

15th Semi-Annual Junkyard Challenge Design Competition

Rail Rider

ENGR107 Fall 2010
Prof. Carl G. Schaefer, Jr.

Design Objective: Design and fabricate a small-scale prototype cart (the Rail Rider) to carry and protect an egg. The Rail Rider will be configured to ride down a staircase railing, leave the end of the railing, and land on the ground without breaking the egg.

Rules:

- The class will be randomly divided into four teams with approximately the same number of students.
- Each team must fund their design efforts. Students may contribute up to (but no more than) \$10.00 each.
- Each team may use, and indeed is encouraged to use, materials found, borrowed, or donated to the group from around the house, the university, the dorm, an outside company, or other entity. The team will be disqualified if items used in the design have been illegally acquired or if it is determined that public or private property has clearly been pilfered.
- **Design Constraints:**
 - The railing shall not be damaged, altered, or modified in any way.
 - No residue shall be left on the railing by the Rail Rider or the egg.
 - The Rail Rider shall remain in contact with the railing from the top to the bottom of the railing.
 - Wrapping the egg in any continuous homogeneous material is not allowed. The egg must be suspended within the Rail Rider.
 - The egg must not be completely covered; at least 20% of the surface area of the egg must be visible after the egg is seated inside the Rail Rider.
 - The Rail Rider shall be designed such that the egg is inserted into the Rail Rider immediately before use.
 - The egg shall not be altered or modified in any way.
 - No adhesive may be used on the egg.
 - No residue will be left on the egg by the Rail Rider vehicle.
 - A team number, to be assigned, will be visible on both sides of the Rail Rider vehicle.
 - The choice of egg must be a Grade A Large egg.
 - No tape of any kind may be used in the construction of the Rail Rider.
- **Preliminary Testing Guidelines:**
 - Any in-process testing must be done using hard-boiled eggs only and with a sheet of plastic, or a tarp, located on the floor in the landing area.

- If testing at the specified test site, all testing must be done after hours and shall not interfere with emergency egress.
- Photographs and video of the in-process testing must be incorporated into the final project presentation.
- **Definition of Success:**
 - The Rail Rider remains in contact with the railing from the top to the bottom.
 - There are NO visible cracks or damage to the egg after it hits the ground and all kinetic energy has been expended.
 - It's gotta look cool!
 - It is voted by classmates and those in attendance (at the project demonstrations) to be the most creative.
- **Deliverables:**
 - A completed Rail Rider vehicle on November 30, 2010.
 - A 20-minute presentation at a Preliminary Design Review to be scheduled.
 - 10 page final report describing the design, development, testing, and fabrication of the Rail Rider. The report shall be prepared by each of the four teams.
- **Grading:**
 - Each design will be scored (graded) using the following scale:
 - Successful completion of design: 50%
 - Final team report: 30%
 - Originality/creativity: 20%