

## 2024-2025 Student Chapter SAMPE Fuselage Contest Rules

**ALL FUSELAGES MUST BE AT LEAST 24" IN LENGTH**

### Section 1: Teams

- 1) The contest will be for enrolled students at an accredited university, college, community college associated with SAMPE. Students attending the contest must be 16 years of age or older in accordance to SAMPE conference regulations; younger students may participate as team members but may not attend. The following rules are to be considered an outline of the requirements and are subject to interpretation by the Governing Committee. The contest is intended to provide an opportunity for students to learn and expand their abilities in composite manufacturing and design. Any design or concept which is not consistent with the spirit of these rules will be disqualified. Students are encouraged to ask for clarification of these rules. The governing committee will publish the question(s) and the committee's answer on the SAMPE contest web site.
- 2) Individual teams must be composed of no more than five members (one team leader and up to four additional members) to allow each student to have a hands-on experience involving design and manufacture of a composite structure. In order to encourage autonomous function of different teams, each entry must meet three requirements:
  - a) Student Fabricated Fuselage: The students are encouraged to solicit advice, instruction, and training from faculty, peers, and industry members during the course of the project. However, all work involved in fabrication of the entry fuselage must be accomplished by the team members themselves without assistance from any other parties.
  - b) Unique Team: Each registered team must have unique student team members.
  - c) Unique Design: Each team can only enter one design. The university or college associated with SAMPE may have more than one team, as long as each team has a unique design. On Test Day where multiple entries from the same college or university are entered, the Governing Committee will compare all approved Design Proposals for those entries. Schools that submit multiple versions of the same design may only have one team place. The eligible team from that university must be decided prior to the teams checking in.
- 3) Between **February 1, 2025 and May 12, 2025**, all teams must submit a design proposal for approval by the Governing Committee (email address: [fuselage@sampe.org](mailto:fuselage@sampe.org)) for each registered entry. Your proposal must include the following elements or they will be returned without review or approval:
  - a) A Title page with the following information included:
    - i) Name of School
    - ii) Names of students on the team (no more than five per entry); Identify which student is the team leader and include their email address. The student team leader's email address will be used by the Governing Committee to provide feedback and/or approval for the proposal submission as well as the Contest Timeline. The Contest Timeline will be sent about a week before the contest which will give details for where to post your poster and check in your

- design, and specifics about testing.
- iii) Faculty advisor Name, email and phone number
  - b) 1 page paper describing the design, materials, manufacturing, and innovation
  - c) A drawing showing the fuselage. Include section cuts for each unique cross section.
  - d) A spreadsheet with student's names and emails
    - i) See Appendix B for format

The Governing Committee will approve or send instructions for required revisions to attain approval no later than **May 20, 2025**. Upon design acceptance the Governing Committee will respond if the design proposal is accepted.

Changes may be made to a design after the proposal has been approved; however, the design may be disqualified if the changes violate the spirit of the rules according to paragraphs 1 or 2.

**\*\*Students are encouraged to submit design proposals early in order to receive approval and feedback earlier.**

4) Students must provide a bill of materials and description of manufacturing processes.

5) Fuselage categories and Design Loads:

- a) Testing will be a 3pt bend test
  - i) Minimum Required Load: 1,000 lbf
    - (1) Total Structure must not deflect more than 1" in analysis at load requirement
  - ii) Testing 3pt bend test
    - (1) Fixture will be the same as the bridge competition.
    - (2) Ref Figures 1,2, and 3 for fixture dimensions.

