III EXPERIMENTAL PROCEDURE

The experimental part of this study was concerned with obtaining the load-deflection curves of bowed struts under a central lateral dead load. A testing apparatus was designed to accomodate as wide a range of testpieces as possible. A heavy steel frame was required capable of supporting both types of end fixing and the loading mechanism.

The specimen was set on the apparatus between two supporting brackets, one of which was bolted firmly on the heavy steel frame at a position coresponding to the length of the specimens, the other arranged to be move-able on the steel base plates which are also mounted on the steel frame. In order to obtain accurate results, air bearings with 100 psi air pressure were provided on the sliding bracket to minimize the friction between the move-able bracket(or sliding bracket)and the base plates. In the case of the hinged bowed strut the end supports can be easily rotated about the vertical axis on a pair of ball bearings which are mounted on each bracket, but for the clamped one the end supports can be locked to resist the rotation by the adjustable bolts as shown in Fig. 7.

To avoid any effect on the testing results due to the rigidity of the apparatus, a high factor of safety was used in the design of the apparatus to give a stiffness approximately 50 times that of the specimen based on the critical condition. At the end of the sliding bracket a 4-ton Capacity hydraulic ram mounted on the steel frame was provided for applying the compressive force to cause the initial

bowing and to resist the extension of the bowed strut during the application of lateral load. To ensure that the axial force was applied in the longitudinal direction, a steel ball was included at the end of the plunger of the ram. In order to investigate the mode shapes at various stages of loading, the three side gauges D1, D2 and D3 were mounted on the steel frame at ¼, ½ and ¾ span of specimens respectively and two other gauges were provided at each end of the specimens for checking the span of bowed struts as shown in Fig. 7.

All the specimens were cut from a 2" wide and ⅛" thick mild steel bar. Generally the nominal length of the specimens was 48", the average width and thickness of each specimen being obtained from five measurements with micrometers.

After the specimen was set up and clamped between the end supports with socket screws, it was necessary to check the straightness of the specimen using a dial gauge sliding along the straight edge of the apparatus. Then the specimen was loaded by the hydraulic ram, worked by a manually-operated master pump, until the initial curvature corresponding to the given rise "b" of the bowed strut, measured by the central gauge D2, was obtained, i e. the axial force applied by the ram, was slightly greater than the first Euler force. Now the readings of all gauges were recorded again. The lateral load was applied, in small increments at the mid span of the bowed strut through a wire rope passing over an adjustable pulley which was provided on both sides of the specimen. In order to be sure that the application of the lateral load was exactly

concentrated, a knife-edge bracket was used. The increments of lateral dead weight in pounds corresponding to the reading of all gauges were recorded in the data sheet, until the lateral dead weight was slightly greater than the critical load, the bowed strut became unstable and snap buckling took place. The span of the bowed strut at the initial state was kept constant throughout the test and it could be checked from the readings of end gauges DIV.1 and DIV.2.

