

Crash Competition

1.0 Introduction:

Roadside objects can pose a threat to drivers' safety, particularly on high-speed and two-lane highways. When there is a limited amount of right-of-way for a road, the clear zones (the distance on both sides of the roadway that should be kept clear) may be minimal. Roadside objects (such as telephone poles, signs, guard-rails, etc.) close to the road easily become hazards to a driver in the event of an accident. Because of this, objects inside the clear zones are required by most highway agencies to be either break-away or protected. Crash attenuators are placed around or in front of objects that drivers are likely to hit to lessen the severity of the impact. They can be buckets filled with sand or rubber devices typical of those found at the end of guard-rails. In this competition, a similar crash attenuator will be designed, built, and tested using a toy vehicle and an egg to represent a passenger.

2.0 Participants

- 2.1 Only one team from each school is allowed to compete in this event. All team members must be undergraduate or graduate students of the school competing.
- 2.2 The team captain must be an undergraduate student. The team captain will be required to attach (and then remove after testing) the crash attenuator to the crash wall.

3.0 Materials and Equipment

- 3.1 A supplies list is given at the end of these rules. Only materials that are on the supplies list will be allowed to be a part of the submitted crash attenuator. All materials are not required. Judges' rulings on materials will be final.
- 3.2 Materials that are required to attach the crash attenuator to the crash wall will be brought by the competing school. These materials must be on the supplies list.
- 3.3 No other equipment is required.

4.0 Team Submittals

- 4.1 Each team must submit a crash attenuator that, when fully attached to the crash wall, is no more than 4 inches deep (in the direction of impact), 6 inches tall, and 6 inches wide.
- 4.2 Any crash attenuator that contains any materials not listed on the supply list will be disqualified.
- 4.3 The name of the school must be clearly marked and visible on the attached crash attenuator.
- 4.4 The team captain must attach (and then remove after testing) the crash attenuator to the crash wall using only materials on the supply list.

5.0 Testing

- 5.1 Testing will be done on a plywood test track. The track will be approximately one (1) foot wide with walls on either side to keep the crash vehicle on the track. The track will be inclined at an unknown angle.
- 5.2 The crash wall will be attached perpendicular to the test track.

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- 5.3 The test vehicle will be a readily available toy vehicle propelled by gravity alone. An egg will be placed by a judge unrestrained in the vehicle to represent a passenger.
- 5.4 The team captain will determine the interval of each test run and will position the crash vehicle on the track for each run at the instruction of the judges.
- 5.5 Each team will be allowed up to two eggs for the test runs. The crash attenuator has failed when the egg used in the test has a viable crack after crashing. Visible cracks will be determined by the judges. Judges rulings will be final.
- 5.6 Each team will be allowed up to 5 runs. No more runs will be allowed once both eggs have been broken.
- 5.7 Before testing, the team captain will be required to attach the crash attenuator to the test wall. At no point during or between the test runs will any repositioning or reattaching be allowed. After testing, the team captain must remove all parts of the crash attenuator from the crash wall.

6.0 Judging and scoring

- 6.1 Teams will be given one point for each two (2) foot test interval that the crash attenuator successfully protects the egg.
- 6.2 Any failed crash attempts will not count; the crash attenuator has failed when the egg comes out cracked. The judges will decide if the egg is cracked. All judges' rulings are final.
- 6.3 Up to 15 points will be given to each team.
- 6.4 In the event of a tie, the judges will determine the team of higher ranking based on creativity and use of materials for those team's crash attenuators.
- 6.5 Example scores are shown below.

Team	Test Distance (distance truck is released from crash attenuator)	Egg result	Final score	Ranking
School 1	10 ft	Not cracked	7 points	3 rd
	20 ft	Cracked		
	14 ft	Not cracked		
	18 ft	Cracked		
School 2	6 ft	Not cracked	9 points	1 st
	12 ft	Not cracked		
	18 ft	Not cracked		
	22 ft	Cracked		
	20 ft	Cracked		
School 3	4 ft	Not cracked	8 points	2 nd
	10 ft	Not cracked		
	16 ft	Not cracked		
	18 ft	Cracked		
	14 ft	Cracked		

Supply List

All materials, with the exception of tape and glue, must be recycled

Packing peanuts
Rubber bands
Paper
Blue painter's tape
Scotch tape
Twine
Paper clips
Cotton balls
Fabric
Plastic bottles
Cardboard
Glue