Figure 1: General Outline of Loading Fixture

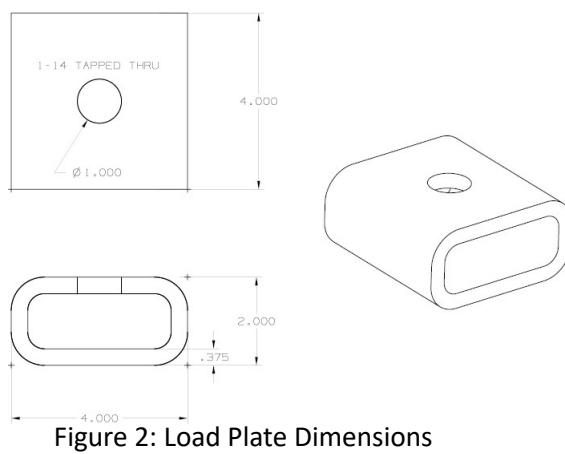
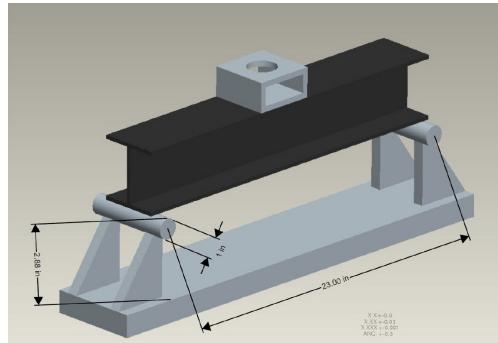


Figure 2: Load Plate Dimensions

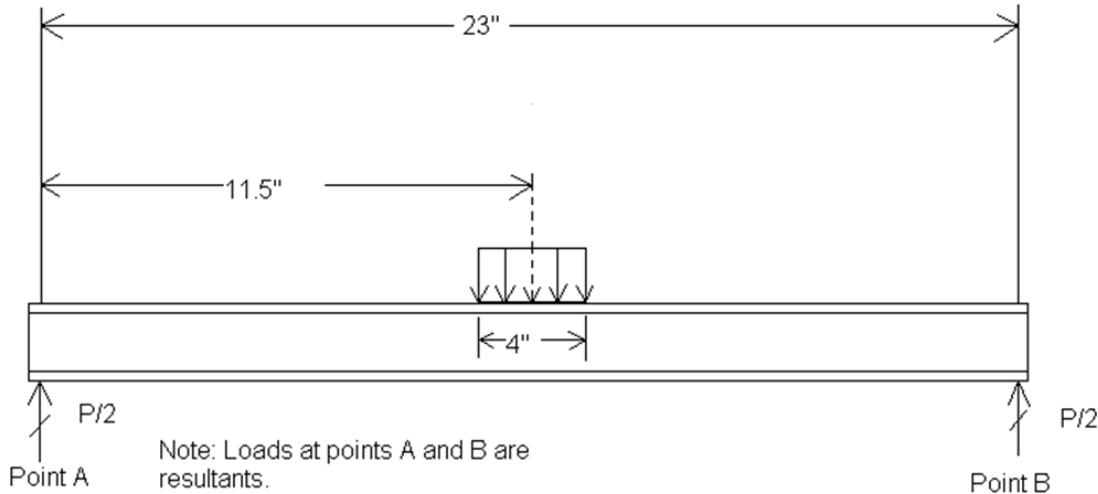


Figure 3: Free Body Diagram of Basic Load Case

- b) Geometry Requirements
  - i) Fuselage MUST BE 24" length minimum
  - ii) Inner diameter (including all structure MUST NOT be less than 5.5") through the entire length
  - iii) Outer diameter MUST NOT exceed 6" through the entire length
  - iv) Fuselage MUST include 4 cutouts; 2 on the left and 2 on the right-hand side of the fuselage representing airplane doors.
  - v) Door Cutouts MUST NOT be less than 2" diameter circle; MUST NOT EXCEED 3" diameter circle
  - vi) Door Cutouts MUST BE at least 10" apart; and no more than 15" from each other's closest edge
  - vii) Door Cutouts MUST BE at least 5" from the edge of the Fuselage from each other's closest edge
  - viii) Door Cutouts DO NOT need to be on the top half of the fuselage. However, you will need to specify loading orientation.
- 6) Materials
  - a) Fiberglass is the only approved material.
  - b) Nomex or Kevlar Honeycomb Core is allowed. Resin filling core is allowed.
  - c) Resin systems are open ended.
- 7) Check-in
  - a) A team member must complete the following prior to the end of check-in
    - i) Provide a compliant fuselage to the design committee
      - (1) If a team requires additional time beyond check-in to modify the design into a compliant design they will receive a 25% weight penalty. This allowance will end 15 minutes prior to the start of the competition.
    - ii) Poster must be hung and ready for judges to review 15 minutes prior to the start of the competition.
- 8) Evaluation Criteria is based on a combined score of ranking based innovation, uniqueness, and ability to meet requirements.
  - a) Ability to meet requirements. This will be ranked from 1st to last based on loading criteria. Score is taken as maximum compression load P (up to that category's design load) where failure occurs. Please note that this means there is NO advantage to exceeding the design load. Weight will be

