934	0.830
PBC14 -A10	34.247	0.000	0.000	10.450	0.864	0.743
PBC14 -A12	34.247	0.000	0.000	9.500	0.990	0.849
RFC14 -B2	34.247	0.000	0.000	19.500	0.945	0.906
RFC14 -B4	34.247	0.000	0.000	18.000	0.984	0.906
RFC14 -B5	34.247	0.000	0.000	16.000	1.032	0.909
RFC14 -B6	34.247	0.000	0.000	15.500	0.999	0.881
RFC14 -B9	34.247	0.000	0.000	8.800	1.028	0.903
RFC14 -B10	34.247	0.000	0.000	8.000	0.935	0.821
RFC14 -B11	34.247	0.000	0.000	9.050	1.177	1.032
RFC14 -B1	34.247	0.000	0.000	18.500	0.896	0.860
RFC14 -B3	34.247	0.000	0.000	16.300	0.891	0.820
RFC14 -B7	34.247	0.000	0.000	14.000	0.903	0.795
RFC14 -B8	34.247	0.000	0.000	11.500	0.914	0.781
PBC13 -C3	27.778	0.000	0.000	26.400	1.321	1.229
PBC13 -C4	27.778	0.000	0.000	21.600	1.244	1.112
PBC13 -C5	27.778	0.000	0.000	15.850	1.091	0.941
PBC13 -C6	27.778	0.000	0.000	9.950	0.979	0.854
PBC13 -C7	27.778	0.000	0.000	7.700	1.121	0.982
PBC13 -C1	27.778	0.000	0.000	35.000	1.580	1.523
PBC13 -C2	27.778	0.000	0.000	23.380	1.056	1.017
RFC13 -D6	27.778	0.000	0.000	29.500	1.467	1.364
RFC13 -D7	27.778	0.000	0.000	24.500	1.302	1.186
RFC13 -D8	27.778	0.000	0.000	23.000	1.318	1.177
RFC13 -D9	27.778	0.000	0.000	20.000	1.248	1.093
RFC13 -D10	27.778	0.000	0.000	16.000	1.097	0.946
RFC13 -D11	27.778	0.000	0.000	13.350	1.015	0.867
RFC13 -D12	27.778	0.000	0.000	12.200	1.039	0.889
RFC13 -D13	27.778	0.000	0.000	9.030	0.994	0.872
RFC13 -D1	27.778	0.000	0.000	34.200	1.463	1.435
RFC13 -D2	27.778	0.000	0.000	17.000	0.734	0.718
RFC13 -D3	27.778	0.000	0.000	35.000	1.569	1.513
RFC13 -D4	27.778	0.000	0.000	22.300	1.000	0.964
RFC13 -D5	27.778	0.000	0.000	34.500	1.436	1.350
Mean					1.081	0.982
c.o.v.					0.185	0.204
I					0.855	0.753
FS					1.794	2.036

TABLE D11
LIPPED CHANNELS OF DAT AND PEKOZ (1980)

(Using calculated average yield stress)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
PBC14 -A3	34.247	0.000	0.000	20.200	0.942	0.902
PBC14 -A5	34.247	0.000	0.000	19.300	1.022	0.937
PBC14 -A9	34.247	0.000	0.000	13.950	0.973	0.839
PBC14 -A11	34.247	0.000	0.000	11.200	0.994	0.851
PBC14 -A13	34.247	0.000	0.000	10.500	1.153	1.011
PBC14 -A14	34.247	0.000	0.000	8.200	1.171	1.028
PBC14 -A1	34.247	0.000	0.000	19.000	0.847	0.826
PBC14 -A2	34.247	0.000	0.000	16.900	0.788	0.755
PBC14 -A4	34.247	0.000	0.000	16.300	0.805	0.755
PBC14 -A6	34.247	0.000	0.000	14.400	0.762	0.699
PBC14 -A7	34.247	0.000	0.000	13.500	0.774	0.694
PBC14 -A8	34.247	0.000	0.000	13.660	0.859	0.754
PBC14 -A10	34.247	0.000	0.000	10.450	0.817	0.698
PBC14 -A12	34.247	0.000	0.000	9.500	0.967	0.845
RFC14 -B2	34.247	0.000	0.000	19.500	0.888	0.852
RFC14 -B4	34.247	0.000	0.000	18.000	0.931	0.852
RFC14 -B5	34.247	0.000	0.000	16.000	0.988	0.866
RFC14 -B6	34.247	0.000	0.000	15.500	0.957	0.839
RFC14 -B9	34.247	0.000	0.000	8.800	1.028	0.903
RFC14 -B10	34.247	0.000	0.000	8.000	0.935	0.821
RFC14 -B11	34.247	0.000	0.000	9.050	1.177	1.032
RFC14 -B1	34.247	0.000	0.000	18.500	0.842	0.809
RFC14 -B3	34.247	0.000	0.000	16.300	0.843	0.772
RFC14 -B7	34.247	0.000	0.000	14.000	0.865	0.758
RFC14 -B8	34.247	0.000	0.000	11.500	0.889	0.759
PBC13 -C3	27.778	0.000	0.000	26.400	1.173	1.080
PBC13 -C4	27.778	0.000	0.000	21.600	1.130	0.997
PBC13 -C5	27.778	0.000	0.000	15.850	1.020	0.872
PBC13 -C6	27.778	0.000	0.000	9.950	0.974	0.854
PBC13 -C7	27.778	0.000	0.000	7.700	1.121	0.982
PBC13 -C1	27.778	0.000	0.000	35.000	1.380	1.323
PBC13 -C2	27.778	0.000	0.000	23.380	0.922	0.884
RFC13 -D6	27.778	0.000	0.000	29.500	1.311	1.207
RFC13 -D7	27.778	0.000	0.000	24.500	1.174	1.058
RFC13 -D8	27.778	0.000	0.000	23.000	1.204	1.061
RFC13 -D9	27.778	0.000	0.000	20.000	1.154	0.999
RFC13 -D10	27.778	0.000	0.000	16.000	1.030	0.881
RFC13 -D11	27.778	0.000	0.000	13.350	0.969	0.827
RFC13 -D12	27.778	0.000	0.000	12.200	1.009	0.876
RFC13 -D13	27.778	0.000	0.000	9.030	0.994	0.872
RFC13 -D1	27.778	0.000	0.000	34.200	1.277	1.249
RFC13 -D2	27.778	0.000	0.000	17.000	0.641	0.625
RFC13 -D3	27.778	0.000	0.000	35.000	1.379	1.322
RFC13 -D4	27.778	0.000	0.000	22.300	0.879	0.842
RFC13 -D5	27.778	0.000	0.000	34.500	1.436	1.350
Mean					1.009	0.912
c.o.v.					0.178	0.188
I					0.807	0.717
FS					1.901	2.138

TABLE D12
TEST RESULTS OF MULLIGAN AND PEKOZ (1983)
ECCENTRICALLY LOADED COLUMNS

(Using yield stress of flats)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
C1.1	121.500	-0.203	0.000	8.000	1.027	1.010
C2.1	124.170	-0.536	0.000	10.300	1.236	1.206
C2.2	121.708	-0.534	0.000	8.750	0.995	0.970
C2.3	121.167	0.982	0.000	6.750	1.239	1.212
C2.4	121.083	-0.212	0.000	12.400	1.111	1.075
C2.1	184.417	-0.424	0.000	10.400	1.004	0.951
C2.2	183.125	-0.397	0.000	10.000	0.908	0.843
C2.1	175.313	-0.521	0.000	12.500	1.149	1.121
C2.2	175.458	-0.515	0.000	8.750	0.790	0.770
Mean					1.051	1.018
c.o.v.					0.142	0.150
I					0.884	0.847
FS					1.734	1.810

TABLE D13
TEST RESULTS OF MULLIGAN AND PEKOZ (1983)
ECCENTRICALLY LOADED COLUMNS

(Using calculated average yield stress - all sectio)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
C1.1	121.500	-0.203	0.000	8.000	1.006	0.989
C2.1	124.170	-0.536	0.000	10.300	1.223	1.192
C2.2	121.708	-0.534	0.000	8.750	0.984	0.959
C2.3	121.167	0.982	0.000	6.750	1.221	1.195
C2.4	121.083	-0.212	0.000	12.400	1.101	1.065
C2.1	184.417	-0.424	0.000	10.400	0.998	0.944
C2.2	183.125	-0.397	0.000	10.000	0.902	0.835
C2.1	175.313	-0.521	0.000	12.500	1.143	1.114
C2.2	175.458	-0.515	0.000	8.750	0.785	0.765
Mean					1.040	1.006
c.o.v.					0.140	0.149
I					0.877	0.839
FS					1.749	1.828

TABLE D14
TEST RESULTS OF MULLIGAN AND PEKOZ (1983)
ECCENTRICALLY LOADED COLUMNS

(Using calculated average yield stress)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
C1.1	121.500	-0.203	0.000	8.000	1.027	1.010
C2.1	124.170	-0.536	0.000	10.300	1.236	1.206
C2.2	121.708	-0.534	0.000	8.750	0.995	0.970
C2.3	121.167	0.982	0.000	6.750	1.239	1.212
C2.4	121.083	-0.212	0.000	12.400	1.111	1.075
C2.1	184.417	-0.424	0.000	10.400	1.004	0.951
C2.2	183.125	-0.397	0.000	10.000	0.908	0.843
C2.1	175.313	-0.521	0.000	12.500	1.149	1.121
C2.2	175.458	-0.515	0.000	8.750	0.790	0.770
Mean					1.051	1.018
c.o.v.					0.142	0.150
I					0.884	0.847
FS					1.734	1.810

TABLE D15
TEST RESULTS OF MULLIGAN AND PEKOZ (1983)
CONCENTRICALLY LOADED COLUMNS

(Using yield stress of flats)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
C1	130.133	0.000	0.000	9.800	1.111	1.080
C2	129.711	0.000	0.000	10.400	1.209	1.161
C3	127.652	0.000	0.000	8.200	1.153	1.069
C4	129.000	0.000	0.000	8.400	1.233	1.152
C5	121.583	0.000	0.000	11.800	1.232	1.184
C1	195.844	0.000	0.000	9.600	1.228	1.187
C2	196.022	0.000	0.000	8.750	1.241	1.179
C3	200.932	0.000	0.000	7.600	1.265	1.189
C4	182.292	0.000	0.000	10.800	1.353	1.289
C1	87.167	0.000	0.000	11.000	0.997	0.953
C1	175.375	0.000	0.000	12.300	1.122	1.097
C2	175.854	0.000	0.000	12.100	1.076	1.032
C3	175.708	0.000	0.000	11.800	1.067	1.023
Mean					1.176	1.123
c.o.v.					0.083	0.080
I					1.053	1.008
FS					1.456	1.521

TABLE D16
TEST RESULTS OF MULLIGAN AND PEKOZ (1983)
CONCENTRICALLY LOADED COLUMNS

(Using calculated average yield stress - all sectio)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
C1	130.133	0.000	0.000	9.800	1.096	1.066
C2	129.711	0.000	0.000	10.400	1.195	1.147
C3	127.652	0.000	0.000	8.200	1.144	1.059
C4	129.000	0.000	0.000	8.400	1.224	1.141
C5	121.583	0.000	0.000	11.800	1.216	1.168
C1	195.844	0.000	0.000	9.600	1.217	1.174
C2	196.022	0.000	0.000	8.750	1.231	1.168
C3	200.932	0.000	0.000	7.600	1.256	1.180
C4	182.292	0.000	0.000	10.800	1.342	1.275
C1	87.167	0.000	0.000	11.000	0.991	0.946
C1	175.375	0.000	0.000	12.300	1.111	1.087
C2	175.854	0.000	0.000	12.100	1.067	1.021
C3	175.708	0.000	0.000	11.800	1.057	1.013
Mean					1.165	1.111
c.o.v.					0.083	0.080
I					1.044	0.998
FS					1.469	1.536

TABLE D17
TEST RESULTS OF MULLIGAN AND PEKOZ (1983)
CONCENTRICALLY LOADED COLUMNS

(Using calculated average yield stress)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
C1	130.133	0.000	0.000	9.800	1.111	1.080
C2	129.711	0.000	0.000	10.400	1.209	1.161
C3	127.652	0.000	0.000	8.200	1.153	1.069
C4	129.000	0.000	0.000	8.400	1.233	1.152
C5	121.583	0.000	0.000	11.800	1.232	1.184
C1	195.844	0.000	0.000	9.600	1.228	1.187
C2	196.022	0.000	0.000	8.750	1.241	1.179
C3	200.932	0.000	0.000	7.600	1.265	1.189
C4	182.292	0.000	0.000	10.800	1.353	1.289
C1	87.167	0.000	0.000	11.000	0.997	0.953
C1	175.375	0.000	0.000	12.300	1.122	1.097
C2	175.854	0.000	0.000	12.100	1.076	1.032
C3	175.708	0.000	0.000	11.800	1.067	1.023
Mean					1.176	1.123
c.o.v.					0.083	0.080
I					1.053	1.008
FS					1.456	1.521

TABLE D18
HAT SECTIONS OF PEKOZ AND WINTER (1967)
FROM PEKOZ (1987), TABLE 3.3-1

(Using yield stress of flats)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LH1 -LS - 1	20.448	0.100	0.000	3.990	1.489	1.321
LH1 -LS - 2	20.448	0.900	0.000	2.210	1.201	1.116
LH1 -LS - 3	20.448	1.400	0.000	1.570	1.006	0.946
LH2 -LS - 1	25.190	0.000	0.000	3.730	1.381	1.211
LH2 -LS - 2	25.190	1.330	0.000	1.830	1.070	0.989
LH2 -LS - 3	25.190	1.860	0.000	1.290	0.854	0.801
LH3 -LS - 1	17.000	0.000	0.000	3.220	1.400	1.229
LH3 -LS - 2	17.000	0.760	0.000	1.780	1.171	1.085
LH3 -LS - 3	17.000	1.260	0.000	1.280	1.008	0.941
LH4 -LS - 1	27.813	0.000	0.000	4.000	1.550	1.361
LH4 -LS - 2	27.813	0.950	0.000	1.810	1.090	1.011
LH4 -LS - 3	27.813	1.450	0.000	1.550	1.099	1.026
LH5 -LS - 1	33.021	0.000	0.000	3.060	1.569	1.378
LH5 -LS - 2	33.021	1.020	0.000	1.520	1.056	0.962
LH5 -LS - 3	33.021	1.520	0.000	1.270	0.992	0.914
LH6 -LS - 1	22.917	0.000	0.000	2.840	1.578	1.379
LH6 -LS - 2	22.917	0.760	0.000	1.470	1.157	1.065
LH6 -LS - 3	22.917	1.270	0.000	1.140	1.056	0.983
Mean					1.207	1.095
c.o.v.					0.188	0.162
I					0.950	0.897
FS					1.614	1.710

TABLE D19
HAT SECTIONS OF PEKOZ AND WINTER (1967)
FROM PEKOZ (1987), TABLE 3.3-1

(Using calculated average yield stress - all sectio)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LH1 -LS - 1	20.448	0.100	0.000	3.990	1.483	1.317
LH1 -LS - 2	20.448	0.900	0.000	2.210	1.176	1.089
LH1 -LS - 3	20.448	1.400	0.000	1.570	0.975	0.918
LH2 -LS - 1	25.190	0.000	0.000	3.730	1.381	1.211
LH2 -LS - 2	25.190	1.330	0.000	1.830	1.046	0.968
LH2 -LS - 3	25.190	1.860	0.000	1.290	0.832	0.777
LH3 -LS - 1	17.000	0.000	0.000	3.220	1.400	1.229
LH3 -LS - 2	17.000	0.760	0.000	1.780	1.141	1.053
LH3 -LS - 3	17.000	1.260	0.000	1.280	0.970	0.914
LH4 -LS - 1	27.813	0.000	0.000	4.000	1.550	1.361
LH4 -LS - 2	27.813	0.950	0.000	1.810	1.071	0.995
LH4 -LS - 3	27.813	1.450	0.000	1.550	1.076	1.006
LH5 -LS - 1	33.021	0.000	0.000	3.060	1.569	1.378
LH5 -LS - 2	33.021	1.020	0.000	1.520	1.041	0.950
LH5 -LS - 3	33.021	1.520	0.000	1.270	0.977	0.901
LH6 -LS - 1	22.917	0.000	0.000	2.840	1.578	1.379
LH6 -LS - 2	22.917	0.760	0.000	1.470	1.140	1.043
LH6 -LS - 3	22.917	1.270	0.000	1.140	1.036	0.966
Mean					1.191	1.081
c.o.v.					0.199	0.172
I					0.921	0.872
FS					1.664	1.759

TABLE D20
HAT SECTIONS OF PEKOZ AND WINTER (1967)
FROM PEKOZ (1987), TABLE 3.3-1

(Using calculated average yield stress)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LH1 -LS - 1	20.448	0.100	0.000	3.990	1.483	1.317
LH1 -LS - 2	20.448	0.900	0.000	2.210	1.176	1.089
LH1 -LS - 3	20.448	1.400	0.000	1.570	0.975	0.918
LH2 -LS - 1	25.190	0.000	0.000	3.730	1.381	1.211
LH2 -LS - 2	25.190	1.330	0.000	1.830	1.046	0.968
LH2 -LS - 3	25.190	1.860	0.000	1.290	0.832	0.777
LH3 -LS - 1	17.000	0.000	0.000	3.220	1.400	1.229
LH3 -LS - 2	17.000	0.760	0.000	1.780	1.141	1.053
LH3 -LS - 3	17.000	1.260	0.000	1.280	0.970	0.914
LH4 -LS - 1	27.813	0.000	0.000	4.000	1.550	1.361
LH4 -LS - 2	27.813	0.950	0.000	1.810	1.071	0.995
LH4 -LS - 3	27.813	1.450	0.000	1.550	1.076	1.006
LH5 -LS - 1	33.021	0.000	0.000	3.060	1.569	1.378
LH5 -LS - 2	33.021	1.020	0.000	1.520	1.041	0.950
LH5 -LS - 3	33.021	1.520	0.000	1.270	0.977	0.901
LH6 -LS - 1	22.917	0.000	0.000	2.840	1.578	1.379
LH6 -LS - 2	22.917	0.760	0.000	1.470	1.140	1.043
LH6 -LS - 3	22.917	1.270	0.000	1.140	1.036	0.966
Mean					1.191	1.081
c.o.v.					0.199	0.172
I					0.921	0.872
FS					1.664	1.759

TABLE D21
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985)
FROM PEKOZ (1987), TABLE3.3-2

(Using yield stress of flats)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC1 -LS - 1	31.744	-1.500	0.000	12.750	1.275	1.264
LC1 -LS - 2	31.744	-1.500	0.000	11.250	1.184	1.168
LC1 -LS - 3	31.744	-1.500	0.000	9.450	1.059	1.041
LC2 -LS - 1	16.515	2.000	0.000	22.000	1.793	1.776
LC2 -LS - 2	16.515	2.250	0.000	18.650	1.728	1.703
LC2 -LS - 3	16.515	2.250	0.000	17.600	1.704	1.670
Mean					1.457	1.437
c.o.v.					0.220	0.220
I					1.089	1.074
FS					1.408	1.428

