



Pumpkin Slings

AT PICATINNY ARSENAL

Contest Entry Form

Friday, October 20, 2017
(rain date Friday, October 27)
PICATINNY ARSENAL

Route 15 North, Wharton, NJ 07885
<http://www.pica.army.mil/Picatinny>

School: _____

Team Name for Publishing: _____

Name of Adult In Charge: _____

Mailing Address _____

Phone: Home: _____ Work: _____

Email: _____

_____ Yes, we have obtained Board of Education approval

Name of Administrative Contact _____

Our Team represents (check one): _____ Elementary / Junior High _____ High School

_____ Estimated Number Attending (10 youth and 2 chaperones limit)

Indicate your Class (see descriptions in section A.) and machine details – Please check all that apply. This will help us determine placing more quickly. We reserve the right to merge classes based on participation.

_____ Trebuchet _____ Floating Arm Trebuchet _____ Catapult

Arm Length _____ Rough Dimensions _____

Designed for _____ pounds maximum counterweight

Prizes will be awarded for greatest distance in each class, best of 3 attempts. The grand prize trophy will be awarded for the overall distance winner.



RULES AND REGULATIONS:

A. Machine Class Information

The machine can be of any design as long as it is constructed of materials designed for the weights or stresses that will be put on them; materials should be rated for the job they are asked to perform. Machines will be inspected prior to the competition by a panel of judges who will determine compliance with the guidelines. No motors, engines, pneumatic assist, compressed air, steam or any other compressed gas, hydraulics or ignitable substances may be used or attached in any way. Machines must conform to all General and Safety rules.

For all machines, the throwing arm may have a maximum length of 6 feet. This length is measured from the center of the arm's rotational axis to the point where the fixed sling line attaches to the arm. The position of the rotational axis that yields the longest arm measurement will apply. In the case of a machine without a sling, arm length is measured from the rotational axis to the center of the projectile in the ready to launch position.

1. Traditional Trebuchet

All energy used to launch the pumpkin after release comes from the potential energy stored in an elevated mass. The throwing arm has a fixed axis of rotation.

2. Floating Arm Trebuchet

All energy used to launch the pumpkin after release comes from the potential energy stored in an elevated mass. The throwing arm has an axis of rotation that moves as the throw progresses. The F2k variation of this class has a throwing arm for which the position of the fulcrum along the throwing arm also moves during the throw. All floating arm trebuchets are grouped together during the competition, but these different designs have different release and safety requirements, as detailed in sections C and D.

3. Catapult

All or some of the energy used to launch the pumpkin after release shall come from the potential energy stored in an elastic material. This class includes machines such as torsion catapults and ballistae.

B. General Rules

1. The machine must be fired at least once by your team prior to attendance. Please keep a Firing Log and bring it with you the day of competition.
2. Each team will have three shots, one shot in each round of the completion. Practice shots may be allowed at the discretion of the organizers.
3. Pumpkins will be supplied by the organizers and will weigh between 2-5 pounds.
4. All pumpkins fired must remain intact until they impact the ground/water to count for an official measurement. Distances will be measured from the pumpkin's position just before the shot is triggered to the point of first impact.
5. Pumpkins may not be altered in any way, except for shortening or removing the stem.
6. If any part of the machine is thrown forward so that it lands in front of the rest of the machine, that shot will be disqualified.
7. No wadding is permitted (including bean chaff, straw, foam, metal, or any other object.)
8. No explosives or internal combustion engines are allowed.
9. The Pumpkin Sling organizers reserve the right to combine any classes if there is a lack of participation, as determined by the organizers. All classes must have three (3) entries in that class to open it to competition. Each machine may enter only one (1) class.
10. Machines may be cocked manually, using a winch, block and tackle, or similar mechanism, or using an electric winch. Electric winches are highly recommended, particularly for larger, more powerful machines. (See winch battery notes in Safety rules).

11. Teams may not preload. Each team must wait until notified by the pit boss, at which time they have 5 minutes to cock the machine, load the pumpkin, and fire.
12. If you are disqualified in any round of the competition for breaking General or Safety rules, you will forfeit the distance for that round. A forfeited shot may not be redone at a later time.
13. Picatinny officials will have final say in what is deemed safe and acceptable.

C. Safety Rules

Precautions must be taken at all times ensure the safety of your team members as well as the safety of those in the pits next to you. The staff is here to help you stay safe, so please help them to help you by communicating with them changes that might impact safe operation of your machine. Don't assume that they understand your equipment as well as you do. If the judges determine that a given machine is not competing and launching in a safe manner as outlined in the rules below, they will be eliminated from competition. No exceptions.