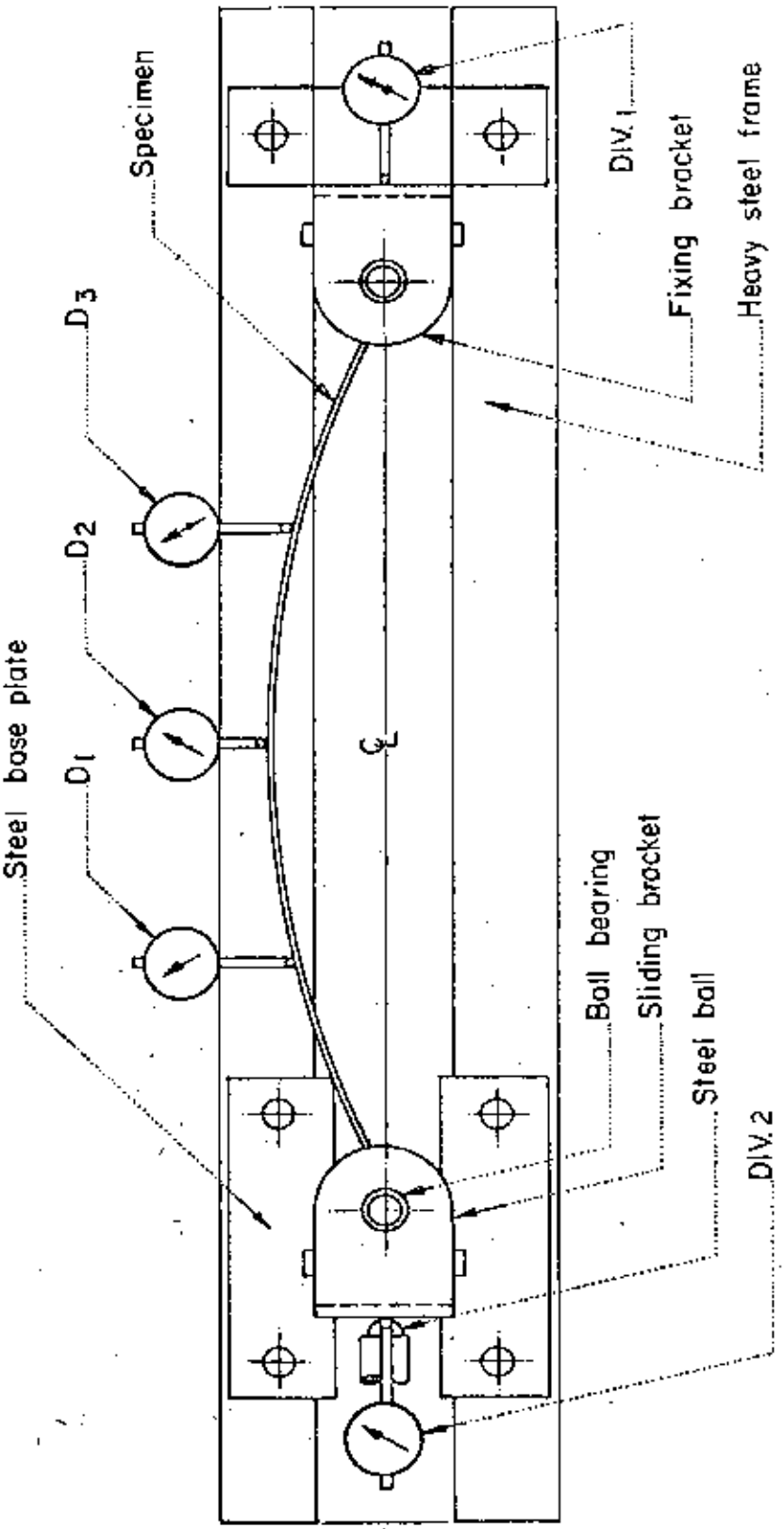

Figure 7 Schematic drawing of testing apparatus.

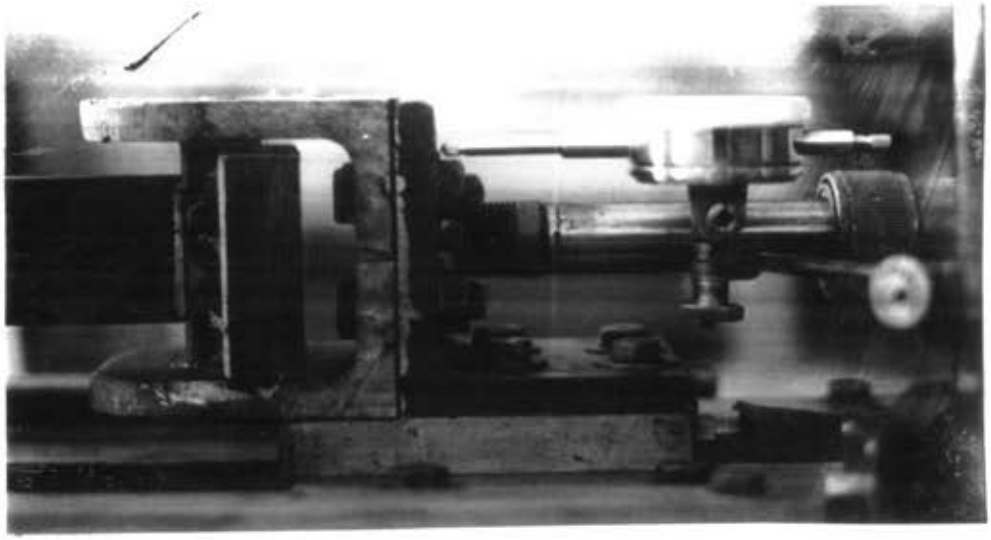

Figure 8.1 Showing method of clamping end of specimen, steel ball and sliding bracket floating on air bearing.

Figure 8.2 Showing Knife-edge bracket with steel rope.

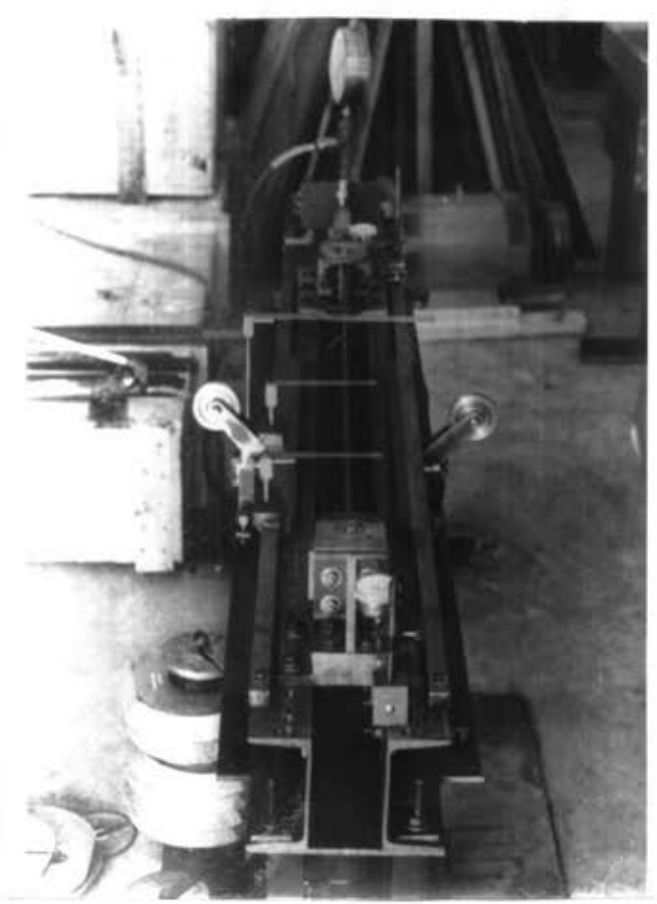

Figure 9.1 Set-up specimen on testing apparatus.

