

Middle Kingdom Siege Handbook

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DEM Siege

The Middle Kingdom Siege Handbook

Introduction

Siege weapons began to become a common sight in SCA events in the late 1990's. When they began to appear at Pennsic War or other war events the evolution of melee fighting began. This document intends to encapsulate the elements of Siege marshaling, Engineer and Crew operations, with the addition of instructions for inspections of engines, ammunition of all kinds, and conventions in combat. Some of the following information and conventions are a more up to date version of some of the original conventions set forth in 1999 documented and produced by Master Erik Erikson, who gave me permission to use them. The new inclusions here are based from my own experience, with the additional advice of Baron Alexander of Hawkwood and Lord Diccon de Reinport. I also wish to thank Docmo Kincaid for his contribution to this work and his contributions to the siege community as a whole. To all these gentry I give my humble thanks.

Please note: What is written here does not supercede the rules of the Society for Creative Anachronism, the Marshals Handbook of the SCA Inc., the Siege Handbook (and any updates to either of these aforementioned documents) or Middle Kingdom Marshals handbook or Rules of the list. Those documents should be considered as the default source for information in every circumstance.

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October 2015**

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Middle Kingdom Siege Authorizations

Only Warranted Siege marshals may conduct any Siege Authorizations.

In all cases, each person attempting to authorize in Siege as Crew or Engineer need to have been trained in the skill they are attempting to authorize for.

Completed authorizations for both Siege Crew and Engineers will be reported on the standard Heavy Combat authorization form and submitted to the Clerk of the Roster.

Note: If there is an initial failure to pass, the Marshal has the option to re- run the authorization **ONCE** on the same day if they choose to do so.

Authorization for those who wish to add this to an existing Heavy combat authorization: Once you are trained, this authorization will be added to your card. See the Section marked Authorization Process below.

Alternative primary authorization for Siege Crew,

If you are only interested in being a member of a siege crew and have no intention of ever entering a corps-à-corps fight, you may seek out a member of the Chivalry to sponsor you to have a Siege Crew authorization without first pursuing a Sword and Shield authorization. With this alternative primary authorization you will NOT be able to carry a backup weapon of any kind. Anyone wishing to become authorized as Siege Crew under this alternative is advised that Section IX.D.4 of the Middle Kingdom Marshals Handbook does apply: **Siege engine crews are fully armored combatants and should be treated as would be any other fighter on the field.**

The official change to the handbook is in section IV.F of the Marshals' Handbook "3. Siege Crew is desired as the primary weapon authorization." Furthermore, the final sentence of that section shall be changed, per the italicized words, to read "The purpose of this program is not to see how many new authorizations can be generated, but rather to increase combat awareness and to offer continued guidance in the Rules and Cultural Expectations for combat archery and siege among the Heavy Weapons Fighters."

Note : Any person authorizing who is not an authorized heavy combatant and are using a Chivalry sponsor: Your Chivalry sponsor must be present at the same event at the time of your authorization.

Authorization Process

The person authorizing must be wearing the required armor of a heavy combat fighter which must pass inspection by a heavy combat marshal. They may wear half gauntlets for hand coverage.

Authorizations should take place at official events with melee activity whenever possible. Any other authorizations such as at practices require special permission from the DEM Siege or a designate.

Any authorization for a new siege crew member should test their knowledge of the rules, focusing more on using any engine and being safe around any type of engine.

Items that should be covered:

Safe areas and Danger areas around each type of engine; trebuchet, onager, ballista/arbalest
How an engine should be killed by a fighter, or by another engine.

Identifying safety problems.

How a crew is killed in combat or how to Yield

Running the active test:

The authorizing marshal should observe the new **crew** member for the following:

- Safe movement around the engine.
- A clear understanding of their tasks as loader/ ammo supplier/ trigger. The crew member should be rotated through each task for no less than 5 fired rounds for each skill
- Ability to help move or reposition the engine as needed.
- How to react to safety situations, combat situations, and the engine being destroyed.

An oral test may be given so the Marshal knows the Crew member understands the rules.

The Siege Engineer

The siege engineer needs to have a more extensive understanding of all aspects of construction, including the engine itself and any of the ammunitions that are used in a given type of engine.

