

1.101 Structures Lab. Fall 2005 Summary of Truss Tests

Tabulation of Truss Design Parameters

The table shows, for each group, whether MIG or SPOT welding was used (column 2); the total cost of the structure as tested (column 3); the weight of the structure (column 4); the strength, as measured by the load at which significant departure from linearity was observed - a value generally significantly less than the load at which the structure collapsed (column 5); and the ratio of strength to weight (column 6).

Summary of Test Results

Group	Mig/Spot	Cost - \$	Wt - lbs.	Strength-lbs	Strength/Wt
W-1	Spot	23.65	1.54	65	42.2
W-2	Mig	21.94	2.13	115	54.0
W-3	Mig	15.46	1.26	78	61.9
W-4	Spot	11.47	0.88	[22]	25.1
Th-1	Mig	25.42	1.30	40	30.8
Th-2	Mig	14.31	1.07	42	39.3
Th-3	S	14.35	1.26	42	34.7
Th-4	S	12.10	0.81	[24]	29.6
Th-5	S	10.42	0.87	95	109.2
Th-6	M	8.63	0.59	[25]	42.7
Th-7	S	14.72	1.18	110	93.2

Note:

- Mig welding compared to spot welding added significantly to the weight of the structure.
- The strength to weight ratios are all large relative to 1.0. This explains why one is often justified in neglecting the weight of the structure itself with respect to the applied loading.
- The three structures that failed at an applied load less than the prescribed 40 pounds showed relatively low cost indicating that more material, correctly positioned, might have rendered these three designs acceptable.
- The design, among those that supported 40 pounds, with the lowest total cost showed the second highest strength and the highest strength to weight ratio. If this were a competition, T5 would take the cake.

The plot below displays these results in graphic form:

