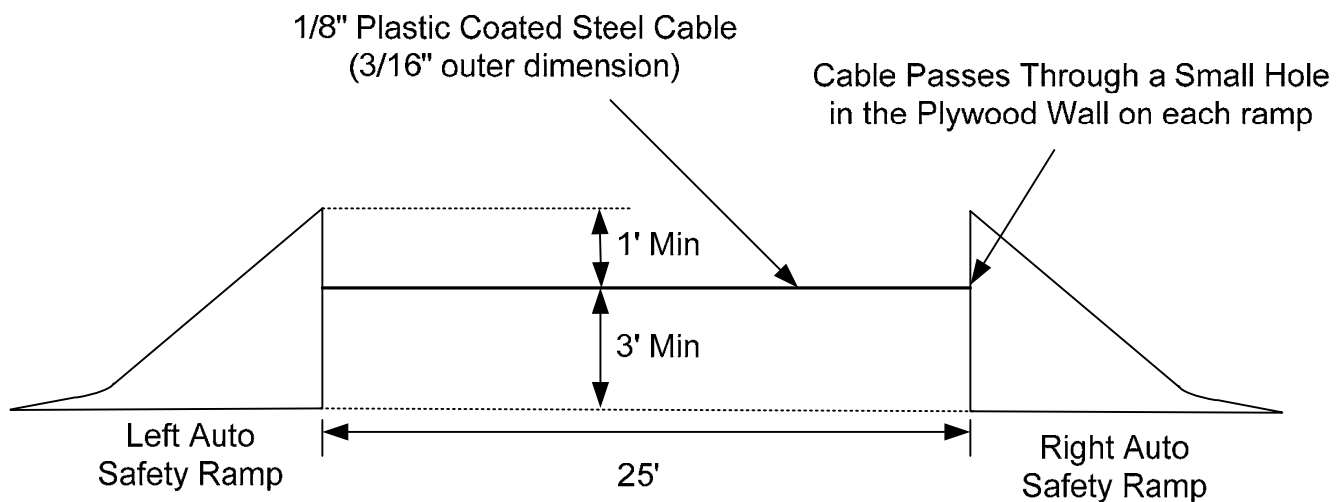


**12th Annual
MCC High School Engineering Competition
Monroe Community College
Tuesday, May 12th, 2009**

Event: Cable Cars

Objective: To design and build a cable car that can travel along a cable from the Left Auto Safety Ramp to the Right Auto Safety Ramp, strike the side of the Right Auto Safety Ramp and then reverse direction and return to the Left Auto Safety Ramp in the least amount of time.

Track Specifications:



The cable will be strung fairly tight but some sag in the cable should be expected due to the weight of the cable car.

Vehicle Specifications:

Maximum

Size: The cable car must be less than or equal to 12" X 12" X 12". **The cable car must remain in this size constraint for the entire race.**

Components: Teams may use commercially supplied components but teams must show that they designed and fabricated a majority of the cable car including the chassis, body and transmission. Use of a commercially purchased vehicle or kit is prohibited.

Motors: Teams may use any number of Radio Shack #273-255 12V DC or Jameco 232039 12V DC motors. No other motors may be used. The specifications for the Jameco motor can be found at:

<http://www.jameco.com/webapp/wcs/stores/servlet/ProductDisplay?langId=-1&storeId=10001&catalogId=10001&productId=232039>

Energy

Source: Each cable car may use one and only one standard size 9V battery such as a Duracell MN1604 or a rechargeable 9V battery having the same size as a Duracell MN1604. No other forms of stored energy may be present in the car **at the start of the race** such as pre-wound rubber bands, compressed springs, balloons, CO₂ cartridges, charged capacitors, or rocket engines.

Control: Remote controls are prohibited. Once the car starts moving the team may not touch or influence the motion of the cable car in any way. The cable car must reverse direction on its own after striking the plywood surface of the right auto safety ramp.

Race

Format: The cable car must start at rest with the car touching the plywood of the left auto safety barrier. When the judge says go, the clock will start and the team will hit a button, lever, string, or other mechanism to start the car. The car must travel to and strike the plywood surface of the right auto safety barrier before reversing direction and returning to the left auto safety barrier. The clock will stop when the car strikes the plywood surface of the left auto safety ramp.

Each team may make a maximum of 3 runs. The final score for a team will be equal to their lowest time in which their car properly completed a round trip between the two ramps. A cable car that does not complete the round trip in less than 60 seconds will receive a DNF (did not finish) for that trial. DNF scores count as a run for a team.

Rules:

1. Each school may enter a maximum of 4 cable cars in this event. The teacher must either call or email Sue O'Brien at 292-2001 or sobrien@monroecc.edu by **Tuesday, May 5th, 2009** to tell her how many cable cars they will enter. The teacher must bring a completed registration form to the competition for each cable car entered.
2. Cable cars may not create emissions of any kind. All parts of your cable car must be securely fastened so that the danger of flying parts is minimized.
3. Chemical or flammable agents are not allowed.
4. Cable cars may not contain any sharp points or edges. All metal corners must be rounded or covered with protective material. The cable car may not cause damage to the cable or ramps.
5. No Pinch points or exposed drive mechanisms may be present. The cable cars may not have components that have the potential to pinch or crush fingers, skin, or other body parts. Drive mechanisms must be covered so that your cable car can be safely touched from any orientation while it is operating.
6. If rotating components such as propellers or rigid bodies are used they must be screened in with wire mesh or other material to prevent a person from being struck by these components.
7. Electrical components that present a shock hazard are not allowed.

8. The ending time of the race will be announced at the beginning of the event. Cable cars must complete all three trials prior to the ending time of the race. A cable car that does not complete all three trials will receive a DNF score for each trial not completed.
9. A cable car that presents a hazard to the participants and/or spectators will not be allowed to compete. Any vehicle that will damage the cable or ramps will also be disqualified.

Copies of these rules are available at www.monroecc.edu/depts/eng&phy/highschl.htm .

For questions contact John Wadach at 292-2488 or jwadach@monroecc.edu .