Items to be covered include every item on the Crew members list above and:

The ability to completely inspect their personal engine for flaws.

The ability to give commands to the crew and smoothly operate the engine.

The safety rules for making an engine 'safe' in or out of combat.

The person being authorized should act solely as the crew captain, giving orders only and *not* have the trigger control. The rest of the crew should be the regular crew of the engine, and should act like trained apes, that is, only do what is ordered when ordered to do it.

- The first shot all should act their parts, and give the person authorizing reasonable leeway.
- For the second and third shots individual crew members should do precisely as ordered and not more. For each shot one should be pre-selected to "mess-up" in various minor ways (connecting the trigger incorrectly, being in the wrong location, having someone walk through the danger zone of a trebuchet/onager, etc).

As the engine is being powered up for the fourth shot (long before it is at full power) a fighter (or someone with a shield and sword) should approach and kill the engineer/captain, followed by killing the engine. The authorization is not over until the engineer /captain orders the engine safe and removed from the field.

An oral test may be administered by the Siege Marshal as well.

Engine Operations

The Engineer and crew need to work together smoothly for safe operation. This means a period of practice and training is necessary. Training should take place outside of any official event activity to begin with. Each crew member should be rotated through all the tasks of engine operation while in training, including firing the weapon, so they fully understand and can be aware of all aspects of it's use.

If ANY crew member detects a fault or failure at any time during engine operation they should call a HOLD immediately.

It is strongly advised that a routine set of commands or calls be used in the process of operating the engine.

Here is an example for a Ballista/ Arbalest:

'Run out' - the process of running the rope out to draw the string.

'hooked' - the hook is attached and ready to pull

'cranking' - the winching of the rope to draw tension

'locked' - the locking of the safety and trigger

'Load' - the loading of the weapon

'clear', - the check for clearance around the engine before firing

'firing'. - the weapon is then fired and the cycle repeats

Here is an example of commands/calls for a trebuchet crew:

"winch slack" - let cable out on the winch so we can hook it up and crank the arm down

"winch on" or "winch go" - crank the winch to cock the arm

"slow" - winch slower so we can pin it

"Pin in" "Safety on" - just calls so the crew knows

"winch slack" - winch out to put the tension on the trigger and off the winch line

"sling loaded" - loader informs winch guy after the sling is full and the loader is clear

"Cocked" - informs crew that the winch line is disconnected, and the engine can be triggered

"safety off" - last thing the winch guy does as he clears the engine

"Clear ahead" "Clear behind" - trigger guy visually confirms the absence of people in the vicinity of the moving arm and calls it

"loose" or 'fire' - trigger man yanks the pin, machine hurls.

Crew members alternate positions so they all understand the operations. In the case of swing arm engines like trebuchets, train the crew not to put your head in the path of the counterweight or the arm, regardless of the trigger safety.

Middle Kingdom Siege Marshal

Pre-requisites

Either

A) Be a current Armored Heavy Combat Marshal who has authorized as an Engineer for Siege combat.

B) Have at least 1 year or 4 events of experience as an engineer, or have completed an appropriate training program within their Kingdom.

C) 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.)

Siege marshals will be allowed to inspect engines and ammunition and train and authorize crew members. They may not inspect any armor or rattan combat weapons worn by fighters unless they have the qualifications to do so.

An oral, written, and or practical test (or any combination of tests) on the general rules for siege operations on the field and the rules of the list will be given.

Overview

Siege Combat has become an integral part of SCA activity, particularly in melee and various wars. The primary job of a Siege Marshal is to secure safe siege operations for combatants, the engineers and crew members, and spectators. Safety is FIRST, before all other considerations.

The Safety Caveat

- **Your job as a Siege Marshal is to find any safety problem that needs to be corrected. In all circumstances the builder of an item, or machine owner or their crew should make any and all adjustments.**
- **You may make suggestions, but do not make adjustments for them.**
- **The problem is corrected once safety is achieved, only then can you approve the item or engine. If it remains unsafe, DO NOT approve it for use.**

Confidence in Action

The need for current, complete, and confident knowledge of the rules and conventions cannot be overstated. Individuals skilled at undermining control and influence in these situations will look first to take advantage of a marshal's confidence. Do not allow yourself to be overridden. A prepared marshal can confront these individuals with courtesy, poise and grace. Your knowledge of the rules, conventions of combat, and the SCA as well as Kingdom Marshal's policies, are the most powerful tools you have as a marshal.