TABLE D22
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985)
FROM PEKOZ (1987), TABLE3.3-2

(Using calculated average yield stress - all sectio)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC1 -LS - 1	31.744	-1.500	0.000	12.750	1.231	1.219
LC1 -LS - 2	31.744	-1.500	0.000	11.250	1.146	1.130
LC1 -LS - 3	31.744	-1.500	0.000	9.450	1.027	1.007
LC2 -LS - 1	16.515	2.000	0.000	22.000	1.664	1.653
LC2 -LS - 2	16.515	2.250	0.000	18.650	1.609	1.585
LC2 -LS - 3	16.515	2.250	0.000	17.600	1.593	1.559
Mean					1.378	1.359
c.o.v.					0.200	0.201
I					1.065	1.048
FS					1.440	1.463

TABLE D23
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985)
FROM PEKOZ (1987), TABLE3.3-2

(Using calculated average yield stress)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC1 -LS - 1	31.744	-1.500	0.000	12.750	1.231	1.219
LC1 -LS - 2	31.744	-1.500	0.000	11.250	1.146	1.130
LC1 -LS - 3	31.744	-1.500	0.000	9.450	1.027	1.007
LC2 -LS - 1	16.515	2.000	0.000	22.000	1.664	1.653
LC2 -LS - 2	16.515	2.250	0.000	18.650	1.609	1.585
LC2 -LS - 3	16.515	2.250	0.000	17.600	1.593	1.559
Mean					1.378	1.359
c.o.v.					0.200	0.201
I					1.065	1.048
FS					1.440	1.463

TABLE D24
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985)
FROM PEKOZ (1987), TABLE3.3-3

(Using yield stress of flats)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC3 -LS - 1	33.233	0.000	-1.450	8.900	1.279	1.236
LC3 -LS - 2	33.685	0.000	-2.000	7.800	1.315	1.294
LC3 -LS - 3	33.685	0.000	-2.000	7.200	1.290	1.257
LC3 -LS - 4	33.685	0.000	-2.000	7.100	1.373	1.322
LC4 -LS - 1	27.111	0.000	-2.500	11.600	1.286	1.258
LC4 -LS - 2	27.111	0.000	-2.500	10.500	1.267	1.225
LC5 -LS - 1	16.394	0.000	-2.030	19.000	1.167	1.128
LC5 -LS - 2	16.394	0.000	-2.000	17.200	1.196	1.134
LC6 -LS - 1	31.293	0.000	-2.380	10.300	1.421	1.398
LC6 -LS - 2	31.293	0.000	-2.130	10.500	1.432	1.387
LC7 -LS - 1	24.152	0.000	-2.250	23.400	1.327	1.301
LC7 -LS - 2	16.576	0.000	-2.220	21.700	1.880	1.802
LC8 -LS - 1	42.818	0.000	-1.500	16.800	1.230	1.218
LC8 -LS - 2	42.818	0.000	-1.500	16.200	1.219	1.202
LC8 -LS - 3	42.818	0.000	-1.500	15.500	1.214	1.188
LC8 -LS - 4	43.421	0.000	-1.660	13.800	1.194	1.161
LC8 -LS - 5	43.421	0.000	-2.000	12.300	1.236	1.185
Mean					1.313	1.276
c.o.v.					0.126	0.123
I					1.127	1.099
FS					1.361	1.395

TABLE D25
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985)
FROM PEKOZ (1987), TABLE3.3-3

(Using calculated average yield stress - all sectio)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC3 -LS - 1	33.233	0.000	-1.450	8.900	1.217	1.174
LC3 -LS - 2	33.685	0.000	-2.000	7.800	1.244	1.223
LC3 -LS - 3	33.685	0.000	-2.000	7.200	1.224	1.192
LC3 -LS - 4	33.685	0.000	-2.000	7.100	1.310	1.259
LC4 -LS - 1	27.111	0.000	-2.500	11.600	1.207	1.180
LC4 -LS - 2	27.111	0.000	-2.500	10.500	1.197	1.155
LC5 -LS - 1	16.394	0.000	-2.030	19.000	1.098	1.061
LC5 -LS - 2	16.394	0.000	-2.000	17.200	1.137	1.075
LC6 -LS - 1	31.293	0.000	-2.380	10.300	1.386	1.362
LC6 -LS - 2	31.293	0.000	-2.130	10.500	1.394	1.353
LC7 -LS - 1	24.152	0.000	-2.250	23.400	1.243	1.219
LC7 -LS - 2	16.576	0.000	-2.220	21.700	1.771	1.693
LC8 -LS - 1	42.818	0.000	-1.500	16.800	1.200	1.188
LC8 -LS - 2	42.818	0.000	-1.500	16.200	1.190	1.172
LC8 -LS - 3	42.818	0.000	-1.500	15.500	1.187	1.160
LC8 -LS - 4	43.421	0.000	-1.660	13.800	1.168	1.136
LC8 -LS - 5	43.421	0.000	-2.000	12.300	1.209	1.161
Mean					1.258	1.221
c.o.v.					0.122	0.119
I					1.084	1.057
FS					1.414	1.451

TABLE D26
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985)
FROM PEKOZ (1987), TABLE3.3-3

(Using calculated average yield stress)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC3 -LS - 1	33.233	0.000	-1.450	8.900	1.217	1.174
LC3 -LS - 2	33.685	0.000	-2.000	7.800	1.244	1.223
LC3 -LS - 3	33.685	0.000	-2.000	7.200	1.224	1.192
LC3 -LS - 4	33.685	0.000	-2.000	7.100	1.310	1.259
LC4 -LS - 1	27.111	0.000	-2.500	11.600	1.207	1.180
LC4 -LS - 2	27.111	0.000	-2.500	10.500	1.197	1.155
LC5 -LS - 1	16.394	0.000	-2.030	19.000	1.098	1.061
LC5 -LS - 2	16.394	0.000	-2.000	17.200	1.137	1.075
LC6 -LS - 1	31.293	0.000	-2.380	10.300	1.386	1.362
LC6 -LS - 2	31.293	0.000	-2.130	10.500	1.394	1.353
LC7 -LS - 1	24.152	0.000	-2.250	23.400	1.243	1.219
LC7 -LS - 2	16.576	0.000	-2.220	21.700	1.771	1.693
LC8 -LS - 1	42.818	0.000	-1.500	16.800	1.200	1.188
LC8 -LS - 2	42.818	0.000	-1.500	16.200	1.190	1.172
LC8 -LS - 3	42.818	0.000	-1.500	15.500	1.187	1.160
LC8 -LS - 4	43.421	0.000	-1.660	13.800	1.168	1.136
LC8 -LS - 5	43.421	0.000	-2.000	12.300	1.209	1.161
Mean					1.258	1.221
c.o.v.					0.122	0.119
I					1.084	1.057
FS					1.414	1.451

TABLE D27
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985)
FROM PEKOZ (1987), TABLE 3.3-4

(Using yield stress of flats)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC9 -LS - 1	26.788	-1.500	-2.000	11.500	1.353	1.339
LC9 -LS - 2	26.788	-1.500	-2.000	11.150	1.415	1.390
LC9 -LS - 3	26.788	-1.500	-2.000	9.950	1.380	1.341
LC10 -LS - 3	31.950	2.000	-2.500	16.400	1.675	1.647
LC11 -LS - 1	31.079	-2.000	-2.500	7.900	1.549	1.540
LC11 -LS - 2	31.079	-2.500	-2.000	7.400	1.532	1.516
LC11 -LS - 3	31.079	-2.000	-2.500	6.800	1.447	1.426
Mean					1.479	1.457
c.o.v.					0.077	0.079
I					1.332	1.310
FS					1.151	1.171

TABLE D28
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985)
FROM PEKOZ (1987), TABLE 3.3-4

(Using calculated average yield stress - all sectio)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC9 -LS - 1	26.788	-1.500	-2.000	11.500	1.276	1.261
LC9 -LS - 2	26.788	-1.500	-2.000	11.150	1.340	1.316
LC9 -LS - 3	26.788	-1.500	-2.000	9.950	1.314	1.277
LC10 -LS - 3	31.950	2.000	-2.500	16.400	1.602	1.575
LC11 -LS - 1	31.079	-2.000	-2.500	7.900	1.468	1.455
LC11 -LS - 2	31.079	-2.500	-2.000	7.400	1.480	1.465
LC11 -LS - 3	31.079	-2.000	-2.500	6.800	1.405	1.382
Mean					1.412	1.390
c.o.v.					0.080	0.083
I					1.268	1.246
FS					1.209	1.231

TABLE D29
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985)
FROM PEKOZ (1987), TABLE 3.3-4

(Using calculated average yield stress)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC9 -LS - 1	26.788	-1.500	-2.000	11.500	1.276	1.261
LC9 -LS - 2	26.788	-1.500	-2.000	11.150	1.340	1.316
LC9 -LS - 3	26.788	-1.500	-2.000	9.950	1.314	1.277
LC10 -LS - 3	31.950	2.000	-2.500	16.400	1.602	1.575
LC11 -LS - 1	31.079	-2.000	-2.500	7.900	1.468	1.455
LC11 -LS - 2	31.079	-2.500	-2.000	7.400	1.480	1.465
LC11 -LS - 3	31.079	-2.000	-2.500	6.800	1.405	1.382
Mean					1.412	1.390
c.o.v.					0.080	0.083
I					1.268	1.246
FS					1.209	1.231

TABLE D30
LIPPED CHANNEL SECTIONS OF THOMASSON (1978)
FROM PEKOZ (1987), TABLE 7.3-2

(Using yield stress of flats)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
A71	463.000	0.000	0.000	3.600	1.000	0.942
A74	463.800	0.000	0.000	3.640	1.000	0.941
A75	463.000	0.000	0.000	3.480	0.956	0.902
A76	446.385	0.000	0.000	3.260	0.939	0.896
A101	311.000	0.000	0.000	8.300	1.059	0.993
A102	311.000	0.000	0.000	7.870	1.009	0.947
A103	310.459	0.000	0.000	8.340	1.073	1.007
A104	301.000	0.000	0.000	7.760	0.739	0.726
A151	198.719	0.000	0.000	17.200	1.095	1.011
A152	202.964	0.000	0.000	15.700	1.036	0.957
A153	210.630	0.000	0.000	16.000	1.114	1.032
A154	207.182	0.000	0.000	16.400	1.118	1.046
A156	206.273	0.000	0.000	15.500	1.057	0.979
Mean					1.015	0.952
c.o.v.					0.099	0.086
I					0.897	0.851
FS					1.710	1.802

TABLE D31
LIPPED CHANNEL SECTIONS OF THOMASSON (1978)
FROM PEKOZ (1987), TABLE 7.3-2

(Using calculated average yield stress - all sectio)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
A71	463.000	0.000	0.000	3.600	0.997	0.940
A74	463.800	0.000	0.000	3.640	0.997	0.938
A75	463.000	0.000	0.000	3.480	0.956	0.899
A76	446.385	0.000	0.000	3.260	0.937	0.893
A101	311.000	0.000	0.000	8.300	1.053	0.988
A102	311.000	0.000	0.000	7.870	1.005	0.943
A103	310.459	0.000	0.000	8.340	1.069	1.002
A104	301.000	0.000	0.000	7.760	0.737	0.723
A151	198.719	0.000	0.000	17.200	1.087	1.003
A152	202.964	0.000	0.000	15.700	1.028	0.949
A153	210.630	0.000	0.000	16.000	1.106	1.024
A154	207.182	0.000	0.000	16.400	1.110	1.037
A156	206.273	0.000	0.000	15.500	1.050	0.971
Mean					1.010	0.947
c.o.v.					0.097	0.085
I					0.894	0.847
FS					1.716	1.811

TABLE D32
LIPPED CHANNEL SECTIONS OF THOMASSON (1978)
FROM PEKOZ (1987), TABLE 7.3-2

(Using calculated average yield stress)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
A71	463.000	0.000	0.000	3.600	1.000	0.942
A74	463.800	0.000	0.000	3.640	1.000	0.941
A75	463.000	0.000	0.000	3.480	0.956	0.902
A76	446.385	0.000	0.000	3.260	0.939	0.896
A101	311.000	0.000	0.000	8.300	1.059	0.993
A102	311.000	0.000	0.000	7.870	1.009	0.947
A103	310.459	0.000	0.000	8.340	1.073	1.007
A104	301.000	0.000	0.000	7.760	0.739	0.726
A151	198.719	0.000	0.000	17.200	1.095	1.011
A152	202.964	0.000	0.000	15.700	1.036	0.957
A153	210.630	0.000	0.000	16.000	1.114	1.032
A154	207.182	0.000	0.000	16.400	1.118	1.046
A156	206.273	0.000	0.000	15.500	1.057	0.979
Mean					1.015	0.952
c.o.v.					0.099	0.086
I					0.897	0.851
FS					1.710	1.802

TABLE D33
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985)
FROM PEKOZ (1987), TABLE 7.3-3

(Using yield stress of flats)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC1 -LU - 1	85.534	0.000	-2.100	18.740	1.164	1.127
LC1 -LU - 2	85.534	0.000	-12.000	6.800	1.088	1.074
LC1 -LU - 3	85.534	0.000	-6.000	12.320	1.242	1.219
LC2 -LU - 1	174.600	0.000	-6.000	5.760	1.061	1.045
LC2 -LU - 2	174.300	0.000	-9.000	4.290	0.960	0.949
LC3 -LU - 1	131.828	0.000	-4.000	8.000	0.910	0.897
LC3 -LU - 2	132.569	0.000	-8.000	6.350	1.028	1.018
LC3 -LU - 3	131.345	0.000	-4.000	8.500	0.966	0.952
LC4 -LU - 1	134.311	0.000	-12.000	7.720	0.972	0.959
LC4 -LU - 2	134.311	0.000	-18.000	5.180	0.865	0.855
LC4 -LU - 3	140.603	0.000	-6.000	10.660	0.967	0.947
LC5 -LU - 1	117.934	0.000	-4.000	13.690	1.051	1.023
LC5 -LU - 2	117.934	0.000	-8.000	9.320	1.013	0.995
LC5 -LU - 3	115.581	0.000	-6.000	11.780	1.065	1.042
LC5 -LU - 4	115.581	0.000	-10.000	7.990	0.972	0.957
LC6 -LU - 1	95.922	0.000	-5.000	28.750	1.081	1.055
LC6 -LU - 2	95.922	0.000	-10.000	19.490	1.056	1.039
LC10 -LU - 1	96.910	0.000	-5.500	24.800	0.994	0.972
LC10 -LU - 2	96.910	0.000	-5.500	25.000	1.002	0.980
Mean					1.024	1.006
c.o.v.					0.085	0.082
I					0.916	0.902
FS					1.674	1.701

TABLE D34
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985)
FROM PEKOZ (1987), TABLE 7.3-3

(Using calculated average yield stress - all sectio)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC1 -LU - 1	85.534	0.000	-2.100	18.740	1.136	1.098
LC1 -LU - 2	85.534	0.000	-12.000	6.800	1.062	1.049
LC1 -LU - 3	85.534	0.000	-6.000	12.320	1.213	1.189
LC2 -LU - 1	174.600	0.000	-6.000	5.760	1.049	1.034
LC2 -LU - 2	174.300	0.000	-9.000	4.290	0.951	0.939
LC3 -LU - 1	131.828	0.000	-4.000	8.000	0.902	0.889
LC3 -LU - 2	132.569	0.000	-8.000	6.350	1.019	1.008
LC3 -LU - 3	131.345	0.000	-4.000	8.500	0.957	0.943
LC4 -LU - 1	134.311	0.000	-12.000	7.720	0.960	0.947
LC4 -LU - 2	134.311	0.000	-18.000	5.180	0.855	0.845
LC4 -LU - 3	140.603	0.000	-6.000	10.660	0.956	0.936
LC5 -LU - 1	117.934	0.000	-4.000	13.690	1.037	1.010
LC5 -LU - 2	117.934	0.000	-8.000	9.320	1.001	0.982
LC5 -LU - 3	115.581	0.000	-6.000	11.780	1.049	1.026
LC5 -LU - 4	115.581	0.000	-10.000	7.990	0.957	0.941
LC6 -LU - 1	95.922	0.000	-5.000	28.750	1.060	1.033
LC6 -LU - 2	95.922	0.000	-10.000	19.490	1.034	1.017
LC10 -LU - 1	96.910	0.000	-5.500	24.800	0.974	0.952
LC10 -LU - 2	96.910	0.000	-5.500	25.000	0.982	0.959
Mean					1.008	0.989
c.o.v.					0.081	0.078
I					0.905	0.890
FS					1.694	1.723

TABLE D35
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985)
FROM PEKOZ (1987), TABLE 7.3-3

(Using calculated average yield stress)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC1 -LU - 1	85.534	0.000	-2.100	18.740	1.164	1.127
LC1 -LU - 2	85.534	0.000	-12.000	6.800	1.088	1.074
LC1 -LU - 3	85.534	0.000	-6.000	12.320	1.242	1.219
LC2 -LU - 1	174.600	0.000	-6.000	5.760	1.061	1.045
LC2 -LU - 2	174.300	0.000	-9.000	4.290	0.960	0.949
LC3 -LU - 1	131.828	0.000	-4.000	8.000	0.910	0.897
LC3 -LU - 2	132.569	0.000	-8.000	6.350	1.028	1.018
LC3 -LU - 3	131.345	0.000	-4.000	8.500	0.966	0.952
LC4 -LU - 1	134.311	0.000	-12.000	7.720	0.972	0.959
LC4 -LU - 2	134.311	0.000	-18.000	5.180	0.865	0.855
LC4 -LU - 3	140.603	0.000	-6.000	10.660	0.967	0.947
LC5 -LU - 1	117.934	0.000	-4.000	13.690	1.051	1.023
LC5 -LU - 2	117.934	0.000	-8.000	9.320	1.013	0.995
LC5 -LU - 3	115.581	0.000	-6.000	11.780	1.065	1.042
LC5 -LU - 4	115.581	0.000	-10.000	7.990	0.972	0.957
LC6 -LU - 1	95.922	0.000	-5.000	28.750	1.081	1.055
LC6 -LU - 2	95.922	0.000	-10.000	19.490	1.056	1.039
LC10 -LU - 1	96.910	0.000	-5.500	24.800	0.994	0.972
LC10 -LU - 2	96.910	0.000	-5.500	25.000	1.002	0.980
Mean					1.024	1.006
c.o.v.					0.085	0.082
I					0.916	0.902
FS					1.674	1.701

TABLE D36
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985)
FROM PEKOZ (1987), TABLE 7.3-4

