2013 Kansas Science Olympiad

HELI OPTERS Div B

Description

- Team of up to two students
- No impound
- Approximate time from start to finish: approx. 15 min.
- Official flights: 8 min. (2 flights)
- Eye protection not required but highly recommended
- Bring up to 2 helicopters
- Flight log is required

CONSTRUCTION PARAMETERS

- DESIGN
- MATERIAL
- MASS
- ROTORS
- ROTOR CONSTRUCTION
- POWER

DESIGN

- Published plan(s)
- Commercial kits
- Student design
TIPS

Published plan:
Indoor Flying Models by Lew Gitlow (9min. 16.2 sec.)

Commercial available kits:

A2Z Corp, Englewood, CO
TURNERTOYS
1958 ELMORE RD
MORRISVILLE, VT 05661

MATERIALS:
Any materials EXCEPT Boron filaments!

Functional components:
• Rotor
• Rotor blades
• Vertical stabilizing surface
• Motor stick

TIPS

• Paper – Japanese tissue paper
• Plastic film covering
OS FILM
www.osfilm.com
2115 State Route 31, Glen Garner, NJ 08826

Method of attaching functional components
• Tape
• Thread
• Music wire
• Malleable wire
• Paper
• Metal or plastic tube

Helicopter may be braced with string of any base material?

Rotor Thrust Bearings
Rubber Motor
Rubber O-Ring
Helicopter Mass
(Excluding the motor)
3 grams or more!

ROTORS
Rotors are defined as surfaces that contribute lift by rotating on a common path around a vertical axis.

- Up to three (3) sets of rotors
- Must be fixed pitch
- Maximum dia. of 30.0 cm
- No limit on number of blades per rotor
- No limit on blade’s chord
- No other lifting surfaces

ROTOR CONSTRUCTION
- Competitor must construct the rotor themselves.
- Commercially available rotors or propellers must not be used in whole or part.
- Commercially available thrust bearings may be used.

POWER
Motor = The big rubber band!

- No limit on motor weight!
- Including any attachments such as O-rings.
- May be lubricated before or after check-in.
- Motors must be removable from helicopter.
- No limit on number of motors.

TIPS
- Bring more than two rubber motors!
- Bagged and labeled good motors for official flights ONLY.
- Find Rubber Lube at F.A.I. Model Supply
MARKING

• Must have team name or number on helicopter or will be ranked after all teams that do not violate the construction rules.

COMPETITION

• Room dimensions (Approx. length, width and ceiling height)
  CMLE@COX.NET
• Cordon off competition area
• No supports or assistance from outside cordon off area
• 8 minutes for two (2) official flights
• Must present a flight log

FLIGHT LOG

• Data must include 6 parameters with at least ten (10) flights
• Three of the six parameters must be:
  1. Motor size
  2. Number of turns on the motor at launch
  3. Flight time
Flight Log must have school name and team number!

SCORING

• Team with incomplete flight log will have 10% deducted from their flight time of each flight.
• Team without flight log will have 30% deducted from their flight time of each flight.
• Team that violate “Construction” or “Competition” rules will be ranked after all teams that do not violate those rules.

Common failure modes

• No back up motors!
• O-ring failure during winding
• Lack of marking
• “Forgot” the flight log
• Mishandling!
• Lack of communication!

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What questions do you have for me?