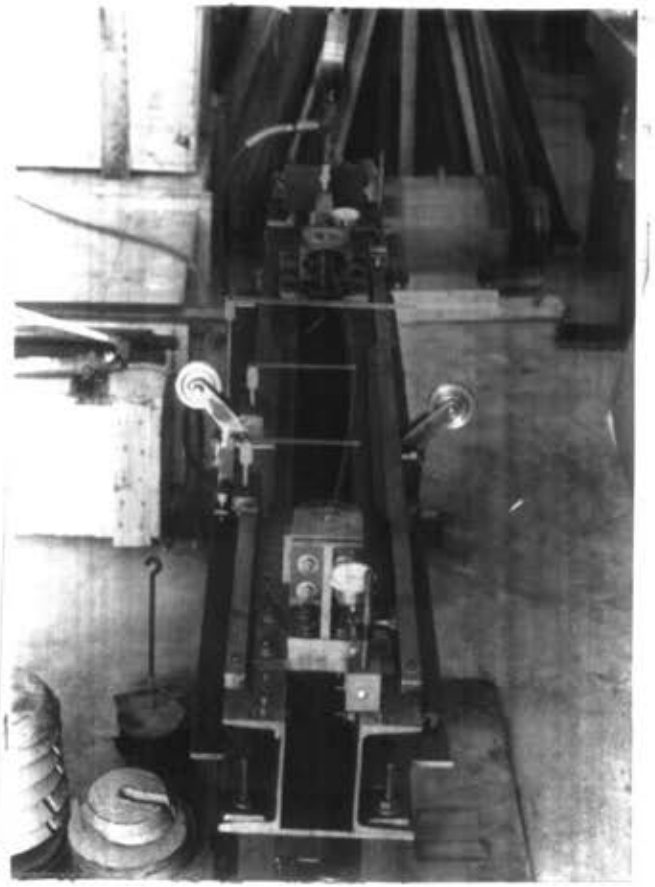

Figure 9.2 Specimen under initial thrust.

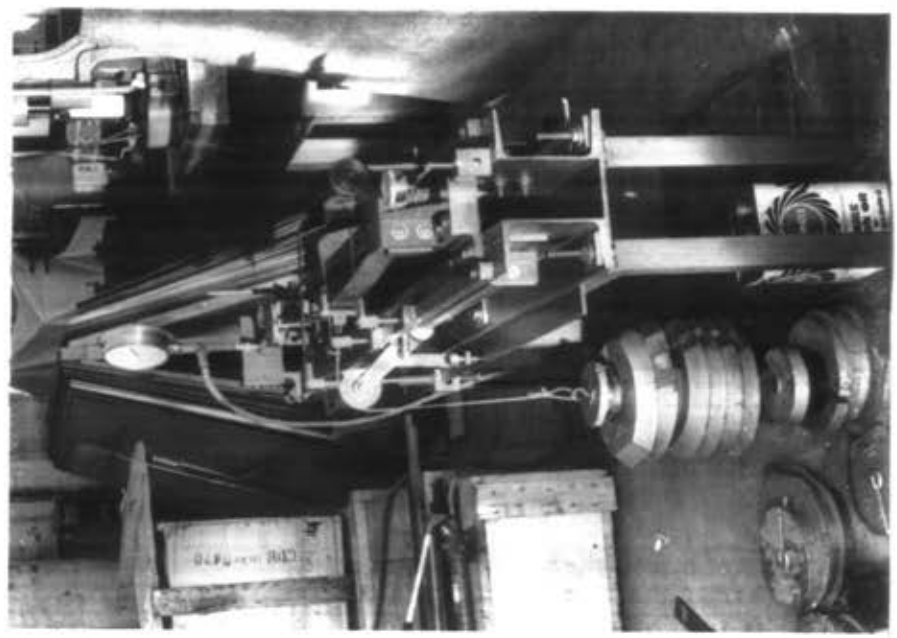

Figure 9.4 Bowed strut undergone snap buckling.

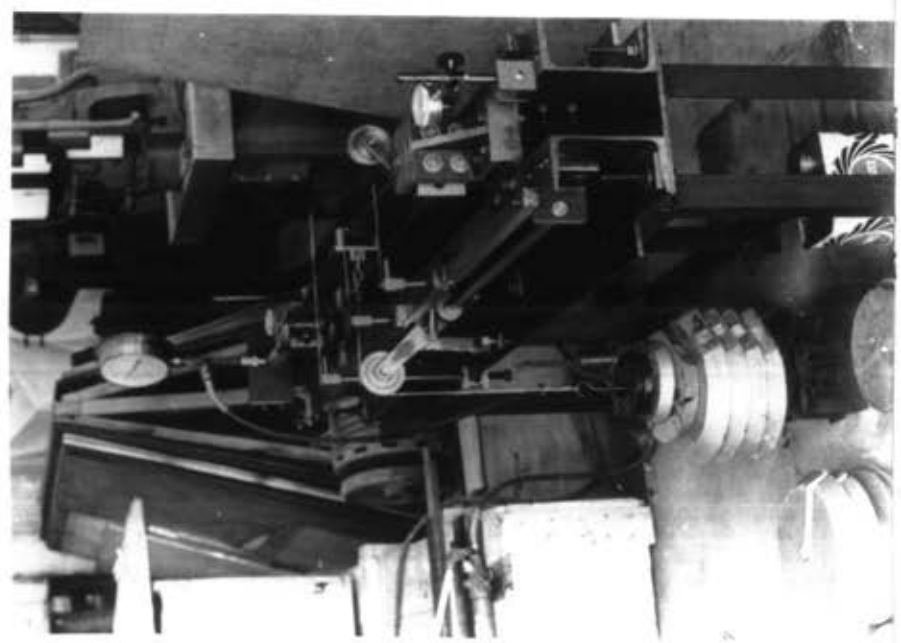

Figure 9.3 Shallow bowed strut under lateral central concentrated load.