(Using yield stress of flats)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC7 -LU - 1	71.688	1.500	-3.500	6.500	1.654	1.646
LC7 -LU - 2	71.688	1.500	-3.500	5.800	1.585	1.555
LC7 -LU - 3	71.688	1.500	-3.500	5.350	1.602	1.569
LC8 -LU - 1	136.650	1.000	-2.000	11.850	1.199	1.153
LC8 -LU - 2	136.650	1.000	-2.000	12.000	1.217	1.170
LC8 -LU - 3	133.902	1.000	-4.000	10.750	1.189	1.146
LC8 -LU - 4	133.902	1.000	-4.000	10.550	1.167	1.125
LC8 -LU - 5	136.017	1.000	-6.000	8.900	1.129	1.092
LC8 -LU - 6	136.017	1.000	-6.000	9.350	1.184	1.144
LC9 -LU - 1	115.903	-0.380	-3.940	14.000	0.997	0.956
LC9 -LU - 2	115.903	-0.380	-6.000	10.100	0.870	0.840
LC9 -LU - 3	117.081	-0.380	-6.000	10.600	0.898	0.868
LC9 -LU - 4	117.081	-0.630	-3.940	11.700	0.890	0.858
Mean					1.199	1.163
c.o.v.					0.223	0.234
I					0.890	0.849
FS					1.722	1.806

TABLE D37
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985)
FROM PEKOZ (1987), TABLE 7.3-4

(Using calculated average yield stress - all sectio)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC7 -LU - 1	71.688	1.500	-3.500	6.500	1.589	1.582
LC7 -LU - 2	71.688	1.500	-3.500	5.800	1.530	1.503
LC7 -LU - 3	71.688	1.500	-3.500	5.350	1.555	1.524
LC8 -LU - 1	136.650	1.000	-2.000	11.850	1.186	1.139
LC8 -LU - 2	136.650	1.000	-2.000	12.000	1.204	1.156
LC8 -LU - 3	133.902	1.000	-4.000	10.750	1.176	1.133
LC8 -LU - 4	133.902	1.000	-4.000	10.550	1.154	1.112
LC8 -LU - 5	136.017	1.000	-6.000	8.900	1.117	1.079
LC8 -LU - 6	136.017	1.000	-6.000	9.350	1.172	1.132
LC9 -LU - 1	115.903	-0.380	-3.940	14.000	0.989	0.947
LC9 -LU - 2	115.903	-0.380	-6.000	10.100	0.862	0.832
LC9 -LU - 3	117.081	-0.380	-6.000	10.600	0.890	0.860
LC9 -LU - 4	117.081	-0.630	-3.940	11.700	0.882	0.851
Mean					1.177	1.142
c.o.v.					0.212	0.222
I					0.892	0.850
FS					1.719	1.803

TABLE D38
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985)
FROM PEKOZ (1987), TABLE 7.3-4

(Using calculated average yield stress)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC7 -LU - 1	71.688	1.500	-3.500	6.500	1.589	1.582
LC7 -LU - 2	71.688	1.500	-3.500	5.800	1.530	1.503
LC7 -LU - 3	71.688	1.500	-3.500	5.350	1.555	1.524
LC8 -LU - 1	136.650	1.000	-2.000	11.850	1.199	1.153
LC8 -LU - 2	136.650	1.000	-2.000	12.000	1.217	1.170
LC8 -LU - 3	133.902	1.000	-4.000	10.750	1.189	1.146
LC8 -LU - 4	133.902	1.000	-4.000	10.550	1.167	1.125
LC8 -LU - 5	136.017	1.000	-6.000	8.900	1.129	1.092
LC8 -LU - 6	136.017	1.000	-6.000	9.350	1.184	1.144
LC9 -LU - 1	115.903	-0.380	-3.940	14.000	0.997	0.956
LC9 -LU - 2	115.903	-0.380	-6.000	10.100	0.870	0.840
LC9 -LU - 3	117.081	-0.380	-6.000	10.600	0.898	0.868
LC9 -LU - 4	117.081	-0.630	-3.940	11.700	0.890	0.858
Mean					1.186	1.151
c.o.v.					0.208	0.218
I					0.905	0.863
FS					1.695	1.776

TABLE D39
LIPPED CHANNEL SECTIONS OF LOUGHLAN (1979)
FROM PEKOZ (1987), TABLE 7.3-5

(Using yield stress of flats)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
L1	116.937	0.290	0.000	3.120	1.054	1.006
L2	116.406	0.290	0.000	3.600	1.020	0.989
L3	118.406	0.400	0.000	3.520	0.934	0.900
L4	117.437	0.400	0.000	3.780	0.945	0.917
L5	117.031	0.410	0.000	4.100	0.979	0.958
L6	149.312	0.070	0.000	3.800	1.121	1.061
L7	147.500	0.070	0.000	3.970	1.061	1.015
L8	147.625	0.070	0.000	4.310	1.059	1.026
L9	149.219	0.180	0.000	4.340	1.043	1.000
L10	148.719	0.190	0.000	4.570	1.039	1.007
L11	147.937	0.190	0.000	4.650	1.009	0.985
L12	178.906	0.180	0.000	3.350	1.106	1.053
L13	179.250	0.180	0.000	3.530	1.057	1.017
L14	178.687	0.180	0.000	3.850	1.085	1.052
L15	181.406	0.000	0.000	4.900	1.084	1.034
L16	181.406	0.000	0.000	5.180	1.081	1.042
L17	179.031	0.000	0.000	5.310	1.054	1.027
L18	211.031	0.220	0.000	3.130	1.110	1.057
L19	210.000	0.220	0.000	3.390	1.094	1.050
L20	210.594	0.220	0.000	3.670	1.086	1.058
Mean					1.051	1.013
c.o.v.					0.049	0.045
I					0.963	0.930
FS					1.592	1.648

TABLE D40
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985)
FROM PEKOZ (1987), TABLE 7.3-5
(Using calculated average yield stress - all sectio)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
L1	116.937	0.290	0.000	3.120	1.043	0.997
L2	116.406	0.290	0.000	3.600	1.006	0.978
L3	118.406	0.400	0.000	3.520	0.926	0.891
L4	117.437	0.400	0.000	3.780	0.936	0.909
L5	117.031	0.410	0.000	4.100	0.969	0.949
L6	149.312	0.070	0.000	3.800	1.111	1.053
L7	147.500	0.070	0.000	3.970	1.053	1.005
L8	147.625	0.070	0.000	4.310	1.049	1.014
L9	149.219	0.180	0.000	4.340	1.036	0.991
L10	148.719	0.190	0.000	4.570	1.029	0.998
L11	147.937	0.190	0.000	4.650	0.998	0.977
L12	178.906	0.180	0.000	3.350	1.095	1.044
L13	179.250	0.180	0.000	3.530	1.047	1.006
L14	178.687	0.180	0.000	3.850	1.072	1.041
L15	181.406	0.000	0.000	4.900	1.077	1.027
L16	181.406	0.000	0.000	5.180	1.072	1.034
L17	179.031	0.000	0.000	5.310	1.045	1.019
L18	211.031	0.220	0.000	3.130	1.102	1.050
L19	210.000	0.220	0.000	3.390	1.083	1.040
L20	210.594	0.220	0.000	3.670	1.076	1.046
Mean					1.041	1.003
c.o.v.					0.050	0.045
I					0.954	0.922
FS					1.607	1.664

TABLE D41
LIPPED CHANNEL SECTIONS OF LOH AND PEKOZ (1985)
FROM PEKOZ (1987), TABLE 7.3-5

(Using calculated average yield stress)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
L1	116.937	0.290	0.000	3.120	1.054	1.006
L2	116.406	0.290	0.000	3.600	1.020	0.989
L3	118.406	0.400	0.000	3.520	0.934	0.900
L4	117.437	0.400	0.000	3.780	0.945	0.917
L5	117.031	0.410	0.000	4.100	0.979	0.958
L6	149.312	0.070	0.000	3.800	1.121	1.061
L7	147.500	0.070	0.000	3.970	1.061	1.015
L8	147.625	0.070	0.000	4.310	1.059	1.026
L9	149.219	0.180	0.000	4.340	1.043	1.000
L10	148.719	0.190	0.000	4.570	1.039	1.007
L11	147.937	0.190	0.000	4.650	1.009	0.985
L12	178.906	0.180	0.000	3.350	1.106	1.053
L13	179.250	0.180	0.000	3.530	1.057	1.017
L14	178.687	0.180	0.000	3.850	1.085	1.052
L15	181.406	0.000	0.000	4.900	1.084	1.034
L16	181.406	0.000	0.000	5.180	1.081	1.042
L17	179.031	0.000	0.000	5.310	1.054	1.027
L18	211.031	0.220	0.000	3.130	1.110	1.057
L19	210.000	0.220	0.000	3.390	1.094	1.050
L20	210.594	0.220	0.000	3.670	1.086	1.058
Mean					1.051	1.013
c.o.v.					0.049	0.045
I					0.963	0.930
FS					1.592	1.648

TABLE D42
HAT SECTIONS OF LOH AND PEKOZ (1985)

(Using yield stress of flats)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LH1 -LU - 1	58.295	-0.100	0.000	40.600	1.115	1.088
LH1 -LU - 2	56.561	-0.500	0.000	53.600	1.489	1.453
LH2 -LU - 1	82.435	0.000	0.000	8.000	1.205	1.071
LH2 -LU - 2	81.109	-0.750	0.000	6.000	1.186	1.091
LH2 -LU - 3	81.457	-1.500	0.000	4.000	0.973	0.913
LH3 -LU - 1	101.500	0.000	0.000	7.550	0.888	0.836
LH3 -LU - 2	101.848	0.000	0.000	7.900	0.936	0.881
LH3 -LU - 3	101.761	0.000	0.000	8.300	1.002	0.943
LH4 -LU - 1	122.367	0.000	0.000	2.600	0.815	0.743
LH4 -LU - 2	122.267	0.000	0.000	2.300	0.754	0.685
LH4 -LU - 3	123.567	0.000	0.000	2.900	0.986	0.921
LH5 -LU - 1	135.026	0.000	0.000	5.300	1.088	1.023
LH5 -LU - 2	135.128	0.000	0.000	5.650	1.117	1.052
LH5 -LU - 3	135.590	0.000	0.000	6.000	1.172	1.103
LH5 -LU - 4	131.200	0.000	0.000	5.900	1.124	1.054
Mean					1.057	0.990
c.o.v.					0.171	0.184
I					0.853	0.785
FS					1.797	1.954

TABLE D43
HAT SECTIONS OF LOH AND PEKOZ (1985)

(Using calculated average yield stress - all sectio)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LH1 -LU - 1	58.295	-0.100	0.000	40.600	1.099	1.072
LH1 -LU - 2	56.561	-0.500	0.000	53.600	1.465	1.429
LH2 -LU - 1	82.435	0.000	0.000	8.000	1.199	1.068
LH2 -LU - 2	81.109	-0.750	0.000	6.000	1.176	1.083
LH2 -LU - 3	81.457	-1.500	0.000	4.000	0.966	0.905
LH3 -LU - 1	101.500	0.000	0.000	7.550	0.883	0.831
LH3 -LU - 2	101.848	0.000	0.000	7.900	0.932	0.876
LH3 -LU - 3	101.761	0.000	0.000	8.300	0.998	0.937
LH4 -LU - 1	122.367	0.000	0.000	2.600	0.810	0.741
LH4 -LU - 2	122.267	0.000	0.000	2.300	0.749	0.682
LH4 -LU - 3	123.567	0.000	0.000	2.900	0.980	0.915
LH5 -LU - 1	135.026	0.000	0.000	5.300	1.084	1.019
LH5 -LU - 2	135.128	0.000	0.000	5.650	1.112	1.046
LH5 -LU - 3	135.590	0.000	0.000	6.000	1.167	1.097
LH5 -LU - 4	131.200	0.000	0.000	5.900	1.117	1.050
Mean					1.049	0.983
c.o.v.					0.169	0.181
I					0.850	0.783
FS					1.804	1.959

TABLE D44
HAT SECTIONS OF LOH AND PEKOZ (1985)

(Using calculated average yield stress)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LH1 -LU - 1	58.295	-0.100	0.000	40.600	1.115	1.088
LH1 -LU - 2	56.561	-0.500	0.000	53.600	1.489	1.453
LH2 -LU - 1	82.435	0.000	0.000	8.000	1.205	1.071
LH2 -LU - 2	81.109	-0.750	0.000	6.000	1.186	1.091
LH2 -LU - 3	81.457	-1.500	0.000	4.000	0.973	0.913
LH3 -LU - 1	101.500	0.000	0.000	7.550	0.888	0.836
LH3 -LU - 2	101.848	0.000	0.000	7.900	0.936	0.881
LH3 -LU - 3	101.761	0.000	0.000	8.300	1.002	0.943
LH4 -LU - 1	122.367	0.000	0.000	2.600	0.815	0.743
LH4 -LU - 2	122.267	0.000	0.000	2.300	0.754	0.685
LH4 -LU - 3	123.567	0.000	0.000	2.900	0.986	0.921
LH5 -LU - 1	135.026	0.000	0.000	5.300	1.088	1.023
LH5 -LU - 2	135.128	0.000	0.000	5.650	1.117	1.052
LH5 -LU - 3	135.590	0.000	0.000	6.000	1.172	1.103
LH5 -LU - 4	131.200	0.000	0.000	5.900	1.124	1.054
Mean					1.057	0.990
c.o.v.					0.171	0.184
I					0.853	0.785
FS					1.797	1.954

TABLE D45
ALL TEST RESULTS
FROM PEKOZ (1987), TABLES 3.3-2 ; 3.3-3 ; 3.3-4

(Using yield stress of flats)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC1 -LS - 1	31.744	-1.500	0.000	12.750	1.275	1.264
LC1 -LS - 2	31.744	-1.500	0.000	11.250	1.184	1.168
LC1 -LS - 3	31.744	-1.500	0.000	9.450	1.059	1.041
LC2 -LS - 1	16.515	2.000	0.000	22.000	1.793	1.776
LC2 -LS - 2	16.515	2.250	0.000	18.650	1.728	1.703
LC2 -LS - 3	16.515	2.250	0.000	17.600	1.704	1.670
LC3 -LS - 1	33.233	0.000	-1.450	8.900	1.279	1.236
LC3 -LS - 2	33.685	0.000	-2.000	7.800	1.315	1.294
LC3 -LS - 3	33.685	0.000	-2.000	7.200	1.290	1.257
LC3 -LS - 4	33.685	0.000	-2.000	7.100	1.373	1.322
LC4 -LS - 1	27.111	0.000	-2.500	11.600	1.286	1.258
LC4 -LS - 2	27.111	0.000	-2.500	10.500	1.267	1.225
LC5 -LS - 1	16.394	0.000	-2.030	19.000	1.167	1.128
LC5 -LS - 2	16.394	0.000	-2.000	17.200	1.196	1.134
LC6 -LS - 1	31.293	0.000	-2.380	10.300	1.421	1.398
LC6 -LS - 2	31.293	0.000	-2.130	10.500	1.432	1.387
LC7 -LS - 1	24.152	0.000	-2.250	23.400	1.327	1.301
LC7 -LS - 2	16.576	0.000	-2.220	21.700	1.880	1.802
LC8 -LS - 1	42.818	0.000	-1.500	16.800	1.230	1.218
LC8 -LS - 2	42.818	0.000	-1.500	16.200	1.219	1.202
LC8 -LS - 3	42.818	0.000	-1.500	15.500	1.214	1.188
LC8 -LS - 4	43.421	0.000	-1.660	13.800	1.194	1.161
LC8 -LS - 5	43.421	0.000	-2.000	12.300	1.236	1.185
LC9 -LS - 1	26.788	-1.500	-2.000	11.500	1.353	1.339
LC9 -LS - 2	26.788	-1.500	-2.000	11.150	1.415	1.390
LC9 -LS - 3	26.788	-1.500	-2.000	9.950	1.380	1.341
LC10 -LS - 3	31.950	2.000	-2.500	16.400	1.675	1.647
LC11 -LS - 1	31.079	-2.000	-2.500	7.900	1.549	1.540
LC11 -LS - 2	31.079	-2.500	-2.000	7.400	1.532	1.516
LC11 -LS - 3	31.079	-2.000	-2.500	6.800	1.447	1.426
Mean					1.381	1.351
c.o.v.					0.148	0.150
I					1.152	1.124
FS					1.330	1.364

TABLE D46
ALL TEST RESULTS
FROM PEKOZ (1987), TABLES 3.3-2 ; 3.3-3 ; 3.3-4

(Using calculated average yield stress - all sectio)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC1 -LS - 1	31.744	-1.500	0.000	12.750	1.231	1.219
LC1 -LS - 2	31.744	-1.500	0.000	11.250	1.146	1.130
LC1 -LS - 3	31.744	-1.500	0.000	9.450	1.027	1.007
LC2 -LS - 1	16.515	2.000	0.000	22.000	1.664	1.653
LC2 -LS - 2	16.515	2.250	0.000	18.650	1.609	1.585
LC2 -LS - 3	16.515	2.250	0.000	17.600	1.593	1.559
LC3 -LS - 1	33.233	0.000	-1.450	8.900	1.217	1.174
LC3 -LS - 2	33.685	0.000	-2.000	7.800	1.244	1.223
LC3 -LS - 3	33.685	0.000	-2.000	7.200	1.224	1.192
LC3 -LS - 4	33.685	0.000	-2.000	7.100	1.310	1.259
LC4 -LS - 1	27.111	0.000	-2.500	11.600	1.207	1.180
LC4 -LS - 2	27.111	0.000	-2.500	10.500	1.197	1.155
LC5 -LS - 1	16.394	0.000	-2.030	19.000	1.098	1.061
LC5 -LS - 2	16.394	0.000	-2.000	17.200	1.137	1.075
LC6 -LS - 1	31.293	0.000	-2.380	10.300	1.386	1.362
LC6 -LS - 2	31.293	0.000	-2.130	10.500	1.394	1.353
LC7 -LS - 1	24.152	0.000	-2.250	23.400	1.243	1.219
LC7 -LS - 2	16.576	0.000	-2.220	21.700	1.771	1.693
LC8 -LS - 1	42.818	0.000	-1.500	16.800	1.200	1.188
LC8 -LS - 2	42.818	0.000	-1.500	16.200	1.190	1.172
LC8 -LS - 3	42.818	0.000	-1.500	15.500	1.187	1.160
LC8 -LS - 4	43.421	0.000	-1.660	13.800	1.168	1.136
LC8 -LS - 5	43.421	0.000	-2.000	12.300	1.209	1.161
LC9 -LS - 1	26.788	-1.500	-2.000	11.500	1.276	1.261
LC9 -LS - 2	26.788	-1.500	-2.000	11.150	1.340	1.316
LC9 -LS - 3	26.788	-1.500	-2.000	9.950	1.314	1.277
LC10 -LS - 3	31.950	2.000	-2.500	16.400	1.602	1.575
LC11 -LS - 1	31.079	-2.000	-2.500	7.900	1.468	1.455
LC11 -LS - 2	31.079	-2.500	-2.000	7.400	1.480	1.465
LC11 -LS - 3	31.079	-2.000	-2.500	6.800	1.405	1.382
Mean					1.318	1.288
c.o.v.					0.139	0.142
I					1.112	1.084
FS					1.379	1.415

TABLE D47
ALL TEST RESULTS
FROM PEKOZ (1987), TABLES 3.3-2 ; 3.3-3 ; 3.3-4

(Using calculated average yield stress)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC1 -LS - 1	31.744	-1.500	0.000	12.750	1.231	1.219
LC1 -LS - 2	31.744	-1.500	0.000	11.250	1.146	1.130
LC1 -LS - 3	31.744	-1.500	0.000	9.450	1.027	1.007
LC2 -LS - 1	16.515	2.000	0.000	22.000	1.664	1.653
LC2 -LS - 2	16.515	2.250	0.000	18.650	1.609	1.585
LC2 -LS - 3	16.515	2.250	0.000	17.600	1.593	1.559
LC3 -LS - 1	33.233	0.000	-1.450	8.900	1.217	1.174
LC3 -LS - 2	33.685	0.000	-2.000	7.800	1.244	1.223
LC3 -LS - 3	33.685	0.000	-2.000	7.200	1.224	1.192
LC3 -LS - 4	33.685	0.000	-2.000	7.100	1.310	1.259
LC4 -LS - 1	27.111	0.000	-2.500	11.600	1.207	1.180
LC4 -LS - 2	27.111	0.000	-2.500	10.500	1.197	1.155
LC5 -LS - 1	16.394	0.000	-2.030	19.000	1.098	1.061
LC5 -LS - 2	16.394	0.000	-2.000	17.200	1.137	1.075
LC6 -LS - 1	31.293	0.000	-2.380	10.300	1.386	1.362
LC6 -LS - 2	31.293	0.000	-2.130	10.500	1.394	1.353
LC7 -LS - 1	24.152	0.000	-2.250	23.400	1.243	1.219
LC7 -LS - 2	16.576	0.000	-2.220	21.700	1.771	1.693
LC8 -LS - 1	42.818	0.000	-1.500	16.800	1.200	1.188
LC8 -LS - 2	42.818	0.000	-1.500	16.200	1.190	1.172
LC8 -LS - 3	42.818	0.000	-1.500	15.500	1.187	1.160
LC8 -LS - 4	43.421	0.000	-1.660	13.800	1.168	1.136
LC8 -LS - 5	43.421	0.000	-2.000	12.300	1.209	1.161
LC9 -LS - 1	26.788	-1.500	-2.000	11.500	1.276	1.261
LC9 -LS - 2	26.788	-1.500	-2.000	11.150	1.340	1.316
LC9 -LS - 3	26.788	-1.500	-2.000	9.950	1.314	1.277
LC10 -LS - 3	31.950	2.000	-2.500	16.400	1.602	1.575
LC11 -LS - 1	31.079	-2.000	-2.500	7.900	1.468	1.455
LC11 -LS - 2	31.079	-2.500	-2.000	7.400	1.480	1.465
LC11 -LS - 3	31.079	-2.000	-2.500	6.800	1.405	1.382
Mean					1.318	1.288
c.o.v.					0.139	0.142
I					1.112	1.084
FS					1.379	1.415

TABLE D48
ALL TEST RESULTS
FROM PEKOZ (1987), TABLES 7.3-3, 7.3-4

(Using yield stress of flats)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC1 -LU - 1	85.534	0.000	-2.100	18.740	1.164	1.127
LC1 -LU - 2	85.534	0.000	-12.000	6.800	1.088	1.074
LC1 -LU - 3	85.534	0.000	-6.000	12.320	1.242	1.219
LC2 -LU - 1	174.600	0.000	-6.000	5.760	1.061	1.045
LC2 -LU - 2	174.300	0.000	-9.000	4.290	0.960	0.949
LC3 -LU - 1	131.828	0.000	-4.000	8.000	0.910	0.897
LC3 -LU - 2	132.569	0.000	-8.000	6.350	1.028	1.018
LC3 -LU - 3	131.345	0.000	-4.000	8.500	0.966	0.952
LC4 -LU - 1	134.311	0.000	-12.000	7.720	0.972	0.959
LC4 -LU - 2	134.311	0.000	-18.000	5.180	0.865	0.855
LC4 -LU - 3	140.603	0.000	-6.000	10.660	0.967	0.947
LC5 -LU - 1	117.934	0.000	-4.000	13.690	1.051	1.023
LC5 -LU - 2	117.934	0.000	-8.000	9.320	1.013	0.995
LC5 -LU - 3	115.581	0.000	-6.000	11.780	1.065	1.042
LC5 -LU - 4	115.581	0.000	-10.000	7.990	0.972	0.957
LC6 -LU - 1	95.922	0.000	-5.000	28.750	1.081	1.055
LC6 -LU - 2	95.922	0.000	-10.000	19.490	1.056	1.039
LC10 -LU - 1	96.910	0.000	-5.500	24.800	0.994	0.972
LC10 -LU - 2	96.910	0.000	-5.500	25.000	1.002	0.980
LC7 -LU - 1	71.688	1.500	-3.500	6.500	1.654	1.646
LC7 -LU - 2	71.688	1.500	-3.500	5.800	1.585	1.555
LC7 -LU - 3	71.688	1.500	-3.500	5.350	1.602	1.569
LC8 -LU - 1	136.650	1.000	-2.000	11.850	1.199	1.153
LC8 -LU - 2	136.650	1.000	-2.000	12.000	1.217	1.170
LC8 -LU - 3	133.902	1.000	-4.000	10.750	1.189	1.146
LC8 -LU - 4	133.902	1.000	-4.000	10.550	1.167	1.125
LC8 -LU - 5	136.017	1.000	-6.000	8.900	1.129	1.092
LC8 -LU - 6	136.017	1.000	-6.000	9.350	1.184	1.144
LC9 -LU - 1	115.903	-0.380	-3.940	14.000	0.997	0.956
LC9 -LU - 2	115.903	-0.380	-6.000	10.100	0.870	0.840
LC9 -LU - 3	117.081	-0.380	-6.000	10.600	0.898	0.868
LC9 -LU - 4	117.081	-0.630	-3.940	11.700	0.890	0.858
Mean					1.095	1.070
c.o.v.					0.182	0.184
I					0.870	0.847
FS					1.762	1.809

TABLE D49
ALL TEST RESULTS
FROM PEKOZ (1987), TABLES 7.3-3, 7.3-4

(Using calculated average yield stress - all sectio)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC1 -LU - 1	85.534	0.000	-2.100	18.740	1.136	1.098
LC1 -LU - 2	85.534	0.000	-12.000	6.800	1.062	1.049
LC1 -LU - 3	85.534	0.000	-6.000	12.320	1.213	1.189
LC2 -LU - 1	174.600	0.000	-6.000	5.760	1.049	1.034
LC2 -LU - 2	174.300	0.000	-9.000	4.290	0.951	0.939
LC3 -LU - 1	131.828	0.000	-4.000	8.000	0.902	0.889
LC3 -LU - 2	132.569	0.000	-8.000	6.350	1.019	1.008
LC3 -LU - 3	131.345	0.000	-4.000	8.500	0.957	0.943
LC4 -LU - 1	134.311	0.000	-12.000	7.720	0.960	0.947
LC4 -LU - 2	134.311	0.000	-18.000	5.180	0.855	0.845
LC4 -LU - 3	140.603	0.000	-6.000	10.660	0.956	0.936
LC5 -LU - 1	117.934	0.000	-4.000	13.690	1.037	1.010
LC5 -LU - 2	117.934	0.000	-8.000	9.320	1.001	0.982
LC5 -LU - 3	115.581	0.000	-6.000	11.780	1.049	1.026
LC5 -LU - 4	115.581	0.000	-10.000	7.990	0.957	0.941
LC6 -LU - 1	95.922	0.000	-5.000	28.750	1.060	1.033
LC6 -LU - 2	95.922	0.000	-10.000	19.490	1.034	1.017
LC10 -LU - 1	96.910	0.000	-5.500	24.800	0.974	0.952
LC10 -LU - 2	96.910	0.000	-5.500	25.000	0.982	0.959
LC7 -LU - 1	71.688	1.500	-3.500	6.500	1.589	1.582
LC7 -LU - 2	71.688	1.500	-3.500	5.800	1.530	1.503
LC7 -LU - 3	71.688	1.500	-3.500	5.350	1.555	1.524
LC8 -LU - 1	136.650	1.000	-2.000	11.850	1.186	1.139
LC8 -LU - 2	136.650	1.000	-2.000	12.000	1.204	1.156
LC8 -LU - 3	133.902	1.000	-4.000	10.750	1.176	1.133
LC8 -LU - 4	133.902	1.000	-4.000	10.550	1.154	1.112
LC8 -LU - 5	136.017	1.000	-6.000	8.900	1.117	1.079
LC8 -LU - 6	136.017	1.000	-6.000	9.350	1.172	1.132
LC9 -LU - 1	115.903	-0.380	-3.940	14.000	0.989	0.947
LC9 -LU - 2	115.903	-0.380	-6.000	10.100	0.862	0.832
LC9 -LU - 3	117.081	-0.380	-6.000	10.600	0.890	0.860
LC9 -LU - 4	117.081	-0.630	-3.940	11.700	0.882	0.851
Mean					1.077	1.051
c.o.v.					0.174	0.176
I					0.866	0.843
FS					1.770	1.818

TABLE D50
ALL TEST RESULTS
FROM PEKOZ (1987), TABLES 7.3-3, 7.3-4

(Using calculated average yield stress)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC1 -LU - 1	85.534	0.000	-2.100	18.740	1.164	1.127
LC1 -LU - 2	85.534	0.000	-12.000	6.800	1.088	1.074
LC1 -LU - 3	85.534	0.000	-6.000	12.320	1.242	1.219
LC2 -LU - 1	174.600	0.000	-6.000	5.760	1.061	1.045
LC2 -LU - 2	174.300	0.000	-9.000	4.290	0.960	0.949
LC3 -LU - 1	131.828	0.000	-4.000	8.000	0.910	0.897
LC3 -LU - 2	132.569	0.000	-8.000	6.350	1.028	1.018
LC3 -LU - 3	131.345	0.000	-4.000	8.500	0.966	0.952
LC4 -LU - 1	134.311	0.000	-12.000	7.720	0.972	0.959
LC4 -LU - 2	134.311	0.000	-18.000	5.180	0.865	0.855
LC4 -LU - 3	140.603	0.000	-6.000	10.660	0.967	0.947
LC5 -LU - 1	117.934	0.000	-4.000	13.690	1.051	1.023
LC5 -LU - 2	117.934	0.000	-8.000	9.320	1.013	0.995
LC5 -LU - 3	115.581	0.000	-6.000	11.780	1.065	1.042
LC5 -LU - 4	115.581	0.000	-10.000	7.990	0.972	0.957
LC6 -LU - 1	95.922	0.000	-5.000	28.750	1.081	1.055
LC6 -LU - 2	95.922	0.000	-10.000	19.490	1.056	1.039
LC10 -LU - 1	96.910	0.000	-5.500	24.800	0.994	0.972
LC10 -LU - 2	96.910	0.000	-5.500	25.000	1.002	0.980
LC7 -LU - 1	71.688	1.500	-3.500	6.500	1.589	1.582
LC7 -LU - 2	71.688	1.500	-3.500	5.800	1.530	1.503
LC7 -LU - 3	71.688	1.500	-3.500	5.350	1.555	1.524
LC8 -LU - 1	136.650	1.000	-2.000	11.850	1.199	1.153
LC8 -LU - 2	136.650	1.000	-2.000	12.000	1.217	1.170
LC8 -LU - 3	133.902	1.000	-4.000	10.750	1.189	1.146
LC8 -LU - 4	133.902	1.000	-4.000	10.550	1.167	1.125
LC8 -LU - 5	136.017	1.000	-6.000	8.900	1.129	1.092
LC8 -LU - 6	136.017	1.000	-6.000	9.350	1.184	1.144
LC9 -LU - 1	115.903	-0.380	-3.940	14.000	0.997	0.956
LC9 -LU - 2	115.903	-0.380	-6.000	10.100	0.870	0.840
LC9 -LU - 3	117.081	-0.380	-6.000	10.600	0.898	0.868
LC9 -LU - 4	117.081	-0.630	-3.940	11.700	0.890	0.858
Mean					1.090	1.065
c.o.v.					0.170	0.172
I					0.882	0.859
FS					1.739	1.785

TABLE D51
ALL TEST RESULTS
FROM PEKOZ (1987), TABLES 3.3-2 , 3.3-3 , 3.3-4 , 7.3-2 , 7.3-3 , 7.3-4 , 7.3-5

(Using yield stress of flats)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC1 -LS - 1	31.744	-1.500	0.000	12.750	1.392	1.392
LC1 -LS - 2	31.744	-1.500	0.000	11.250	1.273	1.274
LC1 -LS - 3	31.744	-1.500	0.000	9.450	1.117	1.118
LC2 -LS - 1	16.515	2.000	0.000	22.000	1.793	1.776
LC2 -LS - 2	16.515	2.250	0.000	18.650	1.728	1.703
LC2 -LS - 3	16.515	2.250	0.000	17.600	1.704	1.670
LC3 -LS - 1	33.233	0.000	-1.450	8.900	1.279	1.236
LC3 -LS - 2	33.685	0.000	-2.000	7.800	1.315	1.294
LC3 -LS - 3	33.685	0.000	-2.000	7.200	1.290	1.257
LC3 -LS - 4	33.685	0.000	-2.000	7.100	1.373	1.322
LC4 -LS - 1	27.111	0.000	-2.500	11.600	1.286	1.258
LC4 -LS - 2	27.111	0.000	-2.500	10.500	1.267	1.225
LC5 -LS - 1	16.394	0.000	-2.030	19.000	1.167	1.128
LC5 -LS - 2	16.394	0.000	-2.000	17.200	1.196	1.134
LC6 -LS - 1	31.293	0.000	-2.380	10.300	1.474	1.469
LC6 -LS - 2	31.293	0.000	-2.130	10.500	1.471	1.440
LC7 -LS - 1	24.152	0.000	-2.250	23.400	1.327	1.301
LC7 -LS - 2	16.576	0.000	-2.220	21.700	1.880	1.802
LC8 -LS - 1	42.818	0.000	-1.500	16.800	1.328	1.325
LC8 -LS - 2	42.818	0.000	-1.500	16.200	1.302	1.297
LC8 -LS - 3	42.818	0.000	-1.500	15.500	1.276	1.268
LC8 -LS - 4	43.421	0.000	-1.660	13.800	1.238	1.226
LC8 -LS - 5	43.421	0.000	-2.000	12.300	1.272	1.229
LC9 -LS - 1	26.788	-1.500	-2.000	11.500	1.367	1.359
LC9 -LS - 2	26.788	-1.500	-2.000	11.150	1.415	1.399
LC9 -LS - 3	26.788	-1.500	-2.000	9.950	1.380	1.341
LC10 -LS - 3	31.950	2.000	-2.500	16.400	1.675	1.647
LC11 -LS - 1	31.079	-2.000	-2.500	7.900	1.622	1.619
LC11 -LS - 2	31.079	-2.500	-2.000	7.400	1.588	1.585
LC11 -LS - 3	31.079	-2.000	-2.500	6.800	1.481	1.478
LC1 -LU - 1	85.534	0.000	-2.100	18.740	1.164	1.127
LC1 -LU - 2	85.534	0.000	-12.000	6.800	1.088	1.074
LC1 -LU - 3	85.534	0.000	-6.000	12.320	1.242	1.219
LC2 -LU - 1	174.600	0.000	-6.000	5.760	1.061	1.045
LC2 -LU - 2	174.300	0.000	-9.000	4.290	0.960	0.949
LC3 -LU - 1	131.828	0.000	-4.000	8.000	0.910	0.897
LC3 -LU - 2	132.569	0.000	-8.000	6.350	1.028	1.018
LC3 -LU - 3	131.345	0.000	-4.000	8.500	0.966	0.952
LC4 -LU - 1	134.311	0.000	-12.000	7.720	0.972	0.959
LC4 -LU - 2	134.311	0.000	-18.000	5.180	0.865	0.855
LC4 -LU - 3	140.603	0.000	-6.000	10.660	0.967	0.947
LC5 -LU - 1	117.934	0.000	-4.000	13.690	1.051	1.023
LC5 -LU - 2	117.934	0.000	-8.000	9.320	1.013	0.995
LC5 -LU - 3	115.581	0.000	-6.000	11.780	1.065	1.042
LC5 -LU - 4	115.581	0.000	-10.000	7.990	0.972	0.957
LC6 -LU - 1	95.922	0.000	-5.000	28.750	1.081	1.055
LC6 -LU - 2	95.922	0.000	-10.000	19.490	1.056	1.039
LC10 -LU - 1	96.910	0.000	-5.500	24.800	0.994	0.972
LC10 -LU - 2	96.910	0.000	-5.500	25.000	1.002	0.980
LC7 -LU - 1	71.688	1.500	-3.500	6.500	1.654	1.646
LC7 -LU - 2	71.688	1.500	-3.500	5.800	1.585	1.555
LC7 -LU - 3	71.688	1.500	-3.500	5.350	1.602	1.569
LC8 -LU - 1	136.650	1.000	-2.000	11.850	1.199	1.153
LC8 -LU - 2	136.650	1.000	-2.000	12.000	1.217	1.170
LC8 -LU - 3	133.902	1.000	-4.000	10.750	1.189	1.146
LC8 -LU - 4	133.902	1.000	-4.000	10.550	1.167	1.125
LC8 -LU - 5	136.017	1.000	-6.000	8.900	1.129	1.092
LC8 -LU - 6	136.017	1.000	-6.000	9.350	1.184	1.144
LC9 -LU - 1	115.903	-0.380	-3.940	14.000	0.997	0.956
LC9 -LU - 2	115.903	-0.380	-6.000	10.100	0.870	0.840
LC9 -LU - 3	117.081	-0.380	-6.000	10.600	0.898	0.868
LC9 -LU - 4	117.081	-0.630	-3.940	11.700	0.890	0.858
A71	463.000	0.000	0.000	3.600	1.000	0.942

TABLE D 51(CONT.)
ALL TEST RESULTS
FROM PEKOZ (1987), TABLES 3.3-2 , 3.3-3 , 3.3-4 , 7.3-2 , 7.3-3 , 7.3-4 , 7.3-5

Specimen	wmax/t	ex	ey	Ptest	rc	ra
A74	463.800	0.000	0.000	3.640	1.000	0.941
A75	463.000	0.000	0.000	3.480	0.956	0.902
A76	446.385	0.000	0.000	3.260	0.939	0.896
A101	311.000	0.000	0.000	8.300	1.059	0.993
A102	311.000	0.000	0.000	7.870	1.009	0.947
A103	310.459	0.000	0.000	8.340	1.073	1.007
A104	301.000	0.000	0.000	7.760	0.739	0.726
A151	198.719	0.000	0.000	17.200	1.095	1.011
A152	202.964	0.000	0.000	15.700	1.036	0.957
A153	210.630	0.000	0.000	16.000	1.114	1.032
A154	207.182	0.000	0.000	16.400	1.118	1.046
A156	206.273	0.000	0.000	15.500	1.057	0.979
L1	116.937	0.290	0.000	3.120	1.054	1.006
L2	116.406	0.290	0.000	3.600	1.020	0.989
L3	118.406	0.400	0.000	3.520	0.934	0.900
L4	117.437	0.400	0.000	3.780	0.945	0.917
L5	117.031	0.410	0.000	4.100	0.979	0.958
L6	149.312	0.070	0.000	3.800	1.121	1.061
L7	147.500	0.070	0.000	3.970	1.061	1.015
L8	147.625	0.070	0.000	4.310	1.059	1.026
L9	149.219	0.180	0.000	4.340	1.043	1.000
L10	148.719	0.190	0.000	4.570	1.039	1.007
L11	147.937	0.190	0.000	4.650	1.009	0.985
L12	178.906	0.180	0.000	3.350	1.106	1.053
L13	179.250	0.180	0.000	3.530	1.057	1.017
L14	178.687	0.180	0.000	3.850	1.085	1.052
L15	181.406	0.000	0.000	4.900	1.084	1.034
L16	181.406	0.000	0.000	5.180	1.081	1.042
L17	179.031	0.000	0.000	5.310	1.054	1.027
L18	211.031	0.220	0.000	3.130	1.110	1.057
L19	210.000	0.220	0.000	3.390	1.094	1.050
L20	210.594	0.220	0.000	3.670	1.086	1.058
Mean					1.174	1.141
c.o.v.					0.196	0.205
I					0.912	0.874
FS					1.680	1.754