Control

Field control is essential in order to reach the goals marshals have set for safety on the field. It is especially imperative that with siege the marshals retain control of the field around an engine, as well as being sure the shots are landing safely within the field. Due to the ranges siege engines shoot and the fact that their targets are not always in direct sight of the engines, it is highly recommended that siege marshals use radios to coordinate with one another to alleviate any problems.

Reporting

You must write up an event report every time you support an event as a siege marshal. The MIC-Siege should write a complete report to include which engines fielded, if any failed, problems, authorizations, etc. Any supporting siege marshal should write up their impressions of the activities, both what worked and what did not, possibly to include suggestions on how to fix those that didn't work. Use the standard Kingdom Marshalate report form for heavy combat and write in the word Siege. The report will go to the Regional Siege Marshal or the Deputy Earl Marshal for Siege.

Marshal's Kit

Marshal's kits are required to perform Marshal activity. Put one together and take it with you to any event where siege might happen. Your kit should include:

REQUIRED Equipment

A binder with a printed copy of the SCA and Middle Kingdom Siege rules and conventions with updates.

A Hard Hat of some type (remember you will be standing next to another engine's target!)

Eye Protection *Impact rated* safety glasses or goggles
(the standard shop goggles are good for dust not impact)

Gauntlets, half gauntlets or hockey gloves

A Marshal's Staff: Wood pole at least 5 ft long banded in Yellow and Black stripes

A Marshals Tabard (black with two gold crossed swords, an engine may be added above the swords)

A Medium point Sharpie/ permanent marker to write down ammunition weight.

A minimum 25 ft long tape measure. This is used to determine an engines foot print on the ground. It can also be used to lay out the siege testing range.

A Scale to weigh ammunition, preferably digital and carry extra batteries.

Optional Equipment:

A Gorget for the neck is strongly recommended

A 300 ft tape measure for marking out siege ranges.

4 short driveway hazard cones

Hand held radio (Family Radio System)

Guidelines for General Use of Combat Siege Engines

Conditions for Using Combat Siege Engines

1. The engineer and all members of a siege engine crew must be authorized heavy weapons fighters. There are no exceptions.
2. Crews must be familiar with the operation of the specific siege engine they are using.
3. The Engineer of a siege engine, whether direct-fire or indirect-fire, must be fully armored as a fighter by Middle Kingdom standards. The Engineer and crew must be fully armored as fighters, half gauntlets are allowed as minimum hand protection.
4. Every engine must have one person designated as the Engineer. There is to be only one engineer at a time firing a siege engine. A new engineer can take over if the old engineer is killed or leaves the engine. This new engineer must have been checked out on the weapon, and be authorized as a siege engineer.
5. A direct fire siege engine firing shafted missiles must have a crew of at least two, including the engineer. A direct fire engine firing any other missiles and indirect fire siege engines must have a crew of at least 3, including the engineer.
6. The engine may not be fired if the engineer has a heavy weapon / hand weapon in their hands or dangling from the wrist.

Overall Guidelines

1. Siege engines may not be used indoors.

2. Before the combat starts, all fighters must be made aware of the use of a siege engine in combat. They should be informed that they are considered engaged at all times with the siege engine if they can be hit on the front or side of their body in a legal area. They should also be informed of the various types of siege missiles in use that day, and the damage inflicted by each.
3. Siege engines cannot be moved during combat without prior approval of the Siege Marshal or Marshal-in-Charge. Turning the siege engine to adjust its aim is not considered movement of the engine. If movement is allowed, all fighters must be informed of this possibility before the battle starts.
4. A Cleared safety zone of the arc of the throwing arm of trebuchet must be set. There should be NO persons in front or behind the arm in its arc of movement. The only exception to this is Perrier weapons which are man operated and the operator must stand forward of the arm.