Table 1.1

Data of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 1 Size : 48 x 1.973 x 0.232 inches

Condition of end : Hinged Rise of curvature : 0.500 inches

Central angle : 0.08380 rads. Radius of curvature : 576.250 inches

Reading No.	P in Pounds	DIV-1 in Div.	DIV-2 in Div.	D-1 in inches	D-2 in inches	D-3 in inches
1	0	0	0	5.726	1.883	1.914
2	0	+0.40	-16.00	5.312	1.383	1.547
3	8.5	+0.60	-16.20	5.312	1.391	1.555
4	8.0	+0.85	-16.45	5.320	1.406	1.562
5	8.0	+0.95	-16.55	5.328	1.430	1.570
6	6.0	+1.15	-16.75	5.336	1.445	1.586
7	5.5	+1.40	-17.00	5.344	1.469	1.609
8	4.0	+1.60	-17.20	5.344	1.492	1.617
9	2.0	+1.75	-17.35	5.352	1.508	1.640
10	1.0	+1.90	-17.50	5.359	1.531	1.664
11	1.0*	+0.65	+ 9.20	6.578	3.187	2.844
12	0	+0.15	- 3.00	5.726	1.883	1.914

Note : *- The snap buckling occurs.

Table 1.2

Data of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 2 Size : 48 x 1.973 x 0.231 inches

Condition of end : Hinged Rise of curvature : 0.625 inches

Central angle : 0.10476 rads. Radius of curvature : 461.113 inches

Reading No.	P in Pounds	DIV-1 in Div.	DIV-2 in Div.	D-1 in inches	D-2 in inches	D-3 in inches
1	0	0	0	5.734	1.890	1.922
2	0	+0.45	-24.00	5.281	1.265	1.477
3	20.0	+0.60	-24.15	5.281	1.281	1.484
4	10.0	+0.70	-24.25	5.289	1.289	1.492
5	10.0	+0.85	-24.40	5.289	1.305	1.500
6	5.0	+1.00	-24.55	5.297	1.312	1.500
7	5.0	+1.10	-24.65	5.297	1.328	1.508
8	5.0	+1.25	-24.80	5.305	1.344	1.523
9	4.0	+1.40	-24.95	5.305	1.367	1.539
10	1.0	+1.50	-25.05	5.305	1.375	1.547
11	1.0	+1.60	-25.15	5.305	1.382	1.562
12	0.5*	+0.40	+11.00	6.640	3.172	2.852
13	0	-0.20	-2.10	5.734	1.890	1.922

Note : *- The snap buckling occurs.

Table 1.3

Data of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 3 Size : 48 x 1.973 x 0.233 inches

Condition of end : Hinged Rise of curvature : 0.750 inches

Central angle : 0.12571 rads. Radius of curvature : 384.375 ...s

Reading No.	P in Pounds	DIV-1 in Div.	DIV-2 in Div.	D-1 in inches	D-2 in inches	D-3 in inches
1	0	0	0	5.734	1.891	1.922
2	0	+0.50	-30.00	5.141	1.141	1.372
3	14.0	+0.70	-30.20	5.141	1.156	1.375
4	8.0	+0.85	-30.35	5.148	1.164	1.382
5	8.0	+1.00	-30.50	5.148	1.172	1.390
6	8.0	+1.15	-30.65	5.156	1.183	1.398
7	8.0	+1.25	-30.75	5.156	1.196	1.406
8	16.0	+1.40	-30.90	5.156	1.227	1.414
9	6.0	+1.65	-31.15	5.156	1.242	1.430
10	3.0	+1.80	-31.30	5.148	1.250	1.445
11	2.0	+1.90	-31.40	5.125	1.266	1.469
12	1.0*	+0.50	-12.10	6.687	3.352	2.953
13	0	0	-0.50	5.734	1.891	1.922

Note : *- The snap buckling occurs.

Table 1.4

Data of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 4 Size : 48 x 1.973 x 0.232 inches

Condition of end : Hinged Rise of curvature : 0.875 inches

Central angle : 0.14666 rads. Radius of curvature : 329.580 inches

Reading No.	P in Pounds	DIV-1 in Div.	DIV-2 in Div.	D-1 in inches	D-2 in inches	D-3 in inches
1	0	0	0	5.734	1.890	1.922
2	0	+0.45	-43.00	5.094	1.015	1.289
3	18.0	+0.75	-43.30	5.102	1.031	1.297
4	16.0	+0.95	-43.50	5.102	1.047	1.305
5	8.0	+1.10	-43.65	5.102	1.055	1.305
6	8.0	+1.20	-43.75	5.102	1.070	1.312
7	8.0	+1.30	-43.85	5.102	1.078	1.320
8	8.0	+1.40	-43.95	5.094	1.086	1.328
9	8.0	+1.55	-44.10	5.086	1.102	1.336
10	4.0	+1.65	-44.20	5.078	1.109	1.344
11	3.0	+1.70	-44.25	5.070	1.117	1.359
12	3.0	+1.80	-44.35	5.062	1.125	1.375
13	3.0	+1.90	-44.45	5.055	1.140	1.398
14	2.0	+2.00	-44.55	5.047	1.156	1.437
15	1.0*	+0.40	-21.80	6.805	3.414	3.023

Note : *- The snap buckling occurs.