TABLE D52
ALL TEST RESULTS
FROM PEKOZ (1987), TABLES 3.3-2 , 3.3-3 , 3.3-4 , 7.3-2 , 7.3-3 , 7.3-4 , 7.3-5

(Using calculated average yield stress - all sectio)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC1 -LS - 1	31.744	-1.500	0.000	12.750	1.353	1.353
LC1 -LS - 2	31.744	-1.500	0.000	11.250	1.240	1.240
LC1 -LS - 3	31.744	-1.500	0.000	9.450	1.090	1.090
LC2 -LS - 1	16.515	2.000	0.000	22.000	1.664	1.642
LC2 -LS - 2	16.515	2.250	0.000	18.650	1.609	1.585
LC2 -LS - 3	16.515	2.250	0.000	17.600	1.593	1.559
LC3 -LS - 1	33.233	0.000	-1.450	8.900	1.217	1.174
LC3 -LS - 2	33.685	0.000	-2.000	7.800	1.244	1.223
LC3 -LS - 3	33.685	0.000	-2.000	7.200	1.224	1.192
LC3 -LS - 4	33.685	0.000	-2.000	7.100	1.310	1.259
LC4 -LS - 1	27.111	0.000	-2.500	11.600	1.207	1.180
LC4 -LS - 2	27.111	0.000	-2.500	10.500	1.197	1.155
LC5 -LS - 1	16.394	0.000	-2.030	19.000	1.098	1.065
LC5 -LS - 2	16.394	0.000	-2.000	17.200	1.137	1.075
LC6 -LS - 1	31.293	0.000	-2.380	10.300	1.443	1.439
LC6 -LS - 2	31.293	0.000	-2.130	10.500	1.436	1.413
LC7 -LS - 1	24.152	0.000	-2.250	23.400	1.243	1.219
LC7 -LS - 2	16.576	0.000	-2.220	21.700	1.771	1.693
LC8 -LS - 1	42.818	0.000	-1.500	16.800	1.303	1.300
LC8 -LS - 2	42.818	0.000	-1.500	16.200	1.279	1.274
LC8 -LS - 3	42.818	0.000	-1.500	15.500	1.254	1.246
LC8 -LS - 4	43.421	0.000	-1.660	13.800	1.216	1.205
LC8 -LS - 5	43.421	0.000	-2.000	12.300	1.245	1.208
LC9 -LS - 1	26.788	-1.500	-2.000	11.500	1.295	1.286
LC9 -LS - 2	26.788	-1.500	-2.000	11.150	1.340	1.332
LC9 -LS - 3	26.788	-1.500	-2.000	9.950	1.314	1.277
LC10 -LS - 3	31.950	2.000	-2.500	16.400	1.602	1.572
LC11 -LS - 1	31.079	-2.000	-2.500	7.900	1.543	1.540
LC11 -LS - 2	31.079	-2.500	-2.000	7.400	1.538	1.535
LC11 -LS - 3	31.079	-2.000	-2.500	6.800	1.441	1.435
LC1 -LU - 1	85.534	0.000	-2.100	18.740	1.136	1.098
LC1 -LU - 2	85.534	0.000	-12.000	6.800	1.062	1.049
LC1 -LU - 3	85.534	0.000	-6.000	12.320	1.213	1.189
LC2 -LU - 1	174.600	0.000	-6.000	5.760	1.049	1.034
LC2 -LU - 2	174.300	0.000	-9.000	4.290	0.951	0.939
LC3 -LU - 1	131.828	0.000	-4.000	8.000	0.902	0.889
LC3 -LU - 2	132.569	0.000	-8.000	6.350	1.019	1.008
LC3 -LU - 3	131.345	0.000	-4.000	8.500	0.957	0.943
LC4 -LU - 1	134.311	0.000	-12.000	7.720	0.960	0.947
LC4 -LU - 2	134.311	0.000	-18.000	5.180	0.855	0.845
LC4 -LU - 3	140.603	0.000	-6.000	10.660	0.956	0.936
LC5 -LU - 1	117.934	0.000	-4.000	13.690	1.037	1.010
LC5 -LU - 2	117.934	0.000	-8.000	9.320	1.001	0.982
LC5 -LU - 3	115.581	0.000	-6.000	11.780	1.049	1.026
LC5 -LU - 4	115.581	0.000	-10.000	7.990	0.957	0.941
LC6 -LU - 1	95.922	0.000	-5.000	28.750	1.060	1.033
LC6 -LU - 2	95.922	0.000	-10.000	19.490	1.034	1.017
LC10 -LU - 1	96.910	0.000	-5.500	24.800	0.974	0.952
LC10 -LU - 2	96.910	0.000	-5.500	25.000	0.982	0.959
LC7 -LU - 1	71.688	1.500	-3.500	6.500	1.589	1.582
LC7 -LU - 2	71.688	1.500	-3.500	5.800	1.530	1.503
LC7 -LU - 3	71.688	1.500	-3.500	5.350	1.555	1.524
LC8 -LU - 1	136.650	1.000	-2.000	11.850	1.186	1.139
LC8 -LU - 2	136.650	1.000	-2.000	12.000	1.204	1.156
LC8 -LU - 3	133.902	1.000	-4.000	10.750	1.176	1.133
LC8 -LU - 4	133.902	1.000	-4.000	10.550	1.154	1.112
LC8 -LU - 5	136.017	1.000	-6.000	8.900	1.117	1.079
LC8 -LU - 6	136.017	1.000	-6.000	9.350	1.172	1.132
LC9 -LU - 1	115.903	-0.380	-3.940	14.000	0.989	0.947
LC9 -LU - 2	115.903	-0.380	-6.000	10.100	0.862	0.832
LC9 -LU - 3	117.081	-0.380	-6.000	10.600	0.890	0.860
LC9 -LU - 4	117.081	-0.630	-3.940	11.700	0.882	0.851
A71	463.000	0.000	0.000	3.600	0.997	0.940

TABLE D52(CONT.)
ALL TEST RESULTS
FROM PEKOZ (1987), TABLES 3.3-2 , 3.3-3 , 3.3-4 , 7.3-2 , 7.3-3 , 7.3-4 , 7.3-5

Specimen	wmax/t	ex	ey	Ptest	rc	ra
A74	463.800	0.000	0.000	3.640	0.997	0.938
A75	463.000	0.000	0.000	3.480	0.956	0.899
A76	446.385	0.000	0.000	3.260	0.937	0.893
A101	311.000	0.000	0.000	8.300	1.053	0.988
A102	311.000	0.000	0.000	7.870	1.005	0.943
A103	310.459	0.000	0.000	8.340	1.069	1.002
A104	301.000	0.000	0.000	7.760	0.737	0.723
A151	198.719	0.000	0.000	17.200	1.087	1.003
A152	202.964	0.000	0.000	15.700	1.028	0.949
A153	210.630	0.000	0.000	16.000	1.106	1.024
A154	207.182	0.000	0.000	16.400	1.110	1.037
A156	206.273	0.000	0.000	15.500	1.050	0.971
L1	116.937	0.290	0.000	3.120	1.043	0.997
L2	116.406	0.290	0.000	3.600	1.006	0.978
L3	118.406	0.400	0.000	3.520	0.926	0.891
L4	117.437	0.400	0.000	3.780	0.936	0.909
L5	117.031	0.410	0.000	4.100	0.969	0.949
L6	149.312	0.070	0.000	3.800	1.111	1.053
L7	147.500	0.070	0.000	3.970	1.053	1.005
L8	147.625	0.070	0.000	4.310	1.049	1.014
L9	149.219	0.180	0.000	4.340	1.036	0.991
L10	148.719	0.190	0.000	4.570	1.029	0.998
L11	147.937	0.190	0.000	4.650	0.998	0.977
L12	178.906	0.180	0.000	3.350	1.095	1.044
L13	179.250	0.180	0.000	3.530	1.047	1.006
L14	178.687	0.180	0.000	3.850	1.072	1.041
L15	181.406	0.000	0.000	4.900	1.077	1.027
L16	181.406	0.000	0.000	5.180	1.072	1.034
L17	179.031	0.000	0.000	5.310	1.045	1.019
L18	211.031	0.220	0.000	3.130	1.102	1.050
L19	210.000	0.220	0.000	3.390	1.083	1.040
L20	210.594	0.220	0.000	3.670	1.076	1.046
Mean					1.146	1.114
c.o.v.					0.180	0.189
I					0.914	0.876
FS					1.678	1.750

TABLE D53
ALL TEST RESULTS
FROM PEKOZ (1987), TABLES 3.3-2 , 3.3-3 , 3.3-4 , 7.3-2 , 7.3-3 , 7.3-4 , 7.3-5

(Using calculated average yield stress)
USING AISC-LRFD BEAM-COLUMN EQUATIONS

Specimen	wmax/t	ex	ey	Ptest	rc	ra
LC1 -LS - 1	31.744	-1.500	0.000	12.750	1.353	1.353
LC1 -LS - 2	31.744	-1.500	0.000	11.250	1.240	1.240
LC1 -LS - 3	31.744	-1.500	0.000	9.450	1.090	1.090
LC2 -LS - 1	16.515	2.000	0.000	22.000	1.664	1.642
LC2 -LS - 2	16.515	2.250	0.000	18.650	1.609	1.585
LC2 -LS - 3	16.515	2.250	0.000	17.600	1.593	1.559
LC3 -LS - 1	33.233	0.000	-1.450	8.900	1.217	1.174
LC3 -LS - 2	33.685	0.000	-2.000	7.800	1.244	1.223
LC3 -LS - 3	33.685	0.000	-2.000	7.200	1.224	1.192
LC3 -LS - 4	33.685	0.000	-2.000	7.100	1.310	1.259
LC4 -LS - 1	27.111	0.000	-2.500	11.600	1.207	1.180
LC4 -LS - 2	27.111	0.000	-2.500	10.500	1.197	1.155
LC5 -LS - 1	16.394	0.000	-2.030	19.000	1.098	1.065
LC5 -LS - 2	16.394	0.000	-2.000	17.200	1.137	1.075
LC6 -LS - 1	31.293	0.000	-2.380	10.300	1.443	1.439
LC6 -LS - 2	31.293	0.000	-2.130	10.500	1.436	1.413
LC7 -LS - 1	24.152	0.000	-2.250	23.400	1.243	1.219
LC7 -LS - 2	16.576	0.000	-2.220	21.700	1.771	1.693
LC8 -LS - 1	42.818	0.000	-1.500	16.800	1.303	1.300
LC8 -LS - 2	42.818	0.000	-1.500	16.200	1.279	1.274
LC8 -LS - 3	42.818	0.000	-1.500	15.500	1.254	1.246
LC8 -LS - 4	43.421	0.000	-1.660	13.800	1.216	1.205
LC8 -LS - 5	43.421	0.000	-2.000	12.300	1.245	1.208
LC9 -LS - 1	26.788	-1.500	-2.000	11.500	1.295	1.286
LC9 -LS - 2	26.788	-1.500	-2.000	11.150	1.340	1.332
LC9 -LS - 3	26.788	-1.500	-2.000	9.950	1.314	1.277
LC10 -LS - 3	31.950	2.000	-2.500	16.400	1.602	1.572
LC11 -LS - 1	31.079	-2.000	-2.500	7.900	1.543	1.540
LC11 -LS - 2	31.079	-2.500	-2.000	7.400	1.538	1.535
LC11 -LS - 3	31.079	-2.000	-2.500	6.800	1.441	1.435
LC1 -LU - 1	85.534	0.000	-2.100	18.740	1.164	1.127
LC1 -LU - 2	85.534	0.000	-12.000	6.800	1.088	1.074
LC1 -LU - 3	85.534	0.000	-6.000	12.320	1.242	1.219
LC2 -LU - 1	174.600	0.000	-6.000	5.760	1.061	1.045
LC2 -LU - 2	174.300	0.000	-9.000	4.290	0.960	0.949
LC3 -LU - 1	131.828	0.000	-4.000	8.000	0.910	0.897
LC3 -LU - 2	132.569	0.000	-8.000	6.350	1.028	1.018
LC3 -LU - 3	131.345	0.000	-4.000	8.500	0.966	0.952
LC4 -LU - 1	134.311	0.000	-12.000	7.720	0.972	0.959
LC4 -LU - 2	134.311	0.000	-18.000	5.180	0.865	0.855
LC4 -LU - 3	140.603	0.000	-6.000	10.660	0.967	0.947
LC5 -LU - 1	117.934	0.000	-4.000	13.690	1.051	1.023
LC5 -LU - 2	117.934	0.000	-8.000	9.320	1.013	0.995
LC5 -LU - 3	115.581	0.000	-6.000	11.780	1.065	1.042
LC5 -LU - 4	115.581	0.000	-10.000	7.990	0.972	0.957
LC6 -LU - 1	95.922	0.000	-5.000	28.750	1.081	1.055
LC6 -LU - 2	95.922	0.000	-10.000	19.490	1.056	1.039
LC10 -LU - 1	96.910	0.000	-5.500	24.800	0.994	0.972
LC10 -LU - 2	96.910	0.000	-5.500	25.000	1.002	0.980
LC7 -LU - 1	71.688	1.500	-3.500	6.500	1.589	1.582
LC7 -LU - 2	71.688	1.500	-3.500	5.800	1.530	1.503
LC7 -LU - 3	71.688	1.500	-3.500	5.350	1.555	1.524
LC8 -LU - 1	136.650	1.000	-2.000	11.850	1.199	1.153
LC8 -LU - 2	136.650	1.000	-2.000	12.000	1.217	1.170
LC8 -LU - 3	133.902	1.000	-4.000	10.750	1.189	1.146
LC8 -LU - 4	133.902	1.000	-4.000	10.550	1.167	1.125
LC8 -LU - 5	136.017	1.000	-6.000	8.900	1.129	1.092
LC8 -LU - 6	136.017	1.000	-6.000	9.350	1.184	1.144
LC9 -LU - 1	115.903	-0.380	-3.940	14.000	0.997	0.956
LC9 -LU - 2	115.903	-0.380	-6.000	10.100	0.870	0.840
LC9 -LU - 3	117.081	-0.380	-6.000	10.600	0.898	0.868
LC9 -LU - 4	117.081	-0.630	-3.940	11.700	0.890	0.858

TABLE D53 (CONT.)
ALL TEST RESULTS
FROM PEKOZ (1987), TABLES 3.3-2 , 3.3-3 , 3.3-4 , 7.3-2 , 7.3-3 , 7.3-4 , 7.3-5

Specimen	wmax/t	ex	ey	Ptest	rc	ra
A71	463.000	0.000	0.000	3.600	1.000	0.942
A74	463.800	0.000	0.000	3.640	1.000	0.941
A75	463.000	0.000	0.000	3.480	0.956	0.902
A76	446.385	0.000	0.000	3.260	0.939	0.896
A101	311.000	0.000	0.000	8.300	1.059	0.993
A102	311.000	0.000	0.000	7.870	1.009	0.947
A103	310.459	0.000	0.000	8.340	1.073	1.007
A104	301.000	0.000	0.000	7.760	0.739	0.726
A151	198.719	0.000	0.000	17.200	1.095	1.011
A152	202.964	0.000	0.000	15.700	1.036	0.957
A153	210.630	0.000	0.000	16.000	1.114	1.032
A154	207.182	0.000	0.000	16.400	1.118	1.046
A156	206.273	0.000	0.000	15.500	1.057	0.979
L1	116.937	0.290	0.000	3.120	1.054	1.006
L2	116.406	0.290	0.000	3.600	1.020	0.989
L3	118.406	0.400	0.000	3.520	0.934	0.900
L4	117.437	0.400	0.000	3.780	0.945	0.917
L5	117.031	0.410	0.000	4.100	0.979	0.958
L6	149.312	0.070	0.000	3.800	1.121	1.061
L7	147.500	0.070	0.000	3.970	1.061	1.015
L8	147.625	0.070	0.000	4.310	1.059	1.026
L9	149.219	0.180	0.000	4.340	1.043	1.000
L10	148.719	0.190	0.000	4.570	1.039	1.007
L11	147.937	0.190	0.000	4.650	1.009	0.985
L12	178.906	0.180	0.000	3.350	1.106	1.053
L13	179.250	0.180	0.000	3.530	1.057	1.017
L14	178.687	0.180	0.000	3.850	1.085	1.052
L15	181.406	0.000	0.000	4.900	1.084	1.034
L16	181.406	0.000	0.000	5.180	1.081	1.042
L17	179.031	0.000	0.000	5.310	1.054	1.027
L18	211.031	0.220	0.000	3.130	1.110	1.057
L19	210.000	0.220	0.000	3.390	1.094	1.050
L20	210.594	0.220	0.000	3.670	1.086	1.058
Mean					1.153	1.121
c.o.v.					0.176	0.184
I					0.925	0.887
FS					1.658	1.728

2. REVIEW OF DESIGN APPROACHES

2.1 THE ECCS APPROACH FOR UNPERFORATED COLUMNS

The ECCS Approach is intended for unperforated columns that may or may not be locally stable. The effect of local buckling on the overall buckling is accounted for through the use of the Q factor defined below. The approach involves the determination of the design strength N_d as follows (the notation has been changed slightly from that given in the ECCS Recommendations [1987]):

$$N_d = A_g F_n \qquad \text{Eq. 1}$$

where

$$F_n = F_y (F - [F^2 - (Q / \lambda^2)]^{1/2}) \qquad \text{Eq. 2}$$

where

$$F = [Q + (1 + \eta(\lambda - 0.2))/\lambda^2] / 2 \qquad \text{Eq. 3}$$

and

$$\lambda = (F_y / F_e)^{1/2} \qquad \text{Eq. 4}$$

F_e and F_y are the elastic buckling and yield stresses, respectively.

For flexural buckling this parameter becomes

$$\lambda = (L / r) (1 / \pi) (F_y / E)^{1/2} \qquad \text{Eq. 5}$$

Other terms of the above equations are

Q	=	A_{eu} / A_g	Eq. 6
A_{eu}	=	Effective area at uniform compression stress equal to yield stress	
A_g	=	Full cross-sectional area	
r	=	Radius of gyration of the full section	
L	=	Effective length	
η	=	$\alpha(4 - 3Q) \leq 0.76$	Eq. 7
α	=	0.34 for the sections tested	

The design strength N_d is to be not less than the axial force caused by the design loads times load factors. The load factor for live load is 1.5.

