

LATOF Prototype Structure Deflection Tests

K. MacArthur

University of New Hampshire Nuclear Instrumentation Lab

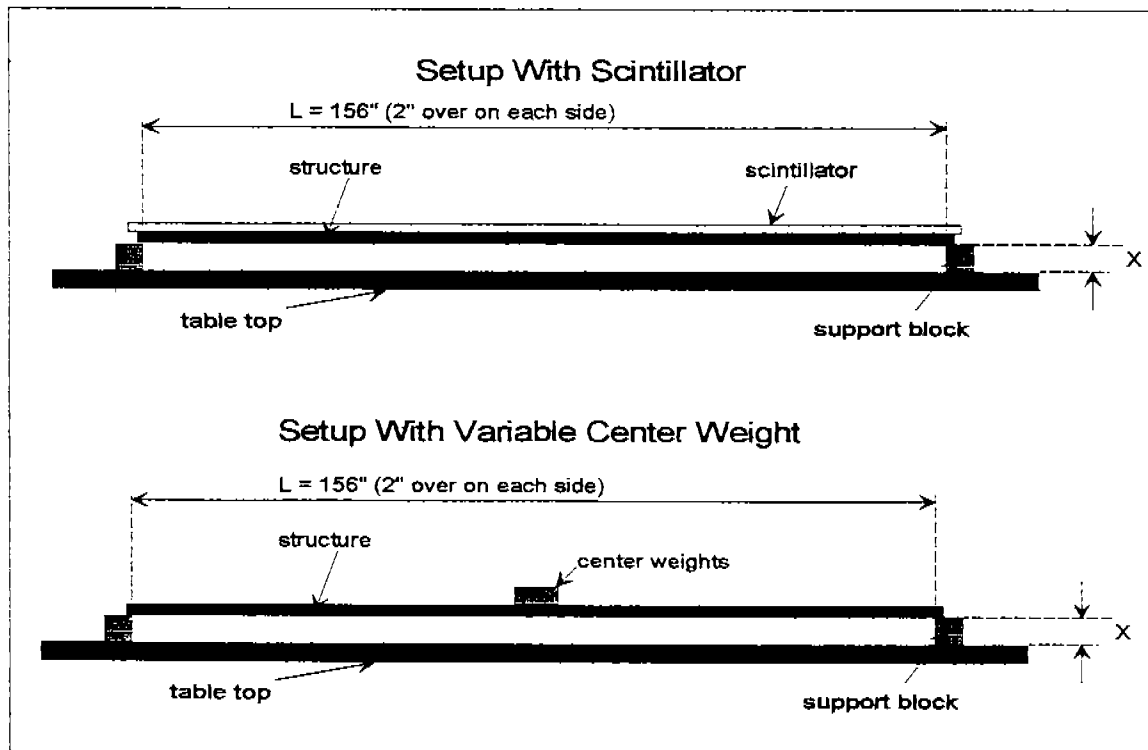
October 12, 1994

Objective: To determine if stainless/polyurethane-foam structures supplied by Bellcomb, Inc. have the required rigidity to support typical LATOF scintillators.

Materials:

- Structural plank consisting of 0.063" T304 stainless steel plates sandwiching 2.5" thick polyurethane structural foam (5 lbs./ft³). Prototype plank was 2.625" thick, 8.00" wide and 160" long.
- Typical LATOF scintillator of similar size (used one 164" long, wrapped).
- Long (16') flat lab table
- Support blocks holding up structure
- Steel tape ruler with 1/32" gradations
- Uniform weights for center load testing (5 lead bricks @ ≈13 lbs. ea. and box of lead foil @ ≈50 lbs.)
- Lab book and pen

Equipment Setup:

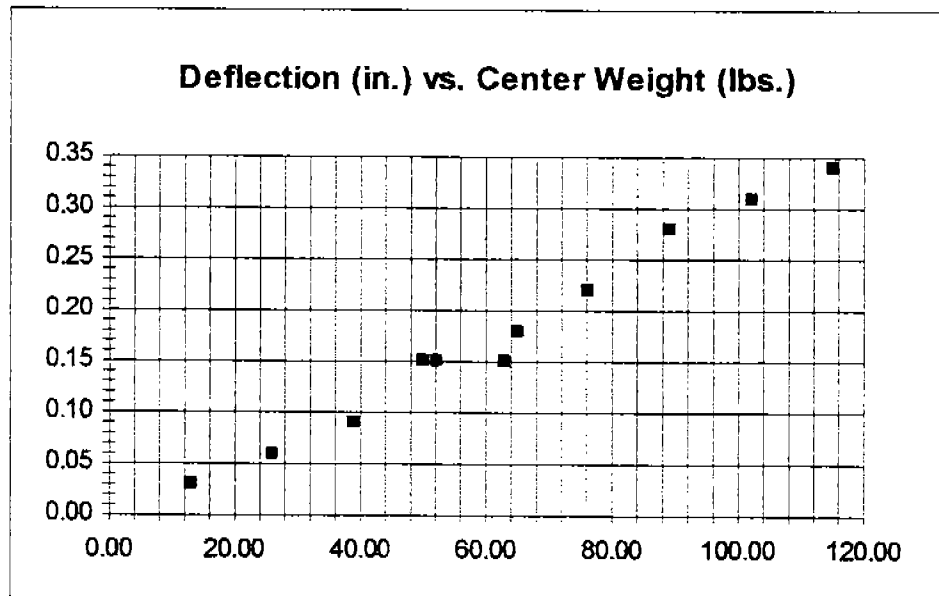


Scintillator Test Results:

<u>Time</u>	<u>X (in.)</u>	<u>Deflection (in.)</u>
0 (No Load)	7.41	0.00
1 min.	7.16	0.25
15 min.	7.13	0.28
4 hrs.	7.13	0.28

Center Load Test Results:

<u>Object(s)</u>	<u>Approx. Wt. (lbs.)</u>	<u>X (in.)</u>	<u>Deflection (in.)</u>
None	0.00	7.31	0.00
1 lead brick	13	7.28	0.03
2 lead bricks	26	7.25	0.06
3 lead bricks	39	7.22	0.09
1 box lead foil	50	7.16	0.15
4 lead bricks	52	7.16	0.15
5 lead bricks	65	7.13	0.18
1 box + 2 bricks	76	7.09	0.22
1 box + 3 bricks	89	7.03	0.28
1 box + 4 bricks	102	7.00	0.31
1 box + 5 bricks	115	6.97	0.34



Conclusions:

A prototype structure will bend only about 0.28" (7 mm) when fully horizontal supporting the weight of a typical LATOF scintillator (for the 164" long one used, weight was estimated to be approx. 110 lbs.). This is when supported only at the ends and with no brackets welded to the metal plates to assist rigidity. This result is within the desired CEBAF deflection specifications (deflection of 1 cm. or less when horizontal).