

Rev. A (9-22-04): Section “ Ping-pong Ball Size” added under Vehicle Specifications.

Rev. B (10-4-04): Item 3A added under “Scoring and Test Procedures” indicating that ping-pong balls must be loose after being placed in the pockets.



2005 ASEE MODEL DESIGN COMPETITION

Sponsored by the Two Year College Division of ASEE

Date: August 3, 2004

Dear Colleague,

On behalf of the American Society for Engineering Education (ASEE) - Two Year College Division (TYCD), we invite you to encourage the submission of student design projects for the 7th Annual ASEE Lower Division MODEL DESIGN COMPETITION. This event will be held in conjunction with the 2005 ASEE Annual Convention, June 12-15, 2005 in Portland, OR. This competition is open to 2nd and 1st year students at four and two year colleges and universities.

In this year’s competition student teams will build a robot capable of depositing standard ping-pong balls in pockets located in the corners of a large, square track. The robots must adhere to the guidelines of the model design competition (attached) and an oral presentation is included as part of the competition.

The main reason for this competition is for students to gain a better understanding of the design process from start to finish. Designing and building something from an idea is probably why they chose engineering in the first place. Use this design competition as a platform to reinforce their ideas and have some *engineering fun!* We hope to see you and your students' entries in Portland.

Please find enclosed the guidelines and registration forms for this event. The interest and registration forms are on the back of this letter.

Sincerely,

Paul E. Gordy - ASEE TYCD Chair

Phone: 757-822-7175

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Email: PGordy@tcc.edu

John Wadach

Phone: 585-292-2488

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Results from the
6th Annual ASEE Model Design Competition
June 21, 2004 - Salt Lake City

The ASEE Model Design Competition is a design/build competition for freshmen & sophomore engineering students at 2-year and 4-year colleges. The competition is held each year during the ASEE Annual Convention. The competition typically involves building an autonomous, battery-powered vehicle to navigate some sort of challenging track. The recent competition in Salt Lake City required vehicles to complete two laps around a figure-8 track with peaks and valleys. Scoring for the competition was based on speed in completing the course as well as on a presentation by student team members before a panel of judges.

Eight teams were registered for the competition, but half of them dropped out just before the event, as they were unable to produce vehicles to complete the course (a common problem in this challenging event). The four teams that were competed were well-prepared and brought impressive vehicles to the event. The results were as follows:

- 1st Place - Tidewater Community College, Virginia Beach, VA
- 2nd Place – Central Carolina Community College, Sanford, NC
- 3rd Place – Monroe Community College, Rochester, NY
- 4th Place – LeTourneau University, Longview, TX

Consider bringing a team from your college to next year's competition on June 13, 2005 in Portland, OR. For more information or a copy of next year's rules, please contact Paul Gordy (Pgordy@tcc.edu, 757-822-7175) or John Wadach, (Jwadach@monroecc.edu, 585-292-2488).