2.2 THE AISI APPROACH FOR UNPERFORATED COLUMNS

The AISI Approach is also intended for unperforated columns that may or may not be locally stable. An exception is discussed in the next section. In this approach first the nominal column buckling stress F_n is determined as follows:

For $F_e \leq F_y/2$ $\quad F_n = F_e$ $\qquad$ Eq. 8
For $F_e > F_y/2$ $\quad F_n = F_y (1 - F_y / 4F_e)$ $\qquad$ Eq. 9

F_e is the elastic column buckling stress, and in case of flexural buckling

$$F_e = \pi^2 E / (KL/r)^2 \qquad \text{Eq. 10}$$

In case of torsional flexural buckling F_e is the elastic torsional-flexural buckling stress.

The column strength P_n is determined as

$$P_n = A_e F_n \qquad \text{Eq. 11}$$

A_e is the effective area of the column at stress F_n. When A_e cannot be determined analytically, the value of A_e for a given F_n can be determined on the basis of stub column test results. The value of A_e can be determined either from the measured axial shortening or from the value of the effective area A_{eu} at ultimate load. These approaches were derived by Pekoz [1986]. The latter approach leads to the following expression:

$$A_e = A - (A - A_{eu}) (F_n / F_y)^{A_{eu}/A} \qquad \text{Eq. 12}$$

A_{eu} is the effective area at ultimate stub column load P_t determined as

$$A_{eu} = (P_t) / F_y \qquad \text{Eq. 13}$$

The column strength P_n is divided by a factor of safety to find the allowable load. For sections thinner that .09 inches a constant factor of safety of 1.92 is used. For thicker sections the factor of safety varies from 1.67 for very short columns to 1.92 for long columns.

2.3 THE AISC APPROACH FOR UNPERFORATED COLUMNS

The American Institute of Steel Construction [1986], "Load and Resistance Factor Design Specification for Structural Steel Buildings" is for hot-rolled steel sections. The AISC design formulation that is also primarily for locally stable unperforated columns is given here for information purposes.

The column strength P_n is determined as

$$P_n = A F_{cr} \qquad \text{Eq. 14}$$

for $\lambda \leq 1.5$ $\quad F_{cr} = (.658^{\lambda^2}) F_y$ $\qquad$ Eq. 15

APPENDIX E - REFERENCE PEKOZ (1988)

Ninth International Specialty Conference on Cold-Formed Steel Structures
St. Louis, Missouri, U.S.A., November 8-9, 1988

DESIGN OF COLD-FORMED STEEL COLUMNS

by Teoman Pekoz, PhD
Professor of Structural Engineering
Cornell University
Ithaca, New York, USA

1. INTRODUCTION

It is well known that imperfections, residual stresses and basic material properties influence the behavior of columns. The imperfections and the residual stresses and the degree to which they influence the performance of columns depends on the methods and details of manufacture as well as the cross-sectional geometry. Cold-formed steel columns have a great variety of shapes and the details of manufacture vary widely. Two general studies on the flexural buckling of locally stable columns have been carried out recently at Cornell and reported in Dat and Pekoz [1980] and Weng and Pekoz [1987]. Several papers on the latter reference will be published in the near future. These general studies show that a simple formulation covering all types of columns is not possible.

This paper presents some of the results of a study to develop a design approach for a specific class of columns, namely, typical lipped channel columns with and without perforations used in industrial rack structures. Since very little test evidence existed, 30 stub columns and 33 columns were tested within this project. This study was sponsored by the Rack Manufacturers Institute. The results of these tests were evaluated along with the results of 42 unperforated column tests carried out in an American Iron and Steel Institute sponsored project reported in Weng and Pekoz [1987]. All the columns considered have either fully effective cross-sections or would have fully effective cross-sections if unperforated.

In the evaluation of the test results, 23 different approaches were used. The approach of the European Convention for Constructional Steelwork [1987], "European Recommendations for the Design of Light Gauge Steel Members" and its possible extensions to perforated columns were among those tried. These approaches will be referred to as the ECCS Approaches. Only five out of the 23 approaches will be focused upon in this paper. Four of these approaches are related to the ECCS Approach. An approach based on the basic AISI Column design equation will also be discussed.

More detailed information on the specimens tested and the other design approaches evaluated can be found in Pekoz [1987].

- Based on test results using the Eq. 12 where A_e is the effective area of the column at NOMINAL STRESS, F_n. The area A was taken consistent with the cross section used in determining NOMINAL STRESS, namely it was the net area when the net section radius of gyration was used in calculating the NOMINAL STRESS and gross area was used when the gross section radius of gyration was used.

NOMINAL STRESS

In determining the NOMINAL STRESS, F_n, both the AISI and the ECCS column design equations were used. The radius of gyration r was taken either for the net section or for the gross section as indicated in Table 2. When net section was used

$$r = (I_m/A_c)^{1/2} \qquad \text{Eq. 17}$$

where I_m is the minimum net moment of inertia and A_c is the area of the section giving the minimum moment of inertia.

In case of torsional flexural buckling F_e is the elastic torsional-flexural buckling stress based on sharp corner gross section properties.

4. EVALUATION OF TEST RESULTS

The results of the evaluations are summarized in Tables 3a, 3b and 3c. Since the hinge-ended and the fixed-ended columns failed by flexural and torsional-flexural buckling, respectively, some conclusions can be drawn about the accuracy of the approaches for both types of buckling. Tables 3a and 3c are for columns where flexural buckling was the governing failure mode. All the columns shown in Table 3b failed by torsional-flexural buckling.

In Tables 3a, 3b and 3c, the ratios of the observed maximum test load P_t divided by the calculated load and their means, standard deviations and coefficient of variations are given. The subscript of the calculated load P refers to the procedures listed in Table 2. In Table 3c which is for locally stable unperforated columns, the procedures PE1, PE2, PE3 and PE4 give the same results and are referred to as PE. For perforated sections λ is calculated for the net section.

It is seen in Tables 3a and 3b that the approach PE2 which is the ECCS Approach modified by the AISI Approach for treating the interaction of local and overall buckling gives smallest standard coefficient of variation for flexural buckling of both the unperforated and perforated columns. This approach also gives the lowest coefficient of variation for torsional-flexural buckling of perforated columns as well. For torsional-flexural buckling of unperforated columns the coefficients of variation for all types of analyses, the coefficient of variations are nearly equal. It should be noted that for the modified AISI approach (PA) the mean quite a bit below 1.0. However, the ultimate load calculated by the column curve is not the only factor to be considered in assessing the design approach. As discussed below the load and resistance factors and the factors of safety involved also need to considered.

5. SOME OBSERVATIONS ON THE DESIGN APPROACHES

The test results of Weng and Pekoz [1987] on unperforated columns as well as the AISI, AISC and the ECCS column curves are plotted in Fig. 3. It is seen that the ECCS curve provides a lower limit and the AISI curve provides an upper limit to the observed results. It is of interest how the allowable loads would compare if one includes the effect of the load and resistance factors and the factor of safety in the calculations. The following parametric study was carried out for such a comparison.

The results of a parametric study are summarized in Tables 4a and 4b. In these tables the modified ECCS approach design load and the modified AISI approach allowable load are compared for perforated and unperforated type A and B columns for various lengths. These tables show the comparisons for the case of constant factor of safety as it is prescribed in the AISI Specification for thicknesses less than .09 inches and the variable factor of safety for the case of thicknesses larger than .09 inches. It is seen that for the case of constant factor of safety the modified AISI approach gives close but consistently lower loads than the modified ECCS approach design strength divided by a load factor equal to 1.5.

For unperforated locally stable columns subject to flexural buckling, a comparison of the ECCS Recommendations, the AISI and the AISC Specifications is shown graphically in Fig. 3. In this figure the curves marked ECCS, AISI and AISC are for nominal strengths according to the respective documents. The curve marked $ECCS_a$ is the ECCS design strength divided by a live load factor of 1.5. The curves marked $AISI_a$ and $AISI_b$ are for the nominal strength divided by a factor of safety of 1.92 and by the varying factor of safety stipulated in the AISI Specification for thicknesses greater than .09 inches. The curve marked $AISC_a$ is for the nominal strength multiplied by a resistance factor of .85 and divided by a live load factor of 1.6. Since the columns considered have very high live to dead load ratios only live load factors are considered.

Since only locally stable unperforated columns can be shown in Fig. 3, the conclusions from this figure are strictly correct for such columns. However, the results for perforated columns should follow similar relative trends. It is seen that for the most part for $\lambda > 1.5$ $F_{cr} = (.877 / \lambda^2) F_y$ Eq. 16

The design strength is ϕP_n where ϕ is the resistance factor equal to .85. The required strength is determined using load factors.

2.4 EXTENSIONS OF THE ECCS AND THE AISI APPROACHES TO PERFORATED COLUMNS

The ECCS Approach can be extended to perforated columns in several ways. The first that comes to mind is to use the value of Q determined by test on stub column specimens. The configuration of perforations in general does not allow the calculation of Q analytically. Another possible extension would involve combining the ECCS column design curve with the AISI Specification [1986] approach for handling the interaction of local and overall buckling. Information on the development of this approach can be found in Pekoz [1986].

The extension of the AISI Approach that gave the most satisfactory results will be discussed below. The AISI Specification contains design provisions for columns with circular perforations within certain limits. Typical rack columns do not fall within these limits of applicability.

3. TEST RESULTS

Two groups of test results were used in this study. The average dimensions of the sections are given in Table 1. The geometry of the sections and the cross-sectional notation are illustrated in Figs. 1 and 2. In Table 1 T is the wall thickness, r' is the average inside corner radius and Q_n is A_{eu} divided by the net minimum area.

3.1 SPECIMENS OF PEKOZ [1987]

The perforated and unperforated columns of Pekoz [1987] have the designations AU1, AU2, AP1, AP2, BU1, BU2, BP1, BP2). Two types of sections were taken from regular manufacturing lines of two different companies designated A and B.

The perforated and unperforated sections are designated as P and U. The letters U and P are followed by 1 or 2 which designate the thinner and the thicker walled-sections, respectively. The number following the thickness designation is the number of the test in the series. The last letter in the designation indicates the end conditions as follows:

F Fixed-ended column. In these tests base plates were welded and the columns were tested flat-ended. Hydrostone was placed at each end to assure uniform distribution of the end loads and the end fixity.

H Hinge-ended. Specially designed end fixtures were used to assure hinged condition about the centroidal axis perpendicular to the axis of symmetry. The difference in the location of the net and the full section centroidal axes were insignificant compared with the accuracy of the cross sectional dimensions and the accuracy with which the column could be aligned.

In this group of specimens, all the fixed ended columns were subject to torsional-flexural and all the hinge ended specimens were subject to flexural buckling. The modes of buckling predicted were confirmed by the appearances of buckling modes.

3.2 SPECIMENS OF WENG AND PEKOZ [1987]

The unperforated columns of Weng and Pekoz [1987] have the designations RFC11, RFC13, RFC14, PBC13, PBC14, P11, P16, R13, R14. RFC and PBC as well as R and P indicate roll-formed and press-braked C-sections, respectively. The numbers that follow indicate the gage of the material.

All columns of this group were tested with hinges about the minor axis and all the specimens were subject to flexural buckling. The loads were aligned with the aid of strain gages to be concentric at about one fourth of the expected ultimate load.

4. EVALUATION OF TEST RESULTS

The approaches summarized in Table 2 involve the calculation of the nominal column strength P_n as follows:

P_n = (AREA) (NOMINAL STRESS)

Depending on the approach different definitions of AREA and the NOMINAL STRESS were used.

AREA

The following possibilities for the calculation of the AREA were considered:

NET is the net minimum area of the section.

EFFECTIVE is the area determined at the nominal stress determined by one of the two approaches:

- Using the effective width equations of the AISI Specification. For the sections considered these equations are basically the same as those of the ECCS Recommendations.

the AISI approaches with constant and variable factors of safety give more conservative results than the ECCS Approach.

It should be noted that stub column results are not plotted in this figure. If they were plotted they would all fall above the strength curves. The behavior of very short columns can be predicted quite conservatively. For this reason a variable factor of safety which is lower for shorter columns appears justified.

Dat and Pekoz [1980] and Weng and Pekoz [1987] show that the lipped channel sections with component elements just at the limit of becoming partially effective, the predictions of the AISI column curve give upper bounds to test results. Dat and Pekoz [1980] also show that members with component elements that do not have slendernesses in this range, the AISI curve gives satisfactory results. Most of the columns in the present study had component elements that were at the limit of being partially effective. It is expected that the procedures discussed above would give more conservative results for other cold-formed steel compression members having component elements not in the range of limiting slenderness between the fully effective and partially effective.

5. SUMMARY AND CONCLUSIONS

Several design provisions for perforated and unperforated lipped channel columns were studied. The formulation that gave the best results for flexural buckling involved obtaining a nominal failure stress using the ECCS Column curve with $Q = 1$ and with net section properties. The nominal strength or the design strength is found by multiplying the nominal failure stress by the effective area determined by stub column tests. For torsional-flexural buckling the nominal failure stress is found on the basis of the full section assuming sharp corners.

It was seen that when the entire design approaches including the column curves, factors of safety, resistance and load factors are considered, the ECCS, AISI and AISC documents lead to closer agreement than just a comparison of the column curves would indicate.

It is hoped that the observations of this paper will aid the specification writing committees in their deliberations.

7. FUTURE WORK

All the columns considered in this study have either fully effective cross-sections or would have had fully effective cross-sections if unperforated. Using the approach developed in this study, namely combining the ECCS column curve with AISI approaches for the interaction of local and overall buckling for the case when the sections are not fully effective, appears promising. This topic will be studied in the near future.

Columns are usually subjected to axial loads in combination with moments. This case is usually treated in design specifications by interaction equations. The load carrying capacity for concentric loading which is the case studied in the present project is one of the parameters that are used in these interaction equations. Therefore the case of combined axial loading and bending will also be studied in the near future.

8. ACKNOWLEDGEMENTS

The author would like to thank Dr. S. J. Errera and the AISI Specification Advisory Committee as well as Mr. Herb Klein and the RMI Specification Advisory Committee for their help, and support. He would also like to acknowledge the sponsorship of AISI and the RMI for the work that served as the basis of this paper.

9. REFERENCES

American Institute of Steel Construction [1986], "Load and Resistance Factor Design Specification for Structural Steel Buildings," American Institute of Steel Construction 1986.

American Iron and Steel Institute [1986], "Specification for the Design of Cold-Formed Steel Structural Members," American Iron and Steel Institute, August 19, 1986.

Dat, D. T. and Pekoz, T., Project Director [1980], "The Strength of Cold-Formed Steel Columns," Research Report, Department of Structural Engineering, Cornell University, 1980.

European Convention for Constructional Steelwork [1987], "European Recommendations for the Design of Light Gauge Steel Members," European Convention for Constructional Steelwork, 1987.

Pekoz, T. [1986], "Development of a Unified Approach to the Design of Cold-Formed Steel Members," American Iron and Steel Institute, Report SG-86-4, November 1986.

Pekoz, T. [1987], "Design of Perforated Cold-Formed Steel Columns," Research Report Prepared for the Rack Manufacturers Institute, October 11, 1987.

Rack Manufacturers Institute [1985], "Specification for the Design, Testing and Utilization of Industrial Storage Racks," Rack Manufacturers Institute, 1985.

Weng, C. C. and Pekoz, T., Project Director [1986], "Flexural Buckling of Cold-Formed Steel Columns," Research Report, Department of Structural Engineering, Cornell University, 1987.

TABLE 1
CROSS-SECTIONAL DIMENSIONS

SECTION	T (in)	A' (in)	B' (in)	C' (in)	r' (in)	F_y (ksi)	Q_n
AU1	.073	3.00	1.63	.80	.17	54.68	.94
AU2	.106	3.03	1.66	.74	.19	57.71	.98
AP1	.069	3.00	1.63	.80	.17	64.00	.77
AP2	.102	3.03	1.66	.74	.19	62.75	.80
BU1	.086	3.00	1.63	.62	.25	51.55	1.00
BU2	.098	3.03	1.63	.61	.24	49.17	1.00
BP1	.086	3.00	1.63	.62	.25	44.64	1.00
BP2	.098	3.03	1.63	.61	.24	45.04	1.00
RFC11	.119	3.16	1.64	.71	.16	40.38	1.00
RFC13	.096	3.07	1.63	.70	.16	51.85	1.00
RFC14	.075	2.99	1.76	.69	.22	55.09	1.00
PBC13	.087	3.02	1.62	.61	.16	38.40	1.00
PBC14	.071	3.00	1.62	.61	.16	36.30	1.00
P11	.118	5.03	2.48	.88	.13	30.59	1.00
P16	.064	2.65	1.37	.63	.09	33.45	1.00
R13	.086	3.01	1.63	.61	.22	50.15	1.00
R14	.075	3.02	1.64	.61	.22	49.73	1.00

TABLE 2
EVALUATION OF LONG COLUMN TEST RESULTS

PROCEDURE	AREA (1)	RADIUS OF GYRATION (1)	DESIGN EQUATION
PE1	GROSS	GROSS	ECCS
PE2	EFFECTIVE (2)	NET (4)	ECCS(3)
PE3	EFFECTIVE	NET (4)	ECCS
PE4	EFFECTIVE (2)	GROSS	ECCS
PA	EFFECTIVE (2)	NET (4)	AISI

(1) please refer to the text for description
(2) determined from stub column test
(3) determined taking Q=1
(4) net section radius of gyration is used for flexural buckling and gross properties are used for torsional flexural buckling. In both cases the net minimum area is used in calculating the effective area from stub column test results.

