

Society for Creative Anachronism



# Siege Engines Handbook



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# Introduction

This document is designed to provide a basic structure for the safe and effective administration of siege engine activities within the SCA. These regulations are designed to provide a common structure for siege activities while giving the individual Kingdoms as much freedom as possible to develop their own structure for the support of these activities.

After consultation with several Kingdom marshals, war marshals, fighters, and siege engineers, it was determined that there was a need for clarification of the regulations involving siege weapons. Most prevalent among the concerns were the difficulty observed in calling shots from missile weapons and the confusion resulting from too many types of ammunition being used by engines and small arms simultaneously. This document limits the types and specifies the appearance of siege ammunition to help address these concerns.

Also quite common in the discussions were concerns about the legitimacy of giving *extra powers* to siege engines. The ability to kill through shields, for example, is documentable in period to almost any class of siege engine, but no other weapon on our field has that power. Rather than limit the siege engineer to nothing more than the damage of an arrow, a compromise was presented for evaluation and accepted for this rules revision. The compromise included a more concise definition of siege weapons, a clearer definition of which devices could expect to have what *extra* damage effect, and a clarification of the appearance and functionality of the weapons on the field—most notably the restriction of rapid-fire devices and devices that would never have existed in period. It is expected that this compromise will show positive results, but that some elements will need to be modified during the evaluation.

# Siege Rules

## I. Marshalling and Authorization

- A. Each Kingdom shall report its activities involving siege to the Society Earl Marshal's Deputy for Siege on a quarterly basis. Any injury resulting from siege activities and requiring professional medical attention will be reported to the Society Earl Marshal immediately after the event where it occurred. It is recommended that each Kingdom Earl Marshal appoint a deputy to fulfill these duties and to oversee the Kingdom Siege Program.
- B. Siege Engineer Authorization
  1. Each Kingdom will have a separate authorization procedure for any person wishing to operate or crew a siege engine. This authorization at a minimum shall include:
    - a. Demonstration of knowledge of the rules for melee combat
    - b. Demonstration of understanding the rules for siege
    - c. Demonstration of ability to safely operate an engine
    - d. Demonstration of ability to inspect engine for safety
    - e. Demonstration of ability to render engine safe, should the need arise
    - f. Understanding of how engines/engineers are killed by opponents
    - g. It is RECOMMENDED that engineers be observed for at least 1 battle before authorizations are made final.
- C. Marshalling Siege Combat
  1. Marshals trained in siege activities will oversee the inspection of engines and operators and will be present on any field where siege engines are in use. During combat there will be a minimum of 1 Siege Marshal for each end of the field that has a siege engine. It is recommended that there be 1 Siege Marshal for every 3 engines in use.
  2. All Siege Marshals shall:
    - a. Be members of the Society for Creative Anachronism
    - 1.b. Be authorized in siege combat, or have gone through a siege marshal training program within their Kingdom
    - c. Have a basic understanding of all major engine types (Ballista/Arbalest, Catapult/Onager, Trebuchet [both counterweight and man-powered])
    - d. Know how to inspect engines and ammunition
    - e. Know the current siege engine regulation
  3. In addition to these requirements, Siege Marshals on the field shall:
    - a. Have at least 1 year or 4 events of experience as an engineer, or have completed an appropriate training program within their Kingdom
    - b. Know the basics of armored combat marshaling (see Marshal's Handbook) and conduct themselves safely on the field. (Being a warranted armored combat marshal is recommended but not required.)

4. Marshals on the field within the range of siege combat are required to wear eye protection which is sufficient to protect against the missiles in use, such as industrial or sports safety glasses or goggles. Note that SCA legal helmets are considered sufficient protection.