Team members pose with their vehicles after the time trials.**2005 ASEE MODEL**

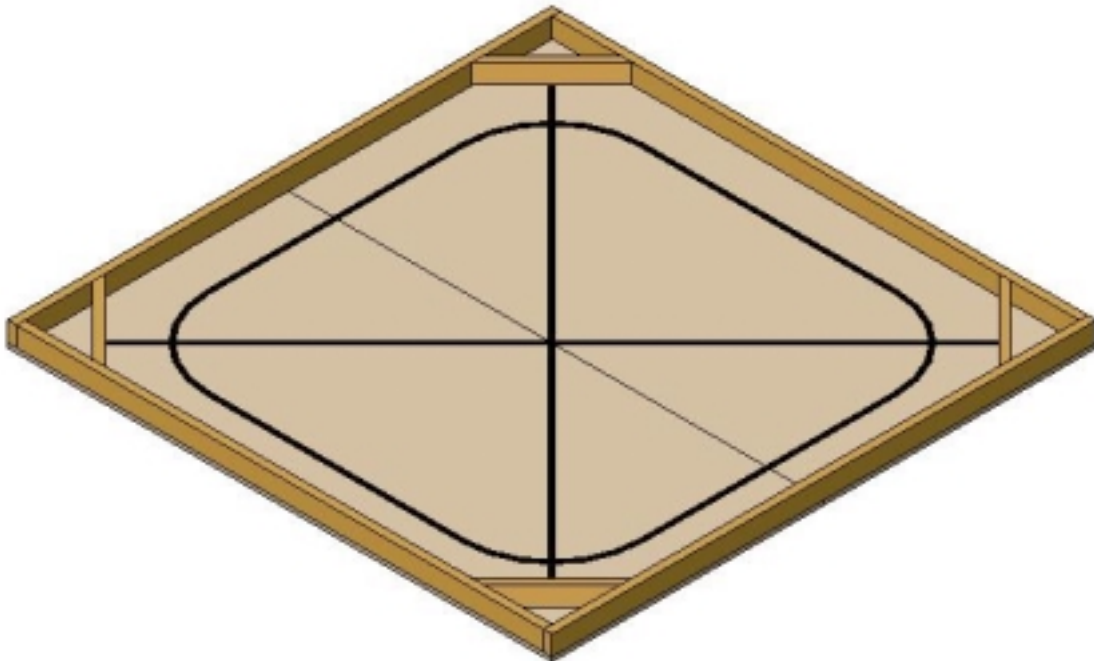
DESIGN COMPETITION
Portland, Oregon
MODEL COMPETITION GUIDELINES

The American Society for Engineering Education (ASEE) Two-Year College Division (TYCD), Model Design Competition will be held Monday, June 13, 2005 in conjunction with the ASEE Annual Convention in Portland, Oregon.

Objective:

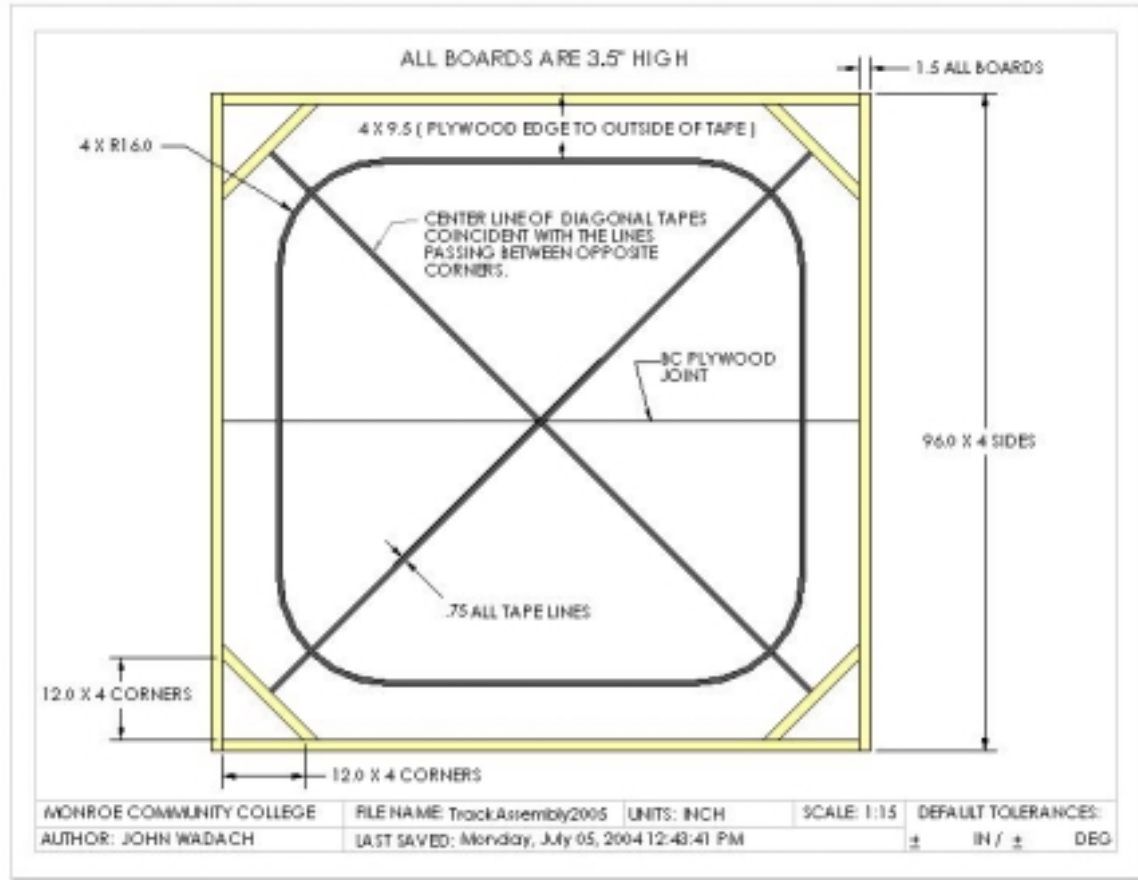
To design and build a zero-emission robot that deposits as many ping-pong balls as possible in each of four triangular pockets in less than 60 seconds. An isometric view of the track is shown below.