TABLE 3a
EVALUATION OF TEST RESULTS
(Pekoz [1987])

TEST	λ	Pt/PE1	Pt/PE2	Pt/PE3	Pt/PE4	Pt/PA
Unperforated Columns						
AU1-1H	0.885	1.296	1.238	1.352	1.296	1.041
AU2-1H	0.954	0.949	0.934	0.961	0.949	0.759
BU1-1H	0.694	1.065	1.065	1.065	1.065	0.953
BU1-2H	0.902	0.813	0.813	0.813	0.813	0.673
BU2-1H	0.706	1.031	1.031	1.031	1.031	0.919
BU2-2H	0.900	0.796	0.796	0.796	0.796	0.660
MEAN		0.992	0.979	1.003	0.991	0.834
STDEV		0.185	0.168	0.203	0.185	0.159
COV		0.187	0.171	0.203	0.187	0.190
Perforated Columns						
AP1-1H	0.987	1.001	1.009	1.398	1.016	0.837
AP1-2H	0.677	0.679	0.705	0.992	0.708	0.647
AP2-1H	0.709	1.052	0.905	1.488	1.052	0.821
AP2-2H	1.062	1.188	1.014	1.607	1.187	0.814
AP2-3H	1.018	1.083	0.921	1.474	1.083	0.751
AP2-4H	1.337	1.018	0.903	1.336	1.018	0.689
BP1-1H	0.612	1.084	1.082	1.324	1.084	0.992
BP1-2H	0.864	1.102	1.093	1.346	1.102	0.919
BP2-1H	0.628	0.920	0.904	1.125	0.920	0.825
BP2-2H	0.876	1.000	0.976	1.222	0.999	0.818
BP2-3H	0.876	0.937	0.915	1.145	0.937	0.766
MEAN		1.006	0.948	1.314	1.010	0.807
STDEV		0.132	0.107	0.181	0.125	0.096
COV		0.132	0.113	0.138	0.124	0.119

TABLE 3b
EVALUATION OF GROUP 1 TEST RESULTS
(Pekoz [1987])

TEST	λ	Pt/PE1	Pt/PE2	Pt/PE3	Pt/PE4	Pt/PA
Unperforated Columns						
AU1-1F	0.725	0.958	0.921	1.006	0.967	0.820
AU1-2F	1.001	1.151	1.100	1.195	1.151	0.883
AU2-1F	0.755	1.091	1.076	1.108	1.093	0.945
AU2-2F	1.021	1.016	1.001	1.029	1.016	0.793
BU1-1F	0.751	1.011	1.011	1.011	1.011	0.888
BU1-2F	1.033	1.091	1.091	1.091	1.091	0.857
BU2-1F	0.724	1.025	1.025	1.025	1.025	0.908
BU2-2F	1.027	1.094	1.094	1.094	1.094	0.862
MEAN		1.055	1.040	1.070	1.056	0.870
STDEV		0.062	0.062	0.065	0.060	0.048
COV		0.059	0.060	0.061	0.057	0.056
Perforated Columns						
AP1-1F	0.802	1.076	1.086	1.544	1.110	0.961
AP1-2F	1.105	1.089	1.088	1.494	1.090	0.866
AP2-1F	0.803	1.287	1.087	1.802	1.287	0.959
AP2-2F	1.058	1.100	0.931	1.489	1.100	0.749
BP1-1F	0.720	1.019	1.011	1.245	1.019	0.897
BP1-2F	0.964	1.070	1.068	1.307	1.069	0.863
BP2-1F	0.717	1.092	1.067	1.335	1.092	0.948
BP2-2F	0.987	1.055	1.041	1.290	1.055	0.833
MEAN		1.099	1.047	1.438	1.103	0.884
STDEV		0.080	0.054	0.184	0.080	0.073
COV		0.073	0.052	0.128	0.073	0.083

TABLE 3c
EVALUATION OF GROUP 2 TEST RESULTS
(Weng and Pekoz [1987])

TEST	λ	Pt/PE	Pt/PA
RFC11-1	0.52	1.093	1.027
RFC11-2	0.75	1.198	1.051
RFC11-3	0.97	1.375	1.106
RFC11-4	1.21	1.241	0.925
RFC13-1	0.58	1.025	0.947
RFC13-2	0.84	1.194	1.014
RFC13-3	1.11	1.286	0.984
RFC13-4	1.37	1.235	0.918
RFC14-1	0.55	0.996	0.927
RFC14-2	0.80	1.038	0.896
RFC14-3	1.05	0.981	0.766
RFC14-4	1.30	1.000	0.740
RFC14-5	1.56	1.033	0.808
PBC13-1	0.51	0.903	0.850
PBC13-2	0.74	1.020	0.900
PBC13-3	0.97	1.145	0.922
PBC14-1	0.49	1.023	0.967
PBC14-2	0.71	1.137	1.012
PBC14-3	0.92	1.135	0.933
PBC14-4	1.14	1.225	0.928
PBC14-5	1.36	1.366	1.013
P11-1	0.60	1.034	0.950
P11-2	0.82	1.079	0.923
P11-3	1.04	1.087	0.853
P11-4	1.26	1.124	0.832
P16-1	0.62	1.026	0.938
P16-2	0.82	1.103	0.944
P16-3	1.03	1.089	0.859
P16-4	1.22	1.160	0.864
P16-5	1.35	1.219	0.904
R13-1	0.58	1.071	0.989
R13-2	0.85	1.186	1.005
R13-3	1.10	1.148	0.891
R13-4	1.37	1.166	0.868
R13-5	1.59	1.124	0.884
R14-1	0.57	1.077	0.997
R14-2	0.82	1.070	0.916
R14-3	1.08	1.101	0.852
R14-4	1.33	1.109	0.821
R14-5	1.57	1.056	0.827
MEAN		1.117	0.919
STDEV		0.100	0.078
COV		0.090	0.085

Table 4a
PARAMETRIC STUDIES
Hinge Ended Columns - Flexural Buckling

SECTION	L	λ	R1	R2	R3
Unperforated Columns					
AU1	40	0.86	1.63	1.09	0.94
AU1	80	1.71	1.55	1.04	1.04
AU1	120	2.57	1.69	1.12	1.12
BU1	40	0.88	1.61	1.07	0.93
BU1	80	1.75	1.56	1.04	1.04
BU1	120	2.63	1.69	1.13	1.13
AU2	40	0.89	1.60	1.07	0.93
AU2	80	1.79	1.57	1.04	1.04
AU2	120	2.68	1.69	1.13	1.13
BU2	40	0.86	1.62	1.08	0.93
BU2	80	1.73	1.55	1.03	1.03
BU2	120	2.59	1.69	1.12	1.12
Perforated Columns					
AP1	40	0.94	1.62	1.08	0.94
AP1	80	1.87	1.60	1.07	1.07
AP1	120	2.81	1.71	1.14	1.14
BP1	40	0.82	1.65	1.10	0.95
BP1	80	1.63	1.52	1.02	1.02
BP1	120	2.45	1.67	1.11	1.11
AP2	40	0.94	1.61	1.07	0.93
AP2	80	1.88	1.60	1.07	1.07
AP2	120	2.82	1.71	1.14	1.14
BP2	40	0.83	1.64	1.09	0.95
BP2	80	1.65	1.53	1.02	1.02
BP2	120	2.48	1.67	1.12	1.12

Notes: L is the effective length in inches. The end conditions are taken to be hinged about the minor axis and for twisting and fixed about major axis.

$$R1 = \frac{\text{(ECCS design strength)}}{\text{(modified AISI allowable with FS = 1.92)}}$$

$$R2 = \frac{\text{(ECCS design strength) / (load factor = 1.5)}}{\text{(modif. AISI allow. with FS = 1.92)}}$$

$$R3 = \frac{\text{(ECCS design strength) / (load factor = 1.5)}}{\text{(modif. AISI allow. with varying FS)}}$$

Table 3c
PARAMETRIC STUDIES
Fixed Ended Columns - Torsional-Flexural Buckling

SECTION	L	λ	R1	R2	R3
Unperforated Columns					
AU1	40	0.54	1.80	1.20	1.04
AU1	80	1.05	1.51	1.01	0.88
AU1	120	1.51	1.49	1.00	1.00
BU1	40	0.57	1.78	1.19	1.03
BU1	80	1.08	1.48	0.99	0.86
BU1	120	1.50	1.48	0.99	0.99
AU2	40	0.57	1.78	1.19	1.03
AU2	80	1.07	1.50	1.00	0.87
AU2	120	1.47	1.47	0.98	0.98
BU2	40	0.55	1.79	1.19	1.03
BU2	80	1.04	1.51	1.01	0.87
BU2	120	1.42	1.44	0.96	0.96
Perforated Columns					
AP1	40	0.59	1.80	1.20	1.04
AP1	80	1.14	1.51	1.01	0.87
AP1	120	1.65	1.56	1.04	1.04
BP1	40	0.53	1.80	1.20	1.04
BP1	80	1.00	1.53	1.02	0.88
BP1	120	1.40	1.44	0.96	0.81
AP2	40	0.59	1.80	1.20	1.04
AP2	80	1.12	1.51	1.01	0.88
AP2	120	1.54	1.52	1.02	1.02
BP2	40	0.53	1.80	1.20	1.04
BP2	80	0.99	1.53	1.02	0.89
BP2	120	1.35	1.42	0.95	0.82

Notes: L is the effective length in inches. The end conditions are taken to be hinged about the minor axis and for twisting and fixed about major axis.

$$R1 = \frac{\text{(ECCS design strength)}}{\text{(modified AISI allowable with FS = 1.92)}}$$

$$R2 = \frac{\text{(ECCS design strength) / (load factor = 1.5)}}{\text{(modif. AISI allow. with FS = 1.92)}}$$

$$R3 = \frac{\text{(ECCS design strength) / (load factor = 1.5)}}{\text{(modif. AISI allow. with varying FS)}}$$

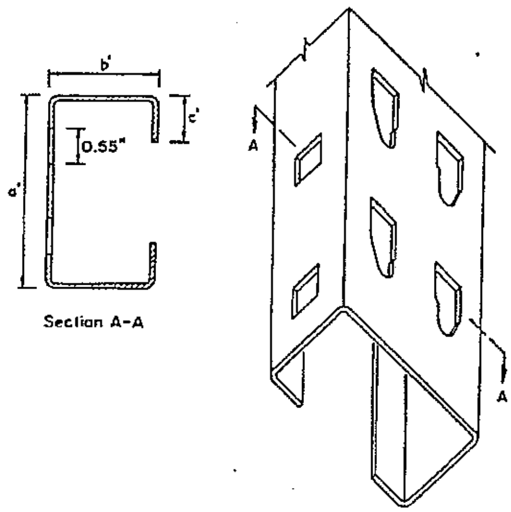


Fig. 1 Type A Specimen

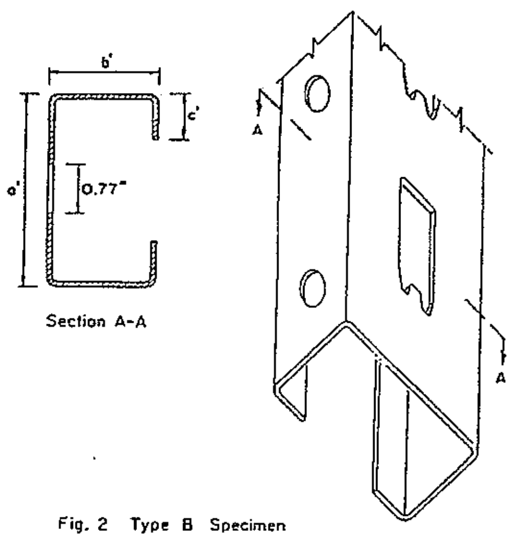


Fig. 2 Type B Specimen

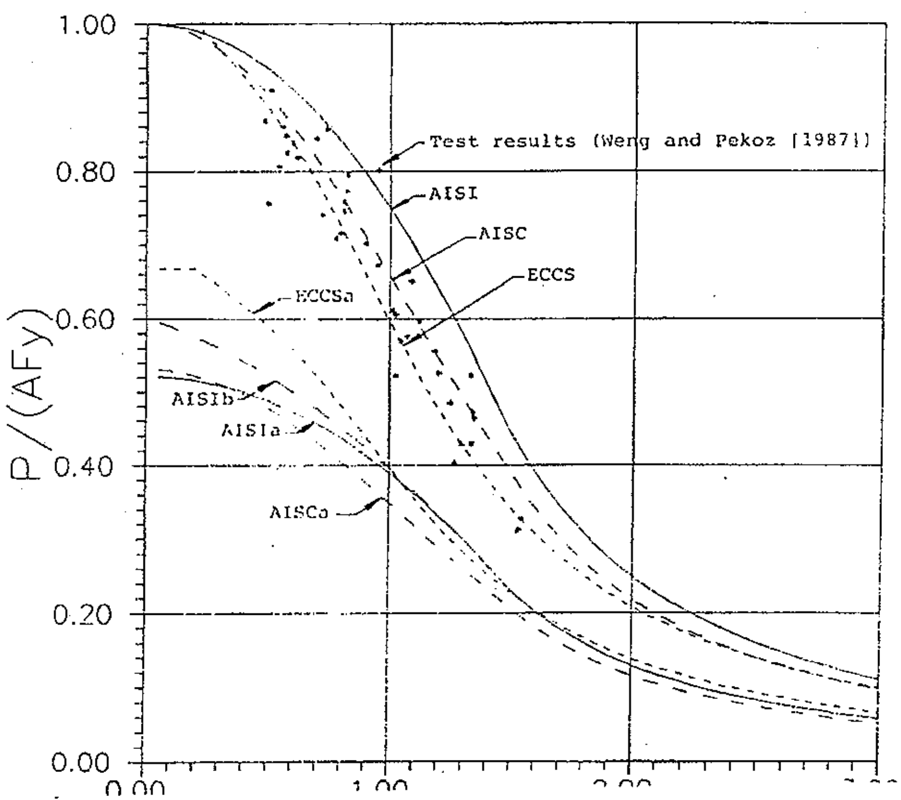


Fig. 3
Unperforated column
test results and
design equations

APPENDIX F
POSSIBLE SPECIFICATION CHANGES

On the basis of the study presented in this report, possible specification changes are given on the following pages. The proposed changes maintain the present resistance factors and factors of safety that is in the present Specifications.

The implications of the proposed column design provisions can be studied with the help of Figs. F1 through F4. The following are the notations for the curves plotted in Figs. F1 through F4:

A AISI without FS or ϕ
B AISC without FS or ϕ

C AISI divided by 1.92
D AISI divided by varying FS

E AISI divided by (LF/0.85)

F AISC divided by 1.92
G AISC divided by varying FS

H AISC divided by (LF/0.85)
I AISC divided by (LF/0.90)

Comparing C and D shows the differences in the present ASD AISI Specification for constant and varying factors of safety.

Comparing C and D with G shows the difference between the present provisions with the proposed ASD provisions.

Comparing E with H shows the difference between the present and the proposed LRFD provisions.comparing H and I shows the effect of using a resistance factor of 0.85 and 0.90.

where

varying FS the factor of safety $\Omega_c=\frac{5}{3}+\frac{3}{8}R-\frac{1}{8}R^3$ in the AISI ASD Specification (1986)

LF $\dfrac{1.2\left(\frac{1}{5}\right)+1.6}{\left(\frac{1}{5}\right)+1}$ load factor for a dead to live load ratio of 1/5.

Comparison of the curves A and B show the difference between the current AISI and proposed AISC LRFD curves for the AISI

Specification. There is some loss in the calculated strength, however the proposed provisions represent the test data better.

The implications of the proposed beam column provisions can be seen in Fig. F5. It is seen that the calculated strength is increased. The resulting provisions are also simpler. They also allow future improvements for the treatment of frames similar to the treatment in the AISC LRFD Specification.