Table 1.5

Data of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 5 Size : 48 x 1.973 x 0.232 inches

Condition of end : Hinged Rise of curvature : 1.000 inches

Central angle : 0.16761 reds. Radius of curvature : 288.500 inches

Reading No.	P in Pounds	DIV-1 in Div.	DIV-2 in Div.	D-1 in inches	D-2 in inches	D-3 in inches
1	0	0	0	5.672	1.890	1.906
2	0	+0.35	-54.00	4.961	0.890	1.203
3	20.0	+0.50	-54.15	4.953	0.906	1.211
4	10.0	+0.60	-54.25	4.953	0.922	1.211
5	10.0	+0.70	-54.35	4.953	0.930	1.211
6	8.0	+0.85	-54.50	4.953	0.937	1.219
7	8.0	+0.95	-54.60	4.953	0.953	1.226
8	8.0	+1.05	-54.70	4.953	0.961	1.234
9	8.0	+1.15	-54.80	4.953	0.977	1.250
10	8.0	+1.30	-54.95	4.953	0.992	1.258
11	5.0	+1.40	-55.05	4.937	1.000	1.265
12	5.0	+1.50	-55.15	4.930	1.007	1.281
13	4.0	+1.65	-55.30	4.906	1.023	1.312
14	2.0	+1.80	-55.45	4.883	1.055	1.375
15	1.0*	+0.30	-41.00	6.828	3.469	3.094

Note : *- The snap buckling occurs.

Table 1.6

Data of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 6 Size : 48 x 1.973 x 0.232 inches

Condition of end : Hinged Rise of curvature : 1.125 inches

Central angle : 0.18682 rads. Radius of curvature : 256.563 inches

Reading No.	P in Pounds	DIV-1 in Div.	DIV-2 in Div.	D-1 in inches	D-2 in inches	D-3 in inches
1	0	0	0	5.734	1.890	1.922
2	0	+0.45	-68.50	4.922	0.765	1.117
3	30.0	+0.65	-68.70	4.922	0.781	1.117
4	20.0	+0.80	-68.85	4.922	0.797	1.125
5	20.0	+1.00	-69.05	4.930	0.820	1.125
6	12.0	+1.15	-69.20	4.922	0.828	1.133
7	12.0	+1.30	-69.35	4.914	0.852	1.140
8	10.0	+1.50	-69.55	4.906	0.867	1.156
9	6.0	+1.65	-69.70	4.890	0.882	1.172
10	4.0	+1.80	-69.85	4.875	0.898	1.187
11	2.0	+1.95	-70.00	4.844	0.914	1.250
12	1.0*	+0.30	-70.00	7.000	3.687	3.227
13	0	-0.20	-1.50	5.734	1.890	1.922

Note : *- The snap buckling occurs.

Table 1.7

Data of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 7 Size : 48 x 1.973 x 0.231 inches

Condition of end : Hinged Rise of curvature : 1.250 inches

Central angle : 0.20777 rads. Radius of curvature : 231.025 inches

Reading No.	P in Pounds	DIV-1 in Div.	DIV-2 in Div.	D-1 in inches	D-2 in inches	D-3 in inches
1	0	0	0	5.672	1.890	1.906
2	0	+0.50	-85.00	4.789	0.640	1.023
3	30.0	+0.65	-85.15	4.781	0.656	1.031
4	20.0	+0.80	-85.30	4.781	0.672	1.031
5	15.0	+1.00	-85.50	4.781	0.687	1.031
6	15.0	+1.20	-85.70	4.773	0.703	1.047
7	15.0	+1.40	-85.90	4.773	0.727	1.055
8	8.0	+1.50	-86.00	4.765	0.734	1.062
9	4.0	+1.60	-86.10	4.757	0.742	1.070
10	4.0	+1.70	-86.20	4.750	0.750	1.086
11	4.0	+1.80	-86.30	4.742	0.765	1.094
12	4.0	+1.90	-86.40	4.727	0.773	1.117
13	4.0	+2.00	-86.50	4.703	0.781	1.140
14	3.0	+2.10	-86.60	4.687	0.812	1.203
15	1.0*	+0.50	-89.00	7.015	3.781	3.273

Note : *- The snap buckling occurs.

Table 1.8

Data of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 8 Size : 48 x 1.973 x 0.232 inches

Condition of end : Hinged Rise of curvature : 1.375 inches

Central angle : 0.22872 rads. Radius of curvature : 210.142 inches

Reading No.	P in Pounds	DIV-1 in Div.	DIV-2 in Div.	D-1 in inches	D-2 in inches	D-3 in inches
1	0	0	0	5.734	1.890	1.922
2	0	+0.40	-101.60	4.750	0.515	0.937
3	40.0	+0.65	-101.85	4.742	0.539	0.945
4	40.0	+0.95	-102.15	4.742	0.570	0.945
5	20.0	+1.10	-102.30	4.734	0.586	0.953
6	10.0	+1.20	-102.40	4.734	0.594	0.953
7	10.0	+1.35	-102.55	4.719	0.609	0.961
8	10.0	+1.55	-102.75	4.711	0.625	0.969
9	6.0	+1.60	-102.80	4.703	0.633	0.977
10	4.0	+1.65	-102.85	4.695	0.640	0.992
11	2.0	+1.70	-102.90	4.687	0.648	1.000
12	2.0	+1.85	-103.05	4.672	0.664	1.023
13	1.0	+1.95	-103.15	4.640	0.672	1.062
14	1.0*	+2.10	-102.20	4.812	1.437	2.250

Note : *- The snap buckling occurs.