## II. SCA Siege Engines and Structures

- A. There are two types of siege devices: active siege engines and passive siege structures. For the purposes of this document, and to avoid confusion, siege engines shall be defined as those designed to deliver missiles larger than the already established small arms ammunition. Siege structures will be defined as devices, such as towers or ramps, used to support personnel but not fitted with active weaponry.
- B. General Siege Engine Regulations
  1. All engines shall have a maximum range of 80 yards. This is especially important in direct-fire weapons, where range greater than this often results in safety concerns involving extreme minimum-range impact.
  2. Engines and their projectiles shall be inspected by a warranted Siege Marshal before being used at that event and after any modifications are made to the engine during the course of an event.
  3. Direct-fire engines shall not be discharged against personnel within a range of 30 feet.
  4. No engine will be discharged while any non-crew person is within 5 feet of the travel path of moving parts (e.g., a trebuchet will not be discharged while a fighter is standing anywhere in the path of the arm, front or back).
  5. Engines must be equipped with a safety device sufficient to prevent accidental firing if they are to be relocated while cocked. Any engine without such a device shall only be relocated while un-cocked.
  6. Except for man-powered trebuchets, all siege engines will be fitted with an appropriate mechanical trigger mechanism that shall be used for every shot.
  7. Cannons or any replica of cannons are not allowed in SCA combat. Engines may not use compressed or ignited gasses or liquids or combusting materials of any kind to power projectiles.
  8. Builders should attempt to visually and functionally recreate period siege engines. Engines shall be powered in a manner functionally consistent with their period counterparts. When period power methods are unsafe or not feasible, alternative sources of power may be used.
  9. Any material approved for use in devices on the battlefield may be used in the construction of engines, provided that the materials are sufficient to ensure the safety of the engine. For safety, the following materials have special requirements:

- a. **Turnbuckles and eye bolts.** When used in or attached to the source of power for an engine, these items shall be rated to withstand 150% of the forces produced (e.g., if the cable attached to a turnbuckle will support 100 pounds of tension, the turnbuckle will be rated at 150 pounds static load). Hardware store and home center hardware is often of low quality and rating, while aircraft or marine hardware is generally more appropriate.
  - b. **Steel cable.** While steel cable is useful for such functions as safe-tying a throwing arm, it will not be used as a bowstring for any type of siege engine.
  - c. **All softwoods and non-laminated hardwoods.** When used as the throwing arm for a catapult, trebuchet, or the bow arms of a torsion ballista, they shall be secured against breakage with a minimum of glue-soaked sisal or jute cord wrapping (2-inch wraps every 6 inches) over a section of rope glued along the full length of the arm. This will keep the arm from leaving the engine should it break. It is strongly recommended that all arms be wrapped in this manner, regardless of material used.
10. Engines shall be durable enough to survive the rigors of combat and, while they should not be struck with hand weapons, should withstand either being struck with a full-force blow or being run into by a combatant.
  11. All engines must be free-standing and may not use an operator as part of their support structure. Operators will not be included in measuring the footprint of an engine.
  12. All engines and ammunition will be labeled with the name of owner, group, and kingdom, for the purpose of identification.
- C. Siege engines are broken down into two categories. Type A engines shall be designed to deliver large ammunition to a range between 40 and 80 yards. Type A engines can use all approved ammunition classes. Type B engines shall be designed to deliver small siege munitions to a range between 40 and 80 yards. Type B engines may not use anything larger than small siege ammunition. For the purposes of administration, any device not designed to deliver these types of ammunition will not be considered a siege engine and unless acceptable for use as combat archery, shall not be usable.
- D. Man-powered trebuchets will be considered Type B engines and must meet the requirements stated, with the exception that they shall not be required to have a mechanical release or cocking device. These engines may fire up to 2 small siege projectiles, or 2–8 small arms projectiles, per shot.
- E. **Type A engines shall:**
1. Have a minimum footprint of 18 square feet.
  2. Be able to deliver a large siege missile at least 40 yards.
  3. Have a mechanical cocking device, such as a winch or windlass and trigger and may not be cocked by hand.
  4. Have a minimum crew of 3 people. Should crew size fall below minimum, the engine will not be operated.
  5. Be able to fire 1 large siege projectile, or up to 5 small siege projectiles, or 2-20 small arms projectiles, per shot.

**F. Type B engines shall:**

1. Have a minimum footprint of 12 square feet.
2. Be able to deliver a small siege missile at least 40 yards.
3. Have a mechanical cocking device, such as a winch or windlass and trigger and may not be cocked by hand. Man powered trebuchets are exempt from this requirement.
4. Have a minimum crew of 2 people. Should crew size fall below minimum, the engine will not be operated.
5. Be able to fire 1 small siege projectile, or 2-4 small arms projectiles, per shot.

