

ANGRY MACHINES

- **Task** Teams consisting of 5 members each have to design, construct, and demonstrate a catapult to hurl a mass at a target 30 feet away with the best accuracy.

Note: The catapults shall be designed and built prior to the contest.

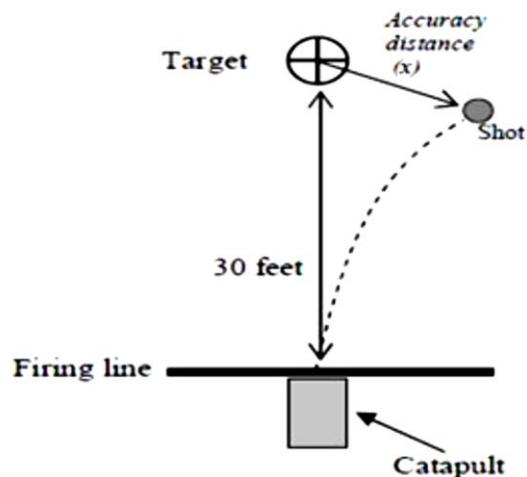


Figure Firing line and target setup.

- **Arena**
Open space (50 × 40 ft)
- **Machine Specifications**
 - All open class catapults must have 2 Locking Mechanisms (1 for release and 1 for safety) to restrain the potential energy while loading and preparing to launch.
 - The catapult must be triggered remotely from a minimum distance of four feet to the side of the device.
 - The device must not be anchored to the ground and must not wobble excessively or tip in a way to cause a safety hazard or cause the device to tip over before, during, or after the launch. Extra weight may be added to the frame to help stabilize the machine.
 - Projectiles for this class will be sized appropriately to the size of the catapult. Projectile weights will range from 1/2Kg to 2Kg. At the discretion of the safety officials, competitors may provide their own projectiles.

➤ Event Rules

Launch Process

- All will have five minutes to practice at the firing line before competing.
- All launchers will fire from the same location (firing line).
- The launcher must be moved to the firing line by hand.
- The catapult must sit on the floor. No hand held types.
- Each team will have a maximum of ten minutes total to take five shots.
- The clock will start after the first shot is taken.
- The firer will await the Judges notification to commence firing. The firer will announce
- "Fire" each time a shot is taken.

- After all five shots are taken; the team will move its catapult back to the staging area to await competition completion.

Inspection

- All open class catapults will be inspected upon arrival for qualification to compete.
- All structural parts of the catapult must be securely fastened prior to participating in the competition.
- No parts other than the projectile are allowed to become disconnected from the catapult at any time during the competition.
- Safety Officials will inspect and verify the following points:
 - a) Arm-Locking Mechanisms required
 - b) Technical Specifications
 - c) Construction integrity
- Qualification at check-in does not represent permanent qualification: Open class catapults are subject to random checks at any time.
- Teams may be requested to demonstrate their safety locking mechanism at the inspection.

Safety

- Any machine that is deemed unsafe or any unsafe or reckless actions by team members may lead to disqualification.
- The Event Officials will visually inspect each device before allowing any launch.
- No electrical devices may be used to load the machines. Hand cranks or manual winches may be used. Wheels may also be used.
- The open class catapult must be triggered remotely from a minimum distance of four feet to the side of the device.
- The safety lock must remain in place until the Event Official requests its release.
- Additional helpers are allowed in the firing line area during setup, but must vacate the area immediately after setup.
- When firing:
 - a. Team members must stand to the side of the device when launching and when the device has potential to launch. The area directly behind and in front of the catapult must be vacated any time the catapult is in a high potential energy state.
 - b. Everyone must be out of the launch field before a launch.
 - c. If any team launches prior to the area being cleared that team is automatically disqualified.
 - d. It is the responsibility of the team to take great care that no person or property should come to harm due to any action by their catapult or their negligence.

- *No team members or spectators will be allowed to walk onto the firing field itself.*
- *All machinery must remain at minimum potential energy until the Event Official notifies the team to prepare for launch.*
- *Because safety is such an issue, disqualification from the event may result from any of the following occurrences during or before a launch:*
 - a. *A team member is cited for not wearing their safety glasses or hard hats.*
 - b. *A team member is directly in front of or directly behind the catapult while the device is being fired or has the potential of being fired, i.e. cocked.*
 - c. *The device launches unintentionally or prematurely.*
 - d. *The team doesn't get the Event Official's approval prior to launch.*
 - e. *The projectile overthrows the target by more than 100 feet*

Note: *Any safety rule is subject to change by the Event Officials at any time.*

Launch Procedures (Test and Competition)

- *The Event Officials will proceed along the firing line, according to the schedule. Each team will be given the option to fire when the Event Official reaches their position.*
- *The machines must be ready to fire within 10 minutes of notification by the Event Official. a. If the team is not ready to fire within 10 minutes of notification, their catapult must be unloaded, returned to a minimum potential energy position, and the team loses their chance to fire and/or score in that round.*
- *Open Class Catapults that do not meet the required safety specifications will have up to 15 minutes after the last team has shot in that round, to make their machine compliant. a. If the catapult cannot be brought into compliance, it will be removed from the competition. If this were to happen, the team's current score becomes their final score.*
- *No one may be in a firing box while adjacent teams shoot. Teams, therefore must be aware of their firing status, and be prepared to enter a firing box when called by the Event Official.*
- *Launch procedures are subject to change by the Event Officials at any time.*

➤ **Judging Criteria**

- *Five shots will be taken. The final score is the average distance (x) away from the target or shot accuracy as shown in Figure. The target will be 30 feet away from the firing line.*
- *Tie: In the event of a tie rematch will be held and in the case again tie occurs the lightest (weight wise) catapult will be declared the winner.*
- *Judges have the right to disqualify those teams for unsportsmanlike conduct.*
- *All decisions by the Judges are final.*
- **Catapults on-site will be examined through these standards:**

1. Design 2. Performance 3. Quality 4. Repeatability 5. Presentation on the spot

Catapult Information: There is website concerning catapult history and design information listed below:



Catapults.info Website: <http://www.catapults.info/>. This site is an excellent site containing historical and design information regarding the different types of catapults. It also contains links to catapult design plans and books

➤ **Provisions at Competition Site**

N.A.

➤ **Faculty Coordinator Details**

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➤ **Student Coordinator Details**

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