Table 1.9

Data of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 9 Size : 48 x 1.973 x 0.232 inches

Condition of end : Hinged Rise of curvature : 1.500 inches

Central angle : 0.24967 rads. Radius of curvature : 192.750 inches

Reading No.	P in Pounds	DIV-1 in Div.	DIV-2 in Div.	D-1 in inches	D-2 in inches	D-3 in inches
1	0	0	0	5.734	1.890	1.922
2	0	+0.50	-119.00	4.625	0.390	0.844
3	40.0	+0.80	-119.30	4.617	0.414	0.844
4	40.0	+1.10	-119.60	4.617	0.445	0.859
5	15.0	+1.25	-119.75	4.609	0.461	0.859
6	15.0	+1.40	-119.90	4.594	0.477	0.875
7	15.0	+1.55	-120.05	4.578	0.492	0.883
8	10.0	+1.70	-120.20	4.562	0.508	0.898
9	8.0	+1.80	-120.30	4.547	0.525	0.906
10	8.0	+2.00	-120.50	4.500	0.547	0.969
11	4.0	+2.10	-120.60	4.469	0.578	1.039
12	2.0*	+0.50	-112.50	7.094	3.750	3.344
13	0	0	-1.10	5.734	1.890	1.922

Note : *- The snap buckling occurs.

Table 1.10

Data of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 10 Size : 48 x 1.973 x 0.233 inches

Condition of end : Clamped Rise of curvature : 0.500 inches

Central angle : 0.08380 reds. Radius of curvature : 576.250 inches

Reading No.	P in Pounds	DIV-1 in Div.	DIV-2 in Div.	D-1 in inches	D-2 in inches	D-3 in inches
1	0	0	0	5.875	1.922	1.953
2	0	+0.40	-17.10	6.234	2.422	2.312
3	12.5	+0.75	-17.45	6.234	2.406	2.312
4	12.0	+1.10	-17.80	6.219	2.383	2.297
5	6.0	+1.30	-18.00	6.211	2.367	2.289
6	6.0	+1.50	-18.20	6.211	2.344	2.289
7	4.0	+1.75	-18.45	6.203	2.328	2.281
8	4.0	+2.05	-18.75	6.188	2.297	2.266
9	2.0	+2.40	-19.10	6.180	2.281	2.258
10	2.0	+2.60	-19.30	6.172	2.250	2.242
11	1.5	+2.75	-19.45	6.164	2.219	2.219
12	1.0	+3.10	-19.80	6.156	2.187	2.203
13	0.5*					

Note : * The snap buckling occurs.

Table 1.11

Data of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 11 Size : 48 x 1.973 x 0.232 inches

Condition of end : Clamped Rise of curvature : 0.625 inches

Central angle : 0.10476 rads. Radius of curvature : 461.113 inches

Reading No.	P in Pounds	DIV-1 in Div.	DIV-2 in Div.	D-1 in inches	D-2 in inches	D-3 in inches
1	0	0	0	5.859	1.906	1.937
2	0	+0.40	-23.00	6.312	2.531	2.406
3	20.0	+0.80	-23.40	6.312	2.523	2.398
4	14.0	+1.30	-23.90	6.305	2.508	2.383
5	11.0	+1.60	-24.20	6.297	2.492	2.375
6	7.0	+1.85	-24.45	6.289	2.477	2.367
7	7.0	+2.20	-24.80	6.281	2.461	2.359
8	6.0	+2.45	-25.05	6.281	2.445	2.359
9	5.0	+2.70	-25.30	6.281	2.430	2.352
10	5.0	+3.10	-25.70	6.273	2.414	2.344
11	5.0	+3.40	-26.00	6.266	2.383	2.336
12	4.0	+3.60	-26.20	6.258	2.367	2.328
13	3.0	+3.90	-26.50	6.258	2.352	2.320
14	3.0	+4.30	-26.90	6.250	2.320	2.305
15	2.0*					

Note : *- The snap buckling occurs.

Table 1.12

Data of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 12 Size : 48 x 1.973 x 0.232 inches

Condition of end : Clamped Rise of curvature : 0.750 inches

Central angle : 0.12571 rads. Radius of curvature : 384.375 inches

Reading No.	P in Pounds	DIV-1 in Div.	DIV-2 in Div.	D-1 in inches	D-2 in inches	D-3 in inches
1	0	0	0	5.875	1.922	1.953
2	0	+0.40	-34.00	6.422	2.672	2.492
3	20.0	+0.75	-34.35	6.406	2.664	2.492
4	20.0	+1.15	-34.75	6.398	2.648	2.492
5	16.0	+1.30	-34.90	6.398	2.633	2.484
6	10.0	+1.55	-35.15	6.398	2.625	2.484
7	10.0	+1.70	-35.30	6.398	2.609	2.484
8	10.0	+2.00	-35.60	6.398	2.594	2.484
9	10.0	+2.30	-35.90	6.391	2.578	2.477
10	10.0	+2.50	-36.10	6.391	2.562	2.477
11	8.0	+2.90	-36.50	6.383	2.547	2.469
12	8.0	+3.15	-36.75	6.375	2.531	2.469
13	8.0	+3.45	-37.05	6.375	2.508	2.461
14	6.0	+3.70	-37.30	6.375	2.492	2.461
15	6.0	+4.10	-37.70	6.367	2.461	2.461

Note : *- The snap buckling occurs.