**G. Siege structures shall:**

1. Be able to support 300 pounds for every 4 square feet of platform area.
2. Be equipped with railings or walls at least 36 inches tall and able to support 100 pounds per foot of railing length if the platform is more than 3 feet from the ground.
3. Be structurally stable (e.g., a wheeled siege tower should have a base big enough and wheels large enough to safely carry crew over the terrain of the field). Battering rams and battering structures are permitted, but should be durable enough to withstand repeated impacts and light enough to be safe when carried or if dropped.

### **III. Siege Ammunition**

A. No siege engine ammunition may exceed 1 pound in weight.

B. Siege Class Munitions (1-pound foam-filled rocks, 4-tennis-ball rocks, and 48-inch ballista bolts) must be colored with yellow tape in the following manners to denote them as Siege Class Munitions. Rocks, both 1-pound foam and 4-tennis-ball, must have at least 50% of their surfaces covered with yellow tape. Ballista bolts made with Siloflex that is not yellow in color must have their shafts and striking surfaces covered completely with yellow tape. These munitions may not be fired from small arms or thrown by hand.

C. Ammunition shall be constructed of the following materials:

1. Open-cell or closed-cell foam.
2. Tennis balls. Tennis balls may be punctured with a hole, not to exceed 1/16<sup>th</sup> of an inch in diameter, to relieve internal pressure. When used as the striking surface of a ballista bolt, tennis balls must be compressible by hand with no less than ½ inch of compression and no more than 1 inch of compression.
3. Golf tubes or Siloflex. Siloflex must meet the following standards: for pipe that is black in color, it must be manufactured to ASTM D2239 or D2737; be made from PE3408; be sized 1"ID if D2239 or 1¼"OD if D2737; and have a SIDR rating of 15 or lower or have a SODR rating of 17 or lower. For pipe that is yellow in color, it must be manufactured to ASTM D2513; made from PE 2406; be 1"IPS; and have an SDR of 11. (Please note that shafts made from yellow Siloflex may not be covered with tape, and the markings must be visible)

4. Cord.
  5. Duct and filament tape.
  6. Film canisters.
  7. PVC reinforcement rings. Rings may not exceed 2 inches in length. Missile shafts may not be made from PVC.
  8. Leather.
  9. Lightweight fabric such as broadcloth, trigger, or similar material.
- D. Large siege ammunition is intended to simulate large, heavy projectiles normally used as anti-structure missiles (e.g., 250-pound sandstone rocks used in the largest of engines). These missiles are simulated with 1-pound “rocks.” 1-pound rocks shall:
1. Be constructed of fabric spheres filled with light-density foam and taped with filament and duct tape for protection.
  2. Be a minimum of 6½ inches in diameter.
- E. Small siege ammunition is intended to simulate smaller, lighter projectiles used as light anti-structure and antipersonnel missiles (e.g., ballista javelins and 10-pound stones as used in Perriers). Permissible small siege projectiles include:
1. 4-tennis-ball clusters secured with filament tape and duct tape (punctured and tied with cord also acceptable).
  2. Spliced golf tube javelins. Splices must be secured with cord and/or filament tape. Striking tips may be either a single tennis ball, tied on and taped with filament and duct tape, or a thrusting tip with a minimum of 3 inches of foam between the striking surface and the end of the javelin and a minimum diameter of 2½ inches. It must have at least 1 inch of progressive give and cannot bottom on the tube. Additionally, the end of the tube must be capped with a minimum of 1/8-inch heavy leather or a 35mm film container securely held in place with filament tape. The tubes may be reinforced with medium-density foam, such as pipe insulation, in order to prevent crush damage. Film canisters, PVC rings (no more than 2 inches long), and similar non-brittle, nonmetallic, lightweight reinforcements (securely attached) may be used at the butt end of the javelin. Non-rigid fletching may be used. Javelins will be at least 48 inches and clearly marked with yellow tape for the length of the shaft.
  3. Other javelins. Materials such as Siloflex or similar semi-rigid, shatter-resistant tubing can be used, as long as the minimum diameter is equivalent to a golf tube and the rest of the construction meets the standards for spliced tube construction.
- F. Specialty siege ammunition is intended to simulate specialty ammunition (e.g., flaming oil pots or flaming javelins) or effect weapons (e.g., diseased animal corpses or the heads of decapitated messengers). Specialty missiles will have damage determined in the scenario rules. Most effect weapons will have little or no damage potential, and therefore should be used sparingly. Specialty siege ammunition may be used as long as it does not exceed the weight or construction limitations of the approved ammunitions.