If you are not certain that your machine conforms to the safety requirements below, please contact the safety committee at info@pumpkinsling.com with a description and photos of your machine.

1. All persons present in the pits during competition must sign a Liability Release Form. Team members under age 18 must have their form signed by a parent or guardian.
2. All team members under the age of 18 must be under adult supervision at all times while in the pits.
3. Hard hats and safety goggles, provided by the team, must be worn at all times by members in the pit area surrounding the machine. The use of gloves by members handling ropes or cables is strongly encouraged.
4. All machines must have a release mechanism that causes the machine to fire smoothly. If your release requires so much effort that it causes the entire machine to rock back and forth or otherwise constitutes a safety issue, it will not be permitted.

More details concerning what constitutes an allowable release mechanism can be found in Section D, below.

5. All machines must have a safety mechanism to prevent premature release while the machine is being cocked and loaded. This mechanism should be designed so that it prevents the throwing arm from starting a throwing motion if the release is inadvertently activated.

More details concerning what constitutes an allowable safety mechanism can be found in Section D, below.

6. Counterweights may be installed onto the machine with the arm cocked into the firing position only after the safety has been engaged. If a ladder is required, it may not be leaned against the machine, or positioned so that a premature release would allow contact by the falling counterweights. A stepladder or A-frame ladder is an option, if used in a safe manner.
7. It is highly recommended that winches have a safety cage that would protect the operator from injury in the event that the winch cable fails. Machines that cannot be cocked in such a way as to insure operator safety will not be allowed to throw.
8. If an electric winch is used, please make sure that your battery will last for the duration of the competition, or that you bring a spare. Teams will not be permitted to recharge batteries by hooking them to a motor vehicle.
9. All cables and cable clamps must be sized and installed properly. If you're not sure about the correct way to install the clamps, look at this:
<http://www.ropecentre.co.nz/general-hardware/wire-rope-grips.html>
10. All machines will be inspected by the safety committee. Any machine found to have structural defects (load beams, firing pins, any load bearing members, supports or support subsystems) will be suspended from the competition until repairs are completed and re-inspected to the satisfaction of the committee.
11. No machine may fire without the approval of the pit boss, or without sounding a horn or other warning device just prior to release.
12. All members of the team must be at least 10 feet away from the machine when it is fired. The disengagement of the safety mechanism is not subject to the 10-foot requirement.
13. Picatinny officials will have final say in what is deemed safe and acceptable.

D. Release and Safety Mechanism Requirements

This section contains details regarding the following rules from the safety section:

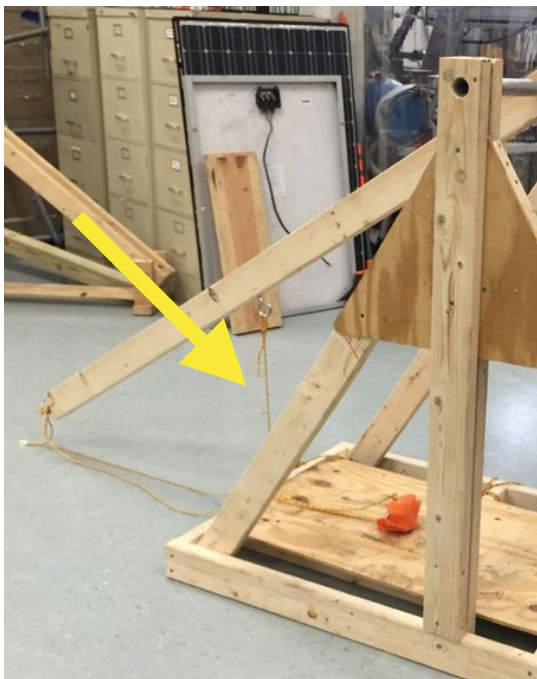
Safety rule #4: All machines must have a release mechanism that causes the machine to fire smoothly. . . and. . .

Safety rule #5: All machines must have a safety mechanism to prevent premature release while the machine is being cocked and loaded. This mechanism should be designed so that it prevents the throwing arm from starting a throwing motion if the release is inadvertently activated.

How you meet these requirements depends on the type of machine you have built. Below are some suggestions of designs that are known to work, and that would be acceptable to the safety committee **if properly implemented**. If your design does not seem to be covered here, please contact the safety committee at info@pumpkinsling.com

Category 1: Throwing arm with a fixed axis.

Some machines, such as traditional trebuchets and catapults, have a throwing arm with a fixed axis of rotation. In this case, the throwing end of the arm may be held in place prior to firing, as shown in the photo below. The release chain or cable must be of sufficient strength, considering the dimensions and counterweight being used. Both ends of the release cable/chain must be anchored with a through bolt or eyebolt (has the nut on the opposite side relative to the direction of pull). A lag bolt or eye screw may be used only if the bolt/screw is perpendicular to the pull of the cable/chain.



