

## ROTOR EGG DROP

1. **DESCRIPTION:** A team will construct an unpowered, autorotation helicopter device, which uses one or more helicopter rotor(s) to safely transport a raw chicken egg from a specified height to the floor.

**A TEAM OF UP TO:** 2

**IMPOUND:** Yes

**APPROXIMATE TIME:** 10 minutes

2. **EVENT PARAMETERS:**

- a. Students may bring only one prebuilt helicopter egg drop device. No other tools or equipment are allowed. The device may be in a protective storage container for impound.
- b. The supervisor will provide a raw, Grade A, large chicken egg, a plastic sandwich bag, a 3oz paper cup, and masking tape to attach the cup to the device and seal the bag (if needed).

3. **CONSTRUCTION PARAMETERS:**

- a. The device must use wings or blades that rotate around a central axis to slow the descent of the egg, using aerodynamic principles of a helicopter rotor in unpowered "autorotation" mode. No energy-producing mechanism of any type may be used to power the rotor(s) to slow the descent of the device. No commercial rotor assemblies may be used. The device must not be or contain an airplane, a balloon, or a parachute.
- b. Students must seal the egg in the provided plastic sandwich bag and place it in the provided cup.
- c. Students must mount or suspend the cup from the bottom of the helicopter device in such a position that the cup will be the first thing to contact the floor. Students may use the provided masking tape to attach the egg and cup to their device.
- d. No other shock absorbing or cushioning materials may be used either inside (including trapped air) or outside the bag or cup to protect the egg before the cup contacts the floor.
- e. The entire device, including the cup in flying configuration, must fit into a 51 cm x 51 cm x 51 cm cube.

4. **THE COMPETITION:**

- a. It is recommended that the event take place indoors, but if the event is held outdoors, teams must be notified of the location prior to the tournament date.
- b. The entire helicopter must be impounded before the start of the event. No modifications are allowed after impound other than to attach or extract the egg and cup from the helicopter.
- c. If the egg is broken by the competitors before the drop, they may request another egg, with a penalty of two seconds subtracted from their final time.
- d. Teams will have only one drop. All teams must drop their device from the same designated height. The drop height will be announced on the day of the tournament. It is recommended that the drop height be the maximum that the site will accommodate with a minimum height of five meters.
- e. Time starts when the device leaves the student's hand and stops when any part of the device touches the floor or the judges otherwise determine the flight is over. It is suggested that three separate timers be used and the final time be the median (middle) of the three times. Timing should be to the nearest 0.01 sec.
- f. After the drop the student is responsible for extracting the egg from the cup and sandwich bag and handing it to the event supervisor for inspection. Those helicopters whose egg did not survive will be ranked below those that survived.
- g. A broken egg is defined as a crack leaving a wet spot on a paper towel.
- h. Once the device is removed after testing there can be no further challenges for scoring or ranking.

5. **SCORING:**

- a. Teams will be ranked by the greatest descent time within each Tier, greatest time wins.
  - i. Tier 1: Met construction/competition parameters and the egg survived.
  - ii. Tier 2: Met construction/competition parameters and the egg did not survive.
  - iii. Tier 3: Did not meet construction/competition parameters and the egg survived.
  - iv. Tier 4: Did not meet construction/competition parameters and the egg did not survive.
- b. The tiebreaker is the mass of the lightest helicopter (without the egg and cup).

**Recommended Resources:** All reference and training resources including the **Rotor Egg Drop DVD** (formerly Helicopter Egg Drop) are available on the Official Science Olympiad Store or Website at [www.soinc.org](http://www.soinc.org)