Figure 1: Isometric View of Track



Track Specifications:

Figure 2: Top View of Track (Not to scale due to JPEG resizing)



Track Materials:

1. Five 2" X 4" X 8' boards (actual dimensions 1.5" X 3.5" X 8').
2. Two 4' X 8' sheets of BC plywood.
3. One roll of 3/4" wide black vinyl electrical tape
4. Fasteners

Construction Procedures:

1. Butt the two sheets of plywood together. The elevation difference between the two sheets along the joint must be less than 1/16". If the elevation difference is greater than 1/16" a support structure must be added beneath the plywood.

2. Snap a chalk line or draw a pencil line between both pairs of opposite plywood corners that will be used to affix diagonal tape lines onto.
3. Layout the outside edge of the oval tape line. The straight sections of the oval line are 9.5" from the outside edge of the plywood surface. All corner arcs have radii of 16.0".
4. Fasten the perimeter 2 X 4 boards to the plywood.
5. Cut the 2 X 4 corner boards to length using a 45° miter. Fasten the boards to the track.
6. Affix two electrical tape pieces so that the centerline of each piece of tape is coincident with one of the diagonal layout lines.
7. Affix the oval tape so that the outside edge of the tape is coincident with the layout lines.

Vehicle Specifications:

Allowable Energy Sources:

Any energy source is allowed as long as it is completely contained within the robot and does not create or emit any gaseous, liquid, or solid materials. Energy sources must not present any safety hazards to participants or spectators.

Maximum Robot Size at Start:

At the start of a trial the robot and balls must be contained within the following dimensions.

Height: 6 inches

Width: 12 inches

Length: 12 inches

Once a trial has begun the robot may unfold into any size.

Components, Fabrication and Cost:

Team members using tools and component parts, which are commonly available to the general public must perform all fabrication. Use of commercially available vehicles, robots, or kits such as RC cars, Legos, K-nex, Fischer-Technics, or erector sets may not be used for the chassis or major subassemblies of the robot. Individual parts from these cars or kits may be integrated into a team's robot. The total cost of all components must not exceed \$350.

Note: *The following section (Ping-Pong Ball Size) was added in Rev. A (9-22-04)*

Ping-Pong Ball Size:

There is some variation in ping-pong ball sizes. The official diameter of a ping-pong ball changed from 38mm to 40mm in October of 2000. Additionally, even nominal 38mm ping-pong balls may vary somewhat. **For this competition, the size of a ping-pong ball must be at least 37.25mm.** The judges may use a measuring device, such as a metal plate with a 37.25mm hole through which approved ping-pong balls should not be able to pass through. Teams should be ready to present their ping-pong balls for inspection if requested to do so by the judges. Also note that a good source for purchasing ping-pong balls online (\$0.95/dozen or \$27.90 for 21 dozen with shipping) is:

http://store.rebeccas.com/store/merchant.mvc?Screen=PROD&Product_Code=BLS575&Category_Code=

Robot Navigation:

A trial will be initiated when a team member presses or pulls a button, lever, string, or other starting mechanism on the robot. Energy from the team member's body may not be used to propel the robot or cause components to move on the robot. The robot must be capable of completing the tasks without any input from the team. Team members may not operate radio, infrared, ultrasonic, electrical, or other remote controls once the robot begins moving.