To effect the release, teams are strongly encouraged to use a snap shackle similar to the one found in the link below. A system utilizing a shackle of this nature will be approved as long as the remainder of the release is deemed safe. Other methods of release will only be approved in advance of the competition if your team submits photos and video of the release in action in advance of the competition date.

(A properly built release with a snap shackle will allow the machine to be triggered with a moderate effort using one hand only. If your planned release requires more effort than this, it is unlikely to be approved!

The bottom line: Snap Shackles are effective and inexpensive - use one!

https://www.shopsoundboatworks.com/ro215fibasns.html?cmp=googleproducts&kw=ro215fibasns&gclid=Cj0KEQiAtqHEBRCNrdC6rYq9_oYBEiQAejvRl8E6nmXRMeep7h4LQ2wgAgeIkku6G5bcy15i1My0Rk4aAmAR8P8HAQ

A triple ring release system such as the one shown here (https://en.wikipedia.org/wiki/3-ring_release_system) is not permitted, as they have proved to be unreliable under high loads.

A safety for a category 1 machine can be a chain that passes over the arm and is anchored to the frame at each end. It should be easily removed by one of your team members without the need for that person to move across to the opposite side of the machine. The requirement for hardware in the first paragraph of this discussion holds for the safety as well.

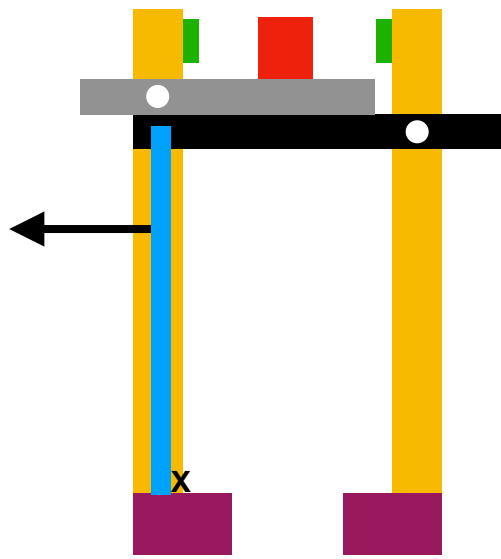
Category 2: Floating arm trebuchet (FAT)

Floating arm trebuchets that are designed **so that the wheels on the throwing arm axis remain in contact with the tracks along which they roll during the entire throwing motion** may use the same type of release and safety as described for Category 1 machines, above.

Category 3: F2k trebuchets.

For an F2k or similar design, in which the arm's axis of rotation is suspended above the tracks when cocked, **the release mechanism must hold the counterweight end of the arm in place prior to release**. One way to accomplish this is shown below. For this method to work, the counterweight end of the arm must be long enough to extend beyond the front edge of the towers. If this is not currently the case with your design, an extension of sufficient strength can be added.

The photo on the left shows two pieces of angle iron, each of them mounted with a lag bolt (not a drywall screw!) so that it can pivot at the top end. The lag bolts on which the angle irons pivot must have a minimum diameter of 3/8", and a minimum length of 3 inches. In the loaded configuration, the counterweight end of the throwing arm (red), rests on top of the compound lever system formed by the angle irons. The lower piece of angle is propped in place by a piece of wood (blue). A rope attached approximately at the position shown with the arrow is pulled to activate the release. A small block of



wood (X) at the bottom of the prop prevents it from kicking back into the tower gap when the shot is triggered.

Note: The design in the **photo** shows two wooden blocks on the outside of the towers which limit the swing of the angle irons after release. This is intended to reduce the possibility that they will swing back into the tower gap during the shot. Since this might interfere with removal of the prop, the suggested design depicted in the **diagram** on the right instead has extended the angle irons as shown and limiting blocks (green) on the inside of the towers to accomplish this.

The safety for this system should hold the blue piece in place so that it cannot be accidentally pulled out to release the shot. For example, a clamp of the proper size might be used to clamp it to the front edge of the tower, with the other end of the clamp located in the tower gap. Another option would be to drill a hole through the prop into the tower, and insert a snugly fitting bolt or eyebolt that would be removed just prior to release.

Additional Important Information

No Alcohol

No Pets. Registered medical service animals only.

All those entering Picatinny Arsenal base must be US Citizens

Proper Photo ID must be presented at time of entry.

Only one machine per school.

Teams should plan on arriving early if their machine takes a fair amount of set up. For the safety of all teams, we cannot start shooting until everyone is ready and team's cannot leave prior to last shot of the competition. We anticipate between 2-2:30 pm, based on start time.