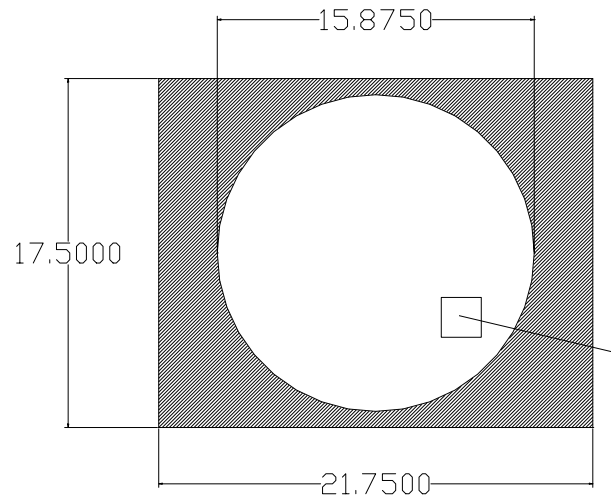


500.101.02 Fall 2002 Design of a Spaghetti Stadium “Dome”

Objective

You are designing a scale model for a stadium. The base footprint for your stadium (minimum diameter = 15.875 in. or 403mm) and the maximum pressure that it must sustain (0.5 psi or 3.4 kPa) have been determined. Your design should be the most aesthetically pleasing structure that carries a 0.5 psi demand pressure using the least amount of building materials (spaghetti, and epoxy) while enclosing the greatest possible volume.



Geometric Limitations

Your stadium “dome” must be testable. Therefore, its footprint must rest in the shaded area in the drawing to the right (note dimensions are in inches in the drawing). The actual dome tester is in the laboratory and may be measured at your convenience. Additionally, the height of your dome should be no greater than 9 in. (229 mm). The “clear” volume enclosed by your stadium is based on should be at least 270 in³ (4400 cm³) this is based on a cone with a radius of 8 in. and a height of 4 in. – smaller enclosed volumes are allowed, but will negatively impact the “economic” ranking of the stadium.

Dome Design / Build / Test Contest

Progress: Group meetings with Dr. Schafer	20
Capacity ¹ : Surpassing 0.5 psi with dome	30
Efficiency ² : (Strength / 0.5 psi) · (1 lb / weight)	10
Economic ² : (Interior Volume / V*) · (1 lb / weight) and strength > 0.5psi	10
Aesthetics ² : as determined by the average given by your classmates	10
Effort ² : as determined by the average score given by your classmates	10
Teamwork: Intra-group grading (double-checked by Dr. Schafer - my final say)	10
	<u>100</u>

¹ All teams with domes that surpass 0.5 psi in loading will be exempted from the final.

² Two teams, selected from the winning teams in efficiency, economic, aesthetics, and effort will be selected to be exempted from presentations, and will act as the ‘judges’ in the presentations

Deadlines and Scheduling

Mon 28-Oct Introduction to contest

Tues 29-Oct, 3 sketches from every person, Truss Test in Computer Lab

Wed 30-Oct, Finalization of design contest rules

Thurs./Fri, 2 sketches from every team and preliminary calculations

Mon 4-Nov, Group work – meetings with Dr. S. (Latrobe 15)

Tues 5-Nov, Group work – meetings with Dr. S. (Latrobe 15)

Wed 6-Nov, Group work – meetings with Dr. S. (Latrobe 15)

Mon 11-Nov, Cleanup (Latrobe 15)

Monday, November 11, 8pm - Dinnertime (pizza) grading and testing of domes

THE LAB IS IN LATROBE 15 – ENTER THROUGH LATROBE 11

1 KEYMASTER FROM EACH GROUP MAY GET A KEY FOR A \$10 DEPOSIT TO MARIANNE IN THE CIVIL ENGINEERING OFFICE (NE CORNER OF LATROBE, #)