Robot Inspection:

Prior to the race the judges will inspect each robot for the following:

- 1) Each robot must meet the required specifications for dimensions, allowable energy sources and components, and other specifications.
- 2) Each robot must pass a safety inspection. Any robot that presents a safety hazard, or has the potential to damage any property or the track will not be allowed in the competition.

Scoring and Test Procedures:

- 1) The robot must begin with some portion of it on or above the joint between the two pieces of plywood. The robot including ping-pong balls must begin within the 12"X12"X 6" maximum size. After a team initiates a trial the robot may change into any size.
- 2) The robot may operate for a maximum of 60 seconds after the judge gives the command to start.
- 3) Each team must provide their own ping-pong balls and the balls may not be modified in any way. Robots may contain as many ping-pong balls as can fit within the 12"X12"X 6" maximum size at the start.

Note: Item 3A below was added in Rev. B (10-4-04).

3A) The ping-pong balls may not be taped, packaged, or bound together in any fashion when they are inside the pockets on the track (i.e., the balls must be loose after being placed in the pockets). Additionally, no materials other than the ping-pong balls may be left in the pockets by the robot or the balls in that pocket will not be counted for scoring purposes.

4) The robot may not clamp or hook onto, bore into, or use adhesives or other materials to stick to the track or boards. The robot may not damage, mark, or leave any residue on the track.

5) Points will be awarded as follows for a trial.

1 Point for each ball deposited in the pocket containing the most balls.

2 Points for each ball deposited in the pocket containing the second most balls.

3 Points for each ball deposited in the pocket containing the third most balls.

4 Points for each ball deposited in the pocket containing the fourth most balls.

A ball is considered to be in a pocket if it is no longer in contact with the robot and any portion of the ball is within the three vertical planes of the inside triangle of the pocket at the end of the 60 second trial.

6) Each team will be allowed to make four trials. The total testing score will be equal to the sum of the points earned in the two trials with the highest point totals.

7) The order of testing will be determined by random draw. Each team will have one minute to begin a trial after being called. All teams will be called for a trial before a team performs their next trial. If time permits, there will be a halftime break of approximately 10 minutes after each team has attempted 2 trials.

8) Teams may not make practice runs after the start of the robot testing session or during halftime.

9) Teams may make changes or repairs to their robots between trials.

Oral Presentation:

Prior to the testing of the vehicles, each team shall make an oral presentation that is less than 10 minutes in duration. The judges may reduce the actual length of the presentations if the number of entries does not allow the presentation component of the competition to be completed in a reasonable period of time. The oral presentation will be followed by up to 3 minutes of questions by the judges. If time allows the judges may allow additional questions from other teams. Only one spokesperson for each team will be allowed to ask questions if recognized by the judges. Other competing team members or spectators may not ask questions or make comments during the oral presentation or questioning period.

The oral presentations should include the following components (each component is worth 5 points):

1. Problem Identification: A description and history of why the vehicle was designed and built.
2. Preliminary Ideas: Problem Formulation
3. Abstraction and Synthesis: Refinement of goals and ideas
4. Analysis: Comparison and evaluation of alternate designs including costs (Scaled drawings of the vehicle need to be included)
5. Final Solution: A discussion of what improvements could be made on future designs is required.

In addition, the assessment of the presentation will include two components worth 5 points each.

6. Presentation Quality and Adherence to the Guidelines of the Project
7. Written report: A written summary (max of 3 pages not including the appendix) of the presentation shall be given to each judge (5 copies). An appendix must be included containing a parts list, detailed cost estimate, CAD drawings, and copies of the receipts or vendor price lists for all parts having a fair market value of more than \$10 is required.