Table 1.12

Data of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 12 Size : 48 x 1.973 x 0.232 inches

Condition of end : Clamped Rise of curvature : 0.750 inches

Central angle : 0.12571 rads. Radius of curvature : 384.375 inches

Reading No.	P in Pounds	DIV-1 in Div.	DIV-2 in Div.	D-1 in inches	D-2 in inches	D-3 in inches
16	4.0	+4.40	-38.00	6.359	2.445	2.453
17	2.0	+4.60	-38.20	6.352	2.422	2.453
18	1.0*					

Note : *- The snap buckling occurs.

Table 1.13

Data of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 13 Size : 48 x 1.973 x 0.232 inches

Condition of end : Clamped Rise of curvature : 0.875 inches

Central angle : 0.14666 rads. Radius of curvature : 329.580 inches

Reading No.	P in Pounds	DIV-1 in Div.	DIV-2 in Div.	D-1 in inches	D-2 in inches	D-3 in inches
1	0	+0.30	0	5.844	1.953	1.922
2	0	+0.75	-45.00	6.523	2.828	2.594
3	40.0	+1.20	-45.45	6.516	2.812	2.594
4	30.0	+1.60	-45.85	6.508	2.797	2.594
5	30.0	+1.95	-46.10	6.500	2.773	2.586
6	24.0	+2.40	-46.55	6.500	2.758	2.586
7	20.0	+2.90	-47.05	6.500	2.734	2.586
8	12.0	+3.40	-47.55	6.500	2.719	2.586
9	12.0	+3.60	-47.75	6.492	2.703	2.586
10	12.0	+4.10	-48.25	6.484	2.687	2.586
11	12.0	+4.50	-48.65	6.484	2.664	2.578
12	8.0	+4.80	-48.95	6.477	2.648	2.578
13	6.0	+5.10	-49.25	6.477	2.633	2.578
14	6.0	+5.50	-49.65	6.469	2.602	2.570
15	4.0	+5.90	-50.05	6.461	2.570	2.562

Note : *- The snap buckling occurs.

Table 1.13

Data of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 13 Size : 48 x 1.973 x 0.232 inches

Condition of end : Clamped Rise of curvature : 0.875 inches

Central angle : 0.14666 rads. Radius of curvature : 329.580 inches

Reading No.	P in Pounds	DIV-1 in Div.	DIV-2 in Div.	D-1 in inches	D-2 in inches	D-3 in inches
16	3.0	+6.40	-50.55	6.445	2.555	2.562
17	1.0	+6.50	-50.65	6.437	2.531	2.562
18	-1.0*					

Note : *- The snap buckling occurs.

Table 1.14

Data of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 14 Size : 48 x 1.973 x 0.231 inches

Condition of end : Clamped Rise of curvature : 1.000 inches

Central angle : 0.16761 rads. Radius of curvature : 288.500 inches

Reading No.	P in Pounds	DIV-1 in Div.	DIV-2 in Div.	D-1 in inches	D-2 in inches	D-3 in inches
1	0	0	0	5.875	1.922	1.953
2	0	+0.40	-56.00	6.586	2.922	2.664
3	20.0	+0.65	-56.25	6.586	2.906	2.664
4	30.0	+0.95	-56.55	6.586	2.898	2.664
5	30.0	+1.20	-56.80	6.586	2.883	2.656
6	30.0	+1.55	-57.15	6.586	2.867	2.656
7	24.0	+1.90	-57.50	6.578	2.844	2.648
8	20.0	+2.20	-57.80	6.578	2.828	2.648
9	20.0	+2.55	-58.15	6.578	2.797	2.648
10	20.0	+3.05	-58.65	6.578	2.773	2.648
11	8.0	+3.40	-59.00	6.578	2.758	2.641
12	8.0	+3.50	-59.10	6.578	2.742	2.641
13	6.0	+3.90	-59.50	6.570	2.719	2.633
14	4.0	+4.30	-59.90	6.570	2.687	2.625
15	3.0	+4.70	-60.30	6.586	2.648	2.602

Note : *- The snap buckling occurs.

Table 1.14

Data of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 14 Size : 48 x 1.973 x 0.231 inches

Condition of end : Clamped Rise of curvature : 1.000 inches

Central angle : 0.16761 rads. Radius of curvature : 288.500 inches

Reading No.	P in Pounds	DIV-1 in Div.	DIV-2 in Div.	D-1 in inches	D-2 in inches	D-3 in inches
16	2.0	+4.90	-60.60	6.594	2.633	2.586
17	1.0*					

Note : * The snap buckling occurs.