## IV. Engine and Structure Inspection

- A. Siege engines shall be inspected before combat use. Engine inspection procedures shall include at least the following:
  - 1. Any event allowing siege engines must have an equipment inspection station. This inspection station shall, at minimum, consist of a field with a firing line and range markers at 40 and 80 yards from the firing position.
  - 2. Preliminary inspection of the engine shall be made before any shots are fired. The marshal will check for structural integrity of the components of the engine.
  - 3. The operational demonstration phase of the inspection shall, at minimum, consist of 4 shots from the engine configured for the maximum power it will use on the field at that event. These 4 shots shall deliver the ammunition between 40 and 80 yards at a firing angle of between 40 to 45 degrees elevation without mechanical failure and shall consistently deliver the ammunition downrange.
  - 4. Static inspection for stability of the engine and mechanical observation of the framework and the mechanism shall be made after the firing.
- B. Siege structures shall be inspected before being allowed to participate in an event. Inspection should include, at minimum, structural integrity, stability, condition of hardware, and condition of any safety devices (barriers, walls, etc.). Ideally, a maximum load of armored combatants should be on board the siege structure during inspection. Inspection will include a demonstration of mobility if the structure is designed to be mobile.

## V. Siege Engine Operation

- A. Anyone operating a siege engine in combat will be armored to the SCA minimum Heavy Weapons Armor requirements. **(Archers' gauntlets may be used instead of full gauntlets for hand protection.)**
- B. Siege engine crews shall be made up of members who are authorized in siege and are familiar with the engine that they are operating.
- C. Siege engine crews shall inspect their engine for wear, stress, and fatigue before each battle and, if possible, during holds.
- D. During holds, siege engine crews may not cock, load, move, or in any other way make their engine ready.
- E. Siege engine crews shall immediately secure their engine should it become unsafe. They will remove the engine from the field at their earliest opportunity.
- F. Siege engine crews are responsible for the safe operation of their engine during combat. They are to make sure that crew members are clear of moving parts and that non-crew personnel are not directly in front of the engine and not within 5 feet of the travel path of moving parts before discharging their weapon.

- G. Siege engine crews are responsible for the safety and condition of their ammunition, and shall visually inspect each round for damage before it is fired. (Ammunition that has been inspected prior to the battle does not need to be re-inspected before it is fired, but any ammunition that has been retrieved from the field must be re-inspected. Engines will not fire ammunition that is not designed for their weapon.
- H. It is recommended that siege engine crews give verbal commands for each phase of engine operation.

## **VI. Siege Ammunition Damage**

- A. Blows from siege-class ammunition (1-pound rocks, 4-tennis-ball clusters, and 48-inch ballista javelins, all colored yellow as outlined in item 2 of Siege Ammunition Standards) will be judged fatal or completely disabling upon striking any legal target area and will be capable of killing through shields, provided that the scenario rules permit this. Hand weapons hit by siege-class munitions will be judged destroyed; anyone intentionally blocking or deflecting siege-class munitions will be considered as having been struck by the munition.
- B. Siege Munitions are considered spent upon striking a target, the ground, or a battlefield structure. Siege class munitions which strike a tree will not be considered spent until striking a target, the ground, or a battlefield structure.
- C. Small Arms Munitions (single tennis balls and tube-shafted combat archery arrows and bolts) fired from a siege engine will be treated as combat archery projectiles.
- D. Small Siege Ammunition, in addition to the above, will also be capable of damaging or destroying light structures such as other siege engines, pavices, siege towers, etc., provided that scenario rules permit this.
- E. Large Siege Ammunition, in addition to all of the above, will also be capable of damaging or destroying any type of structure such as castle walls, towers, redoubts, etc., provided that scenario rules permit this.
- F. Recommendations for Damage to Structures from Siege Engines
  - 1. Since some structures are not easily modifiable during the course of combat, these recommendations should only be applied in situations where they would be practicable. It is also recommended that any of the numbers given below be modified based on the number of engines participating in any given scenario.
  - 2. Breaching walls, destroying towers, and other permanent structures: It is recommended that this be accomplished by hitting the structure 5 times with large siege munitions, and that these structures are immune from damage by small siege projectiles.