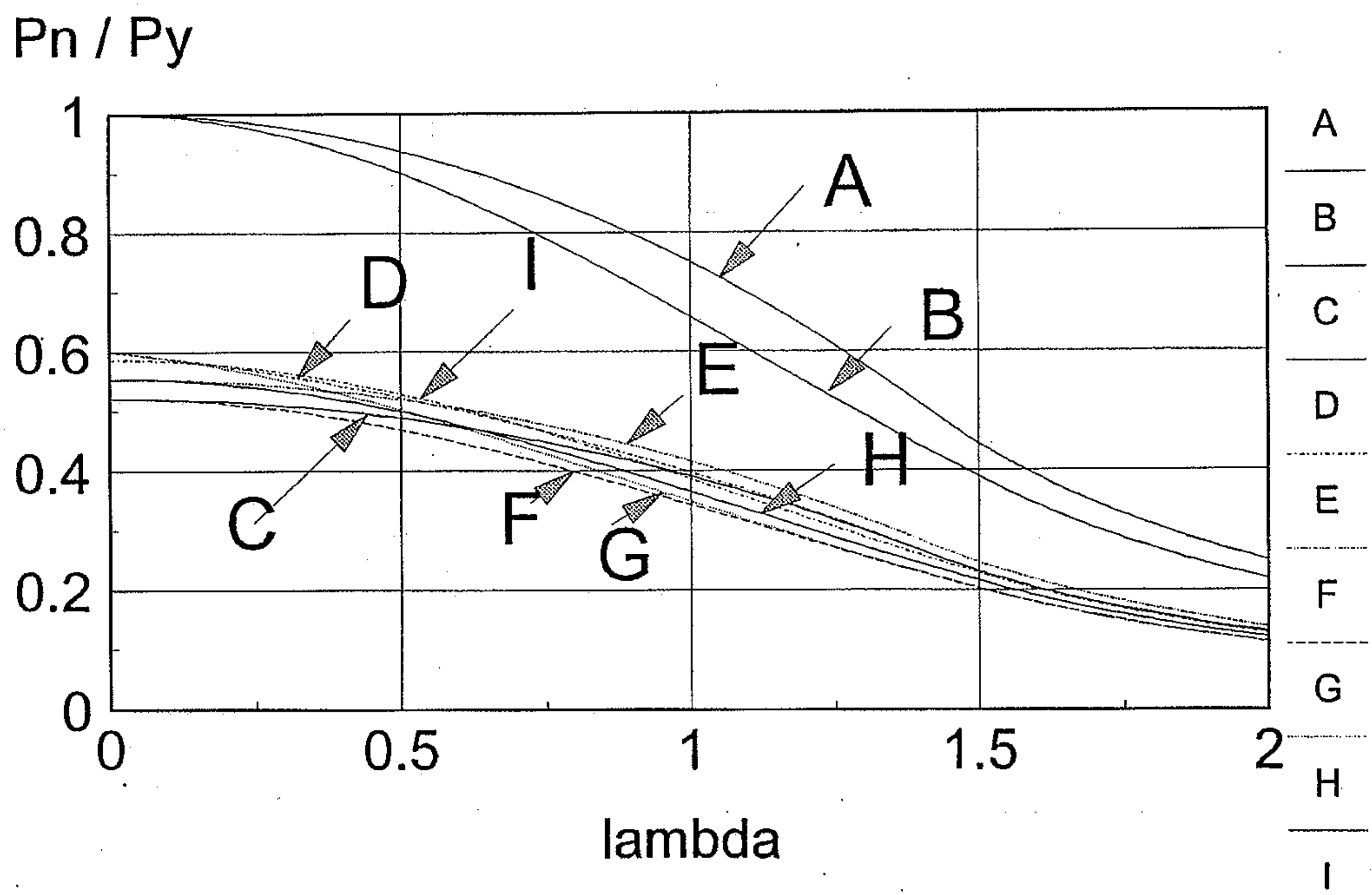


Fig. F1 Study of the present and proposed column design provisions

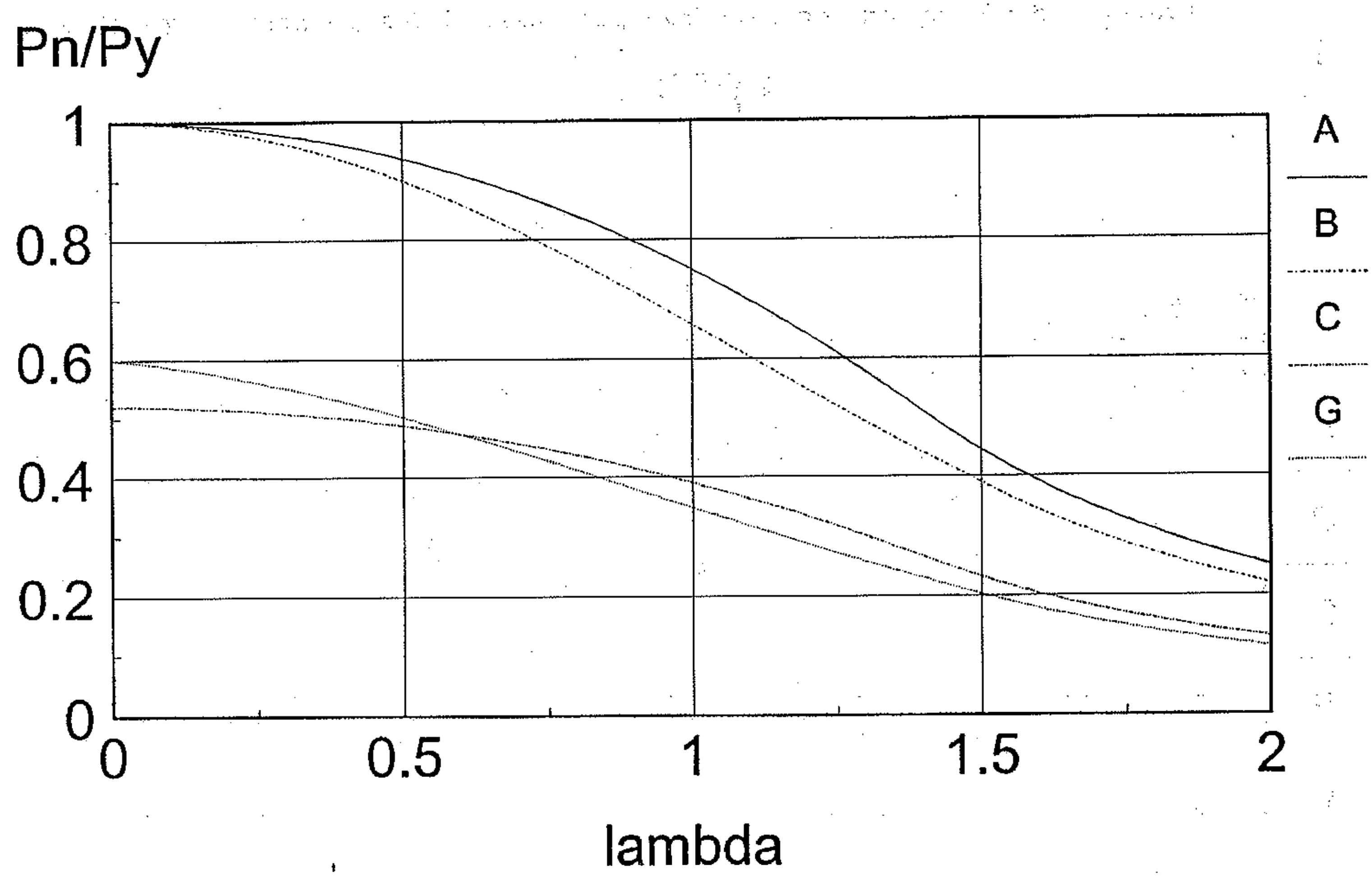


Fig. F2 Study of the present and proposed column design provisions

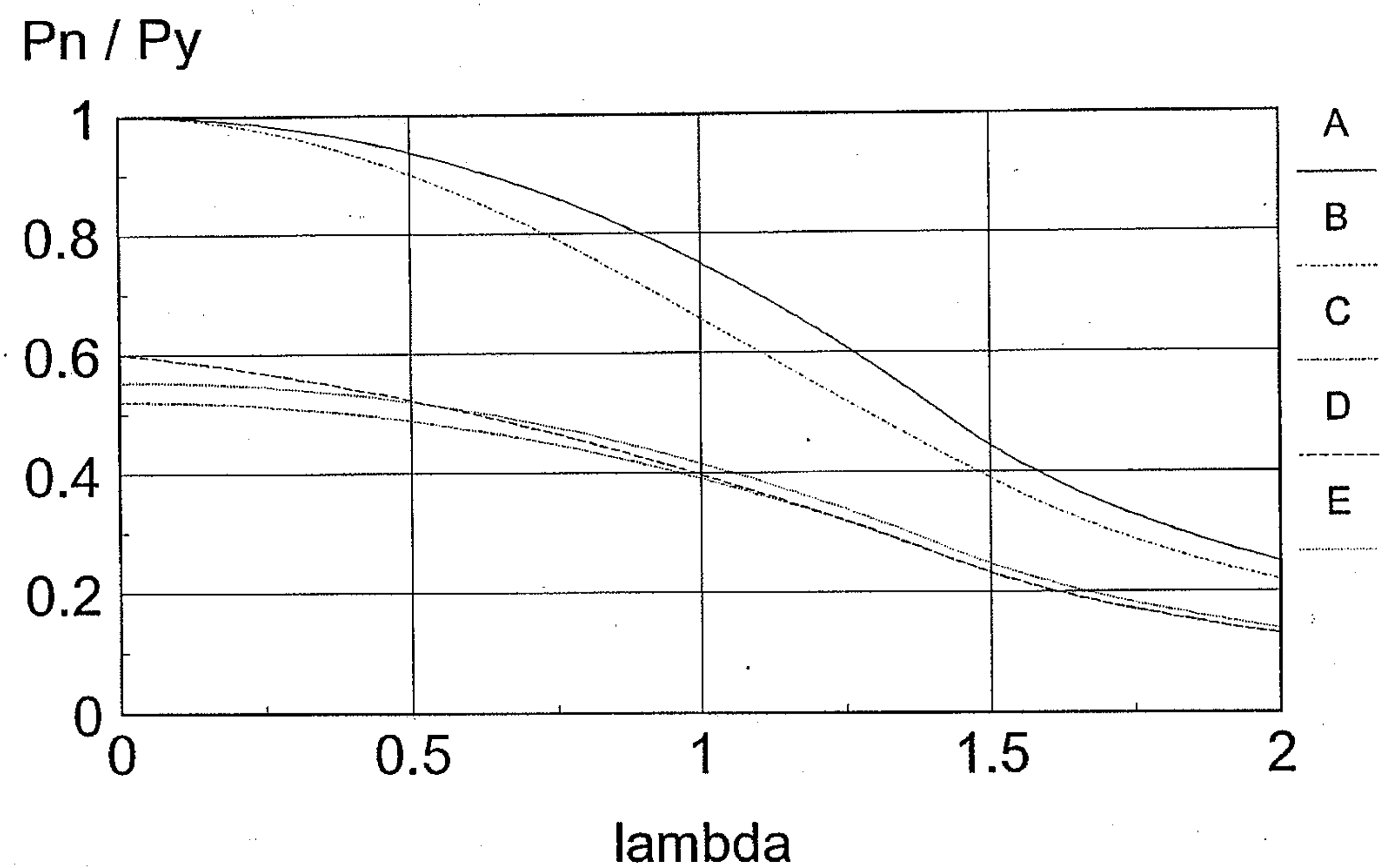


Fig. F3 Study of the present and proposed column design provisions

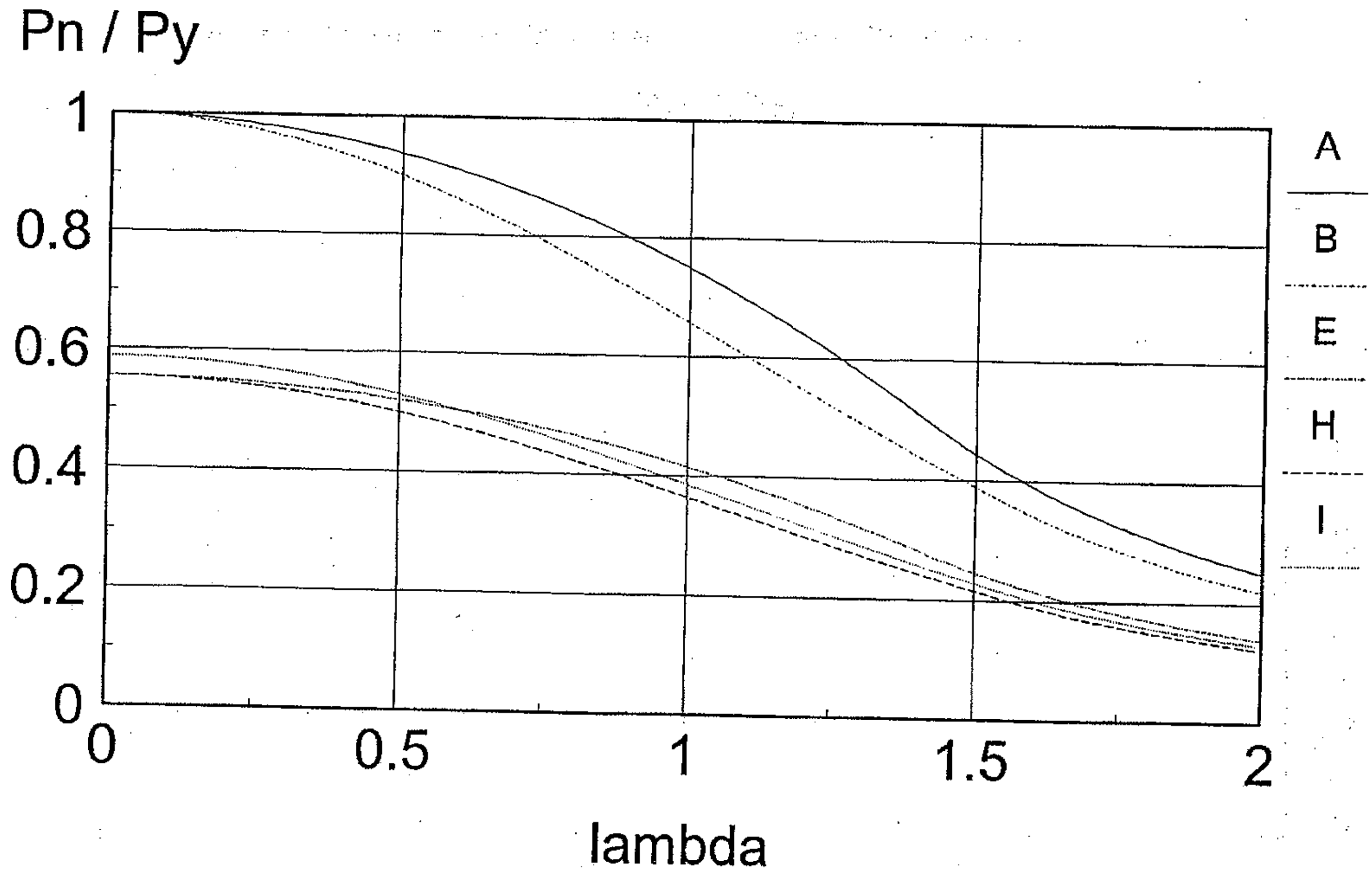


Fig. F4 Study of the present and proposed column design provisions

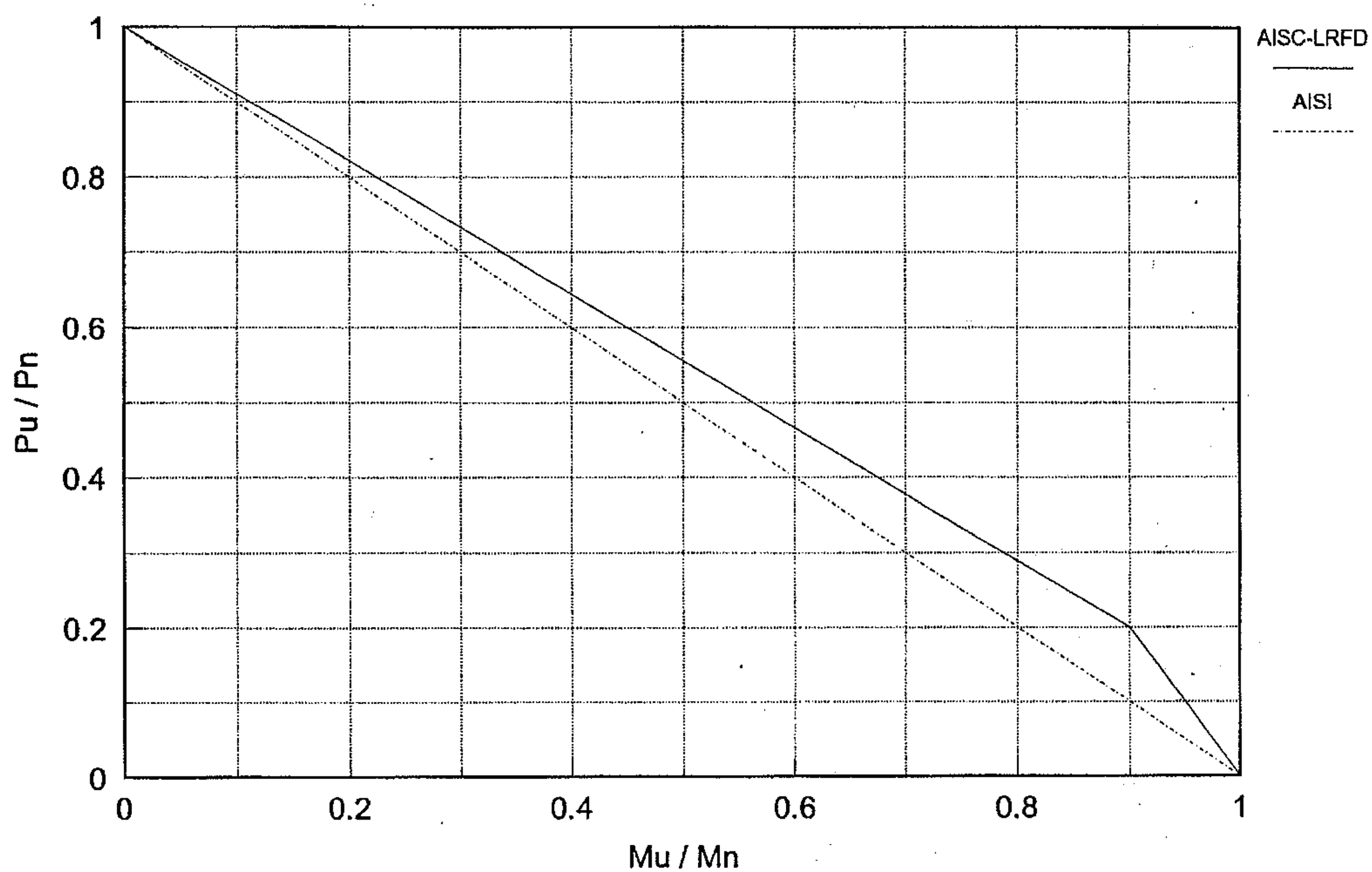


Fig. F5 Study of the present and proposed beam column design provisions

CHANGE TO THE SPECIFICATIONS

It is proposed to change the following formulas in Section C4 in both the ASD and the LRFD Specifications for the Design of Cold-Formed Steel Structural Members from their present form :

For $F_e > F_y/2$ $\quad F_n = F_y(1 - F_y/4F_e)$ (Eq. C4-3 ASD and C4-3 LRFD)

For $F_e \le F_y/2$ $\quad F_n = F_e$ (Eq. C4-4 ASD and C4-4 LRFD)

To the following form:

For $\lambda_c \le 1.5$ $\quad F_n = (0.658^{\lambda_c^2})F_y$

For $\lambda_c > 1.5$ $\quad F_n = \left[\frac{0.877}{\lambda_c^2}\right]F_y$

where

$$\lambda_c = \sqrt{\frac{F_y}{F_e}}$$

Reasons for the change:

The above proposed provisions are shown to be more accurate in "Final Report - DESIGN PROVISIONS FOR COLD-FORMED STEEL COLUMNS AND BEAM COLUMNS" by Pekoz, T. and Sumer, O.

CHANGE TO THE SPECIFICATIONS

It is proposed to change the following formulas in Section C4 in both the ASD and the LRFD Specifications for the Design of Cold-Formed Steel Structural Members from their present forms:

ASD:

$$\frac{P}{P_a}+\frac{C_{mx}M_x}{M_{ax}\alpha_x}+\frac{C_{my}M_y}{M_{ay}\alpha_y}\leq 1.0$$

$$\frac{P}{P_{ao}}+\frac{M_x}{M_{ax}}+\frac{M_y}{M_{ay}}\leq 1.0$$

When $P/P_a \leq 0.15$, the following formula may be used in lieu of the above two formulas.

$$\frac{P}{P_a}+\frac{M_x}{M_{ax}}+\frac{M_y}{M_{ay}}\leq 1.0$$

To the following form:

For $\frac{P_u}{\phi P_n}\geq 0.2$

$$\frac{P}{P_a}+\frac{8}{9}\left(\frac{M_{mx}}{M_{ax}}+\frac{M_{my}}{M_{ay}}\right)\leq 1.0$$

For $\frac{P_u}{\phi P_n}< 0.2$

$$\frac{P}{2P_a}+\left(\frac{M_{mx}}{M_{ax}}+\frac{M_{my}}{M_{ay}}\right)\leq 1.0$$

where

$$M_{mx}=\frac{C_{mx}M_x}{\alpha_x}\leq 1 \quad \text{and} \quad M_{my}=\frac{C_{my}M_y}{\alpha_y}\leq 1$$

LRFD:

$$\frac{P_u}{\phi_c P_n}+\frac{C_{mx}M_{ux}}{\phi_b M_{nx}\alpha_x}+\frac{C_{my}M_{uy}}{\phi_b M_{ny}\alpha_y}\le 1.0$$

$$\frac{P_u}{\phi_c P_{no}}+\frac{M_{ux}}{\phi_b M_{nx}}+\frac{M_{uy}}{\phi_b M_{ny}}\le 1.0$$

When $P_u/\phi_c P_n \le 0.15$, the following formula may be used in lieu of the above two formulas.

$$\frac{P_u}{\phi_c P_n}+\frac{M_{ux}}{\phi_b M_{nx}}+\frac{M_{uy}}{\phi_b M_{ny}}\le 1.0$$

To the following form:

For $\frac{P_u}{\phi P_n}\ge 0.2$

$$\frac{P_u}{\phi P_n}+\frac{8}{9}\left(\frac{M_{mux}}{\phi_b M_{nx}}+\frac{M_{muy}}{\phi_b M_{ny}}\right)\le 1.0$$

For $\frac{P_u}{\phi P_n}<0.2$

$$\frac{P_u}{2\phi P_n}+\left(\frac{M_{mux}}{\phi_b M_{nx}}+\frac{M_{muy}}{\phi_b M_{ny}}\right)\le 1.0$$

where

$M_{mux}=C_{mx}M_{ux}/\alpha_{nx}$

$M_{muy}=C_{my}M_{uy}/\alpha_{ny}$

$1/\alpha_{nx}, 1/\alpha_{ny}=1/\left[1-\frac{P_u}{\phi_c P_E}\right]$

All other terms are as defined in the AISI LRFD Specification.

Reasons for the change:

The above proposed provisions are shown to be more accurate in "Final Report - DESIGN PROVISIONS FOR COLD-FORMED STEEL COLUMNS AND BEAM COLUMNS" by Pekoz, T. and Sumer, O.

American
Iron and Steel
Institute

1140 Connecticut Avenue, NW
Suite 705
Washington, DC 20036
www.steel.org

The New Steel®

Research Report RP-92-1