5. No siege engine can be fired if there is combat occurring within 5 feet in front of an engine, on either side or behind the engine. (see the Combat Bubble Rule in the Marshaling section)
6. No siege engine can be fired during a general hold or while a "localized" hold is occurring anywhere on the field. This may require extra attention on the part of the crew to the field of combat. A siege engine cannot be overrun while waiting on a localized hold. Marshals near the engine should police this.
7. **During holds, siege engine crews may not cock, load, move, or in any other way make their engine ready. During a hold, any ammunition(s) ready to be fired by an engine must be UNLOADED.** Cocked engines may remain cocked. If the hold is long you may be directed by a Marshal to UN cock the engine, but it may not be fired. The engineer MAY uncock the engine at their own discretion for safety reasons.
8. The release trigger of the engine MUST be utilized in the firing of the engine. Holding the arm or string and releasing by hand is not permitted under any circumstances.
9. All siege engines must be designed to be lockable or easily disabled any time they are left unattended. This locking/disabling mechanism must be used when the engine is unattended.
10. The Siege Marshal should be posted near the siege engine to observe the activities of the crew and fighters around the weapon.

Range Requirements

Melee Fields

The primary concern is the same- safe shooting. Consult with the Marshal in charge and be sure there is sufficient range to conduct siege activity. If safety matters allow you to only fire in one direction that is acceptable for authorizing siege engineers and crew in combat.

In order to inspect or use any engine you will need a proper field or range. The range needs to be set so munitions will not be thrown at nor hit anyone not in armor. It also should not be aimed towards vehicles or areas where it is difficult to prevent persons from passing through while firing. The recommended size for the range using a single engine is a minimum of 10 yards wide by 100 yards long. However- 20 by 100 is better, adding more if you have other engines.

The rule of thumb – If you have a football or soccer field sized space- it is big enough.

Testing Range Layout

- 1) Measure the base line you will fire from. (A 100 ft rope laid on the ground makes a good straight line to start from.) Mark out the 20 yards (or more if available) that you need with your tape measure.
- 2) From this point measure out to 40 yards (120 ft) Mark this spot. Move another 40 yards on the same line and mark that spot. This is 80 yards (240 ft) move another 20 yards and mark that spot- 100 yards, 300 ft.
- 3) Go back to the base line and create the other leg moving out 40 yards and marking, 80 yards and marking, and 100 yards.

- 4) Be sure the field width between the marks at 40 and 80 yards is the same as at the base line by measuring between the points you have made for the correct width.
- 5) The engine being tested is placed at the center of the 20 yard baseline and fires from this position.

Test Firing Procedure

Two Siege Marshals are required (One if designated by the DEM for Siege as Special Deputies)

- 1) One marshal is stationed at the engine on the baseline and one is down range standing to one side of the 40 to 80 yard zone.
- 2) The baseline Marshal will call out 'CLEAR DOWN RANGE' to which the Marshal on the field will make sure there is no obstacles to firing, raise one hand in the air and reply 'READY'.
- 3) The Baseline Marshal will raise one hand and direct the Engineer to load and fire the weapon. This marshal will observe the weapon for any problems and the crew for any issues. The Engineer will be directed to call out 'FIRING' and the crew may then fire the engine. The following parameters will apply:
 - o Operational demonstration by firing 4 shots between 40 and 80 yards at a firing angle of between 40 to 45 degrees for weapons. The engine should not misfire. If it does, it fails and needs to be rechecked.
 - o The engine must not overshoot 80 yards. It must achieve 40 yards minimum. An overshoot or undershoot by an engine fails inspection until it can be adjusted.
 - o If different combinations of munitions are to be fired, ie 1 large rock, or 3 small rocks. Each combination should be fired to be sure it does not exceed 80 yards
- 4) The downrange marshal should call out 'GOOD' and raise both hands (a touchdown signal) if the shot lands in the required range. The marshals should make the call of 'OUT' if the shot is NOT in the required range. The marshal may call out the approximate distance of the shot if desired.
- 5) The process is repeated with each shot called until 4 sequential shots are fired that fall into the required 40 to 80 yard range - without any engine failure. The baseline Marshal will observe engine operations and crew function for any safety issues and may stop the process at any time. At the end of the 4th sequential shot that falls in the required range the Marshal will call 'HOLD'.
- 6) Static Inspection of the stability of the engine, framework, and mechanism shall be repeated after the firing.**