Table 1.15

Data of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 15 Size : 48 x 1.973 x 0.232 inches

Condition of end : Clamped Rise of curvature : 1.125 inches

Central angle : 0.18682 rads. Radius of curvature : 256.563 inches

Reading No.	P in Pounds	DIV-1 in Div.	DIV-2 in Div.	D-1 in inches	D-2 in inches	D-3 in inches
1	0	0	0	5.875	1.922	1.953
2	0	+0.60	-68.00	6.664	3.047	2.758
3	100.0	+1.20	-68.60	6.664	3.023	2.773
4	50.0	+1.90	-69.30	6.680	3.000	2.781
5	25.0	+2.20	-69.60	6.664	2.984	2.773
6	20.0	+2.50	-69.90	6.656	2.969	2.773
7	20.0	+2.90	-70.30	6.656	2.953	2.773
8	20.0	+3.40	-70.80	6.656	2.930	2.773
9	15.0	+3.80	-71.20	6.648	2.906	2.781
10	10.0	+4.10	-71.50	6.648	2.891	2.781
11	10.0	+4.40	-71.80	6.648	2.875	2.781
12	10.0	+4.60	-72.00	6.640	2.859	2.781
13	8.0	+4.90	-72.30	6.633	2.844	2.789
14	8.0	+5.20	-72.60	6.625	2.812	2.789
15	8.0	+5.80	-73.20	6.609	2.781	2.797

Note : *- The snap buckling occurs.

Table 1.15

Data of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 15 Size : 48 x 1.973 x 0.232 inches

Condition of end : Clamped Rise of curvature : 1.125 inches

Central angle : 0.18682 rads. Radius of curvature : 256.563 inches

Reading No.	P in Pounds	DIV-1 in Div.	DIV-2 in Div.	D-1 in inches	D-2 in inches	D-3 in inches
16	8.0	+6.20	-73.60	6.758	2.734	2.805
17	4.0	+6.60	-74.00	6.531	2.672	2.828
18	-2.0*					

Note : *- The snap buckling occurs.

Table 1.16

Data of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 16 Size : 48 x 1.973 x 0.232 inches

Condition of end : Clamped Rise of curvature : 1.250 inches

Central angle : 0.20777 rads. Radius of curvature : 231.025 inches

Reading No.	P in Pounds	DIV-1 in Div.	DIV-2 in Div.	D-1 in inches	D-2 in inches	D-3 in inches
1	0	0	0	5.875	1.922	1.953
2	0	+0.40	-85.00	6.766	3.172	2.836
3	100.0	+0.75	-85.35	6.766	3.148	2.836
4	75.0	+1.30	-85.90	6.766	3.117	2.844
5	45.0	+1.80	-86.40	6.766	3.094	2.844
6	45.0	+2.40	-87.00	6.766	3.062	2.844
7	45.0	+3.00	-87.60	6.766	3.023	2.844
8	25.0	+3.40	-88.00	6.766	2.992	2.844
9	25.0	+3.90	-88.50	6.766	2.953	2.844
10	10.0	+4.45	-89.05	6.766	2.891	2.836
11	5.0	+4.75	-89.35	6.750	2.859	2.836
12	2.0*					

Note : *- The snap buckling occurs.

Table 1.17

Data of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 17 Size : 48 x 1.973 x 0.232 inches

Condition of end : Clamped Rise of curvature : 1.325 inches

Central angle : 0.22872 reds. Radius of curvature : 210.142 inches

Reading No.	P in Pounds	DIV-1 in Div.	DIV-2 in Div.	D-1 in inches	D-2 in inches	D-3 in inches
1	0	0	0	5.875	1.922	1.953
2	0	+0.5	-101.0	6.844	3.297	2.969
3	100.0	+1.0	-101.5	6.836	3.273	2.984
4	65.0	+1.5	-102.0	6.828	3.250	3.000
5	60.0	+2.3	-102.8	6.820	3.211	3.008
6	40.0	+2.8	-103.3	6.812	3.187	3.015
7	35.0	+3.5	-104.0	6.805	3.148	3.023
8	25.0	+3.9	-104.4	6.797	3.125	3.031
9	20.0	+4.4	-104.9	6.789	3.102	3.039
10	20.0	+4.9	-105.4	6.781	3.062	3.047
11	20.0	+5.3	-105.8	6.750	3.015	3.062
12	15.0	+5.7	-106.2	6.734	2.953	3.070
13	15.0	+6.1	-106.6	6.687	2.906	3.086
14	5.0	+6.3	-106.8	6.656	2.844	3.094
15	2.0*					

Note : *- The snap buckling occurs.

Table 1.18

Data of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 18 Size : 48 x 1.973 x 0.232 inches

Condition of end : Clamped Rise of curvature : 1.500 inches

Central angle : 0.24967 rads. Radius of curvature : 192.750 inches

Reading No.	P in Pounds	DIV-1 in Div.	DIV-2 in Div.	D-1 in inches	D-2 in inches	D-3 in inches
1	0	0	0	5.875	1.922	1.953
2	0	+0.40	-121.00	6.953	3.422	3.015
3	80.0	+0.60	-121.20	6.953	3.406	3.023
4	80.0	+1.10	-121.70	6.953	3.375	3.023
5	60.0	+1.55	-122.15	6.961	3.352	3.023
6	45.0	+2.00	-122.60	6.961	3.328	3.031
7	50.0	+2.50	-123.10	6.969	3.297	3.031
8	45.0	+3.00	-123.60	6.969	3.250	3.031
9	45.0	+3.60	-124.20	6.984	3.195	3.023
10	30.0	+4.10	-124.70	7.000	3.148	3.007
11	10.0	+4.30	-124.90	7.000	3.125	3.000
12	10.0	+4.50	-125.10	7.015	3.093	2.977
13	6.0	+4.48	-125.40	7.046	3.047	2.922
14	2.0*					

Note : *- The snap buckling occurs.