3. Gates: It is recommended that these be destroyed upon 3 hits from large siege munitions, and that they are immune to small siege munitions.
4. Temporary siege structures and siege engines should be considered destroyed by 1 hit from a large siege munitions and by 3 hits from small siege munitions.
5. If a manned tower or siege structure is destroyed, it is recommended that all occupants of the structure be considered killed as well. If a siege engine is destroyed, it is recommended that any crew in physical contact with the engine be considered killed as well.
6. Maximum rates of fire: While it would be preferable to not have to impose any arbitrary maximum rate of fire, if there are a large number of siege engines at an event, it may be necessary for reasons of fair game play. If so, the following is recommended: Type A engines should be allowed to fire no more than 1 time per minute, and Type B engines should be allowed to fire no more than 2–3 times per minute.

## **VII. Destroying Siege Engines and Structures**

- A. As siege engines can pose many risks to attacking fighters, it is strongly recommended that great caution be exercised when approaching them. Be sure to stay clear of moving parts and try to approach them from the side. When engaging engines or structures, **DO NOT STRIKE THEM WITH A HANDHELD WEAPON**. While these items should be constructed to withstand blows, it is dangerous to do so, as an accidental discharge of the weapon may result. Anyone found intentionally striking a siege engine or structure should be removed from the field and possibly face further action, such as a marshal's court.
- B. The proper way to destroy these weapons is to safely approach the engine or structure, lay your weapon on it, and declare "this weapon is destroyed" (as with a declared kill from behind). This shall be done in a safe and deliberate manner, not in a rush while engaged with another opponent. Siege engine crews are required to wear SCA minimum armor and should be treated as any other fighter on the field. If they are authorized for armored combat and have a secondary weapon, they may use it. If not, they may be killed as an unarmed or helpless opponent; if they yield, do not strike them. Fighting should never take place over or around an active siege engine. If this situation arises, a hold should be called and the engine declared destroyed. Siege engines and structures may also be destroyed by siege class munitions fired from a siege engine.

## **VIII. Miscellaneous**

- A. New and experimental weapons types and ammunition shall be required to undergo the same approval process as any other battlefield object. Current information on new weapons approval procedures is delineated in the Marshal's Handbook.

# Appendix A

## Glossary

**Arbalest** A tension-powered ballista (giant crossbow)

**Ballista** A two-armed, torsion- or tension-powered, arrow- or rock-throwing, direct-fire siege engine

**Ballista bolt** A spear-like projectile shot from a ballista

**Catapult** A single-armed, torsion- or tension-powered, rock-throwing, indirect-fire siege engine.

**Closed-cell foam** Stiff, resilient foam similar to sleeping pads

**Direct fire** Delivery of a missile in a straight, flat trajectory directly into the target

**Effect weapons** Novelty missiles, such as simulated animal parts, usually with no real damaging ability

**Eyebolts** Hardware resembling a bolt formed into a circle on the non-threaded end

**Footprint** Ground area covered by an engine as viewed from directly above, measured as length times width for engines with a square base and length times half the width for engines with a triangular or diamond-shaped footprint

**Indirect fire** Delivery of a missile in a high, arcing trajectory ending at the target

**Light-density foam** Foam weighing up to ½ pound per cubic foot

**Mangonel** A man-powered trebuchet

**Man Powered** – An engine in which the mechanical energy to launch the projectile or munition is supplied directly by people, pulling on ropes for example, rather than being stored mechanically (i.e. by a spring or raised counterweight) for later release.

**Mechanical trigger device** A device used to hold the engine in a braced or cocked state and to activate (shoot) the weapon

**Medium-density foam** Foam weighing between ½ and 4 pounds per cubic foot

**Onager** See *catapult*

**Open-cell foam** Light, sponge-like foam, such as upholstery or pillow foam

**Perrier** A man-powered trebuchet

**Siege engines** Missile-launching devices designed to deliver missiles larger than already established small arms ammunition

**Siege structures** Devices such as towers or ramps that are used to support personnel, but are not fitted with active weaponry

**Specialty ammunition** Special-purpose ammunition, such as simulated flaming missiles

**Trebuchet** A gravity- or man-powered, sling-type, rock-throwing, indirect-fire siege engine

**Turnbuckle** Hardware consisting of 2 eyebolts fitted to a threaded barrel, used for adjusting the length of cables

**Winch** A winding device, usually geared and equipped with a ratchet

**Windlass** A winding device, usually consisting of a spool with double crank handles, a set of pulleys, and hooks, but not normally equipped with a ratcheting device.