used as a tie breaker. This is weight not P/W. Test fixture is the same as the bridge competition.

- b) Innovation and uniqueness will be part of the poster session. A panel of SAMPE professionals will review the posters and score each teams poster based on design and manufacturing uniqueness and innovation.
  - i) Evaluation criteria will include
    - (1) Innovation, uniqueness, and technical content
    - (2) Readability and presentation
    - (3) Relevance to entry
      - (a) A panel of industry judges will give each poster a rating of 1 to 5 for each criterion, 5 being the best and 1 being the worst. The ratings will be summed to yield a total score for each criterion. The scores from the judges will be summed and averaged for each poster to derive the entry's total score.
  - c) A team's final score will be the sum of their poster ranking and design's ability to meet requirements, divided by 2.
    - i) A team that gets a ranked 3 in the poster and 5 in ability to meet requirements will have a final score of 4. This will then be compared to other teams combined scores.
  - d) If a tie occurs on the final score, weight will be used to break the tie.

Team	Penalty	Ranking					Poster(5-Good to 1-bad)					Final Score	Placement
		Weight	Weight + Penalty	Failure Load(1000lb)	Pass	Ranking	Innovation/ Technical Content	Readability and presentation	Relevance to Entry	Average	Poster Ranking		
Team A	No	1000	1000	1451	PASS	4	3.7	4.8	2.5	3.66667	4	4	6
Team B	No	650	650	780	FAIL	6	4.7	4.9	4.5	4.7	1	3.5	4
Team C	No	600	600	1230	PASS	1	2.2	2.5	3.4	2.7	6	3.5	5
Team D	No	750	750	1154	PASS	2	3.6	4.1	2.5	3.4	5	3.5	2
Team E	Yes	600	750	1002	PASS	2	3.7	3.5	4	3.73333	3	2.5	1
Team F	No	900	1050	2000	PASS	5	3.5	4.5	4.2	4.06667	2	3.5	3

- 9) All student team entries must also submit a poster presentation highlighting the uniqueness and innovation of their fuselage. Each entry requires a poster. Posters must be hung upon check-in.
  - a) Posters shall contain the members of the team, sponsoring advisor, and school.
  - b) Registration number shall be in the Top Left Hand Side Corner and easily legible. See image in the Appendix. Failure of judges to be able to find the registration number will result in no scores. Use the registration number provided during by SAMPE when you registrar online. If you have questions on what your registration number is, please reach out.
- 10) Posters shall be 24"x36" Landscape format (orient it horizontally).
- 11) Questions about submission guidelines: When submitting a question, please reference the relevant paragraph(s) in the rules, and include any supporting pictures/images in a Microsoft Word document. All questions and responses will be posted to SAMPE website:

## Appendix

### Appendix A: Consolidated Schedule

Registration Start: **February 1, 2025**

Registration End: **May 12, 2025**

SAMPE Conference: **May 19-22, 2025**

Check-in: See Conference Schedule

Test Date: See Conference Schedule

Awards Announcement: See Conference Schedule

### Appendix B: Submittal Form

University/College	First name	Last name	Emails
Put your university here	Person A	Person A	Fill in each person's email
	Person B	Person B	Fill in each person's email
	Person C	Person C	Fill in each person's email
	Person D	Person D	Fill in each person's email
	Person E	Person E	Fill in each person's email