Scoring:

The judges will evaluate the content and form of the oral presentation and written report. Teams may receive any integer number of points between 0 and 35. The judges may give an equal score to two or more teams.

Rule Interpretations:**Before the date of the competition:**

Contact Paul Gordy or John Wadach regarding competition rules, specification, or schedules.

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1700 College Crescent
Virginia Beach, VA 23453
Phone: 757-822-7175
Email: PGordy@tcc.edu

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1000 E. Henrietta Road
Rochester, NY 14623
Phone: 585-292-2488
Email: JWADACH@monroecc.edu

On the date of the competition:

The judges will interpret the intent of the rules and make all decisions. If the judges determine that a team is in violation of the intent of any rule or specification, they may either deduct points or disqualify the team. All decisions by the judges are final and may not be appealed.

PROJECT TEAM / ENTRY LIMITATIONS:

Each team must have at least one faculty advisor and at least 2 student members but no more than 10 student members. Each team member must primarily be enrolled in freshmen or sophomore level classes. If a school has multiple entries each team must show original design features.

PROJECT INTEREST AND REGISTRATION FORMS:

Please find the entry forms on a separate page. The Interest Form must be received no later than March 1, 2005. A Registration Form for each model design team must be received no later than June 1, 2005.

ASEE ANNUAL CONVENTION PASSES:

It is not required that student team members or faculty advisors be registered for the ASEE Annual Convention. Passes will be provided for all team members and advisors so that they can enter the conference area and exhibition area on the day of the competition. Details for obtaining passes will be made available a couple of weeks prior to the competition.

COMPETITION TIMELINE:

The specific time and location of the oral presentations and robot testing will be sent to all teams and published in the ASEE Final Program and Proceedings booklet. The overall format of the competition is given below.

Morning: Oral Presentations and Evaluations of Written Reports

Lunch: A lunch will be provided for students and faculty advisors. Students are encouraged to sit with students from other teams during lunch.

Afternoon: Robot Testing and Awards

PRACTICE SESSION:

The official track will be available in the Exhibition Hall for teams to practice on prior to or following the oral presentations. Teams should be considerate and only use the track for brief periods if other teams are waiting to use the track. No practice runs may be made once the robot testing has begun or during the halftime period.

AWARDS:

First, second, and third-place teams will receive plaques.

SUNY TYESA COMPETITION

The 2005 State University of New York Two Year Engineering Science Association (SUNY TYESA) will host a design-build competition on or about Friday, May 6, 2005 at one of the SUNY community college campuses. SUNY TYESA will use the same rules and project as the 2005 ASEE Design Competition. Teams interested in participating in the SUNY TYESA competition should contact John Wadach or visit the SUNY TYESA website at: tyesa.org

2005 ASEE Model Design Competition Registration Form

Name of college/university: _____

Name of faculty advisor(s): _____

Mailing Address: _____

Phone: _____ Fax: _____

Email (print clearly): _____

Student team captain: _____

Other student team members:

1. _____ 2. _____ 3. _____

4. _____ 5. _____ 6. _____

7. _____ 8. _____ 9. _____

Number of model entries expected: _____

Which students/advisors need badges for the convention center? (Badges are needed if you are not registered for the convention).

Circle one: All need badges. None need badges. Only those listed below need badges.

Please submit this form to : Paul E. Gordy - ASEE TYCD Chair
Tidewater Community College
1700 College Crescent
Virginia Beach, VA 23453
Phone: 757-822-7175
Fax: 757-427-0327
Email: PGordy@tcc.edu

This form by June 1, 2005 (by US mail , fax, or email)

2005 ASEE Model Design Competition Interest Form

Name of college/university: _____

Name of faculty advisor(s): _____

Mailing Address: _____

Phone: _____ Fax: _____

Email (print clearly): _____

Number of model entries expected: _____

Please submit this form to : Paul E. Gordy - ASEE TYCD Chair
Tidewater Community College
1700 College Crescent
Virginia Beach, VA 23453
Phone: 757-822-7175
Fax: 757-427-0327
Email: PGordy@tcc.edu

This form by March 1, 2005 (by US mail , fax, or email)