Initial Inspection of Siege Engines

Initial Acceptance Inspection for approval for use

Before any newly built siege engine can be used in combat, it must pass an initial acceptance inspection by the Deputy Earl Marshal of Siege or a deputy of his choice. No Siege Weapon may be used that has not passed this initial inspection. The builder/ engineer of the siege weapon needs to set up a time and location so that the initial inspection may be performed for acceptance. This initial acceptance inspection does not have to be done at an event. The following requirements must be met by the builder/operator at the initial inspection:

The builder/engineer of the siege weapon must bring a logbook that will be used for that engine to the initial acceptance inspection. If there is more than one siege weapon, there must be a logbook for each weapon. This logbook must contain the following:

- 1) A copy of the documentation used for the design and size of the siege weapon and the period in which it was used. It is also strongly suggested that a photo of the weapon be included in the logbook.
- 2) A list of the type(s) of missiles approved for use with that engine, along with the minimum and maximum range requirements of the missiles.
- 3) A suggested checklist of all items that must be inspected on that particular engine's before use in a battle. This list will be revised as needed. This inspection checklist will aid in the inspection of the engine for marshals unfamiliar with the engine, plus provide a list of the approved missiles the engine can use.

General Inspection Guidelines

The following points should be considered during the initial approval inspection:

Is the engine design safe for combat use?

Is it safe for the crew?

Is it safe for the targets?

Is it safe for the marshals / spectators?

Is the engine highly likely to misfire?

Does a misfire create any safety issues?

This initial approval inspection will cover (but may not be limited to) the following requirements:

1. There must be sufficient documentation as to the design and size of the siege weapon and the period it was used. (One primary source, or two good secondary sources). Radically different types of siege engine may be approved by the D.E.M. for Siege or an appointed deputy, on a case by case basis.
2. Scale is important. Although it is unfeasible to design every type of siege engine to scale, a reasonable attempt should be made to make the engine of appropriate scaled size to the real thing. Direct-firing siege weapons should approximate the scale size of the original. Indirect-firing siege weapons may be scaled back but should still be of sufficient size to identify as such.
3. The siege engine must conform to the basic construction standards listed in the construction section of this handbook. It must also meet any SCA or Middle Kingdom requirements.

4. The structure of the siege engine and base must be sound and stable. An engine that can be easily tipped over is unacceptable.

5. 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.

Type B engines shall:

1. Have a minimum footprint of 12 square feet.
2. Be able to deliver a small siege missile or bolt 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.

6. The siege engine must have some sort of locking trigger mechanism, enabling it to remain cocked without human contact.

7. The siege engine must be able to fire consistently (at least 4 times) without mishap and be reasonably accurate when aimed. If a misfire does occur, the engine may not be used until the problem has been found and corrected and another test fire cycle passed.

8. An engine is tested by firing 4 shots down range. These 4 shots shall deliver the ammunition between 40 and 80 yards at a firing angle of between 40 to 45 degrees elevation (if applicable) without mechanical failure and shall consistently deliver the ammunition downrange. If a misfire occurs it must not endanger fighters, crew, marshals or spectators. If the engine misfires while being tested, it may be adjusted or corrected and tested again.

9) Trebuchets, Perriers (manually operated trebuchets) and Onager type weapons are not required to be elevated for testing. They still must fire 4 shots without misfire and deliver their ammunition a minimum of 40 yards

Logging and Activity tracking

If the engine passes the initial acceptance inspection, it should be noted in the logbook of the engine along with the signature of the marshal that inspected the engine and the date it was approved. Only the Deputy Earl Marshal for Siege, a deputy of their choice, or a Siege Marshal with special permission may do the initial approval acceptance of a siege engine. Any major changes to the engine will require a new approval inspection and must be noted in the logbook of that engine.

The initial approval inspection does not take the place of future inspections at subsequent events, however if that inspection takes place the same day as the event, a pre-use inspection can be skipped that day only.

If the builder/engineer wants to use missiles not listed in the logbook at the initial acceptance inspection, these must be tested, approved and noted in the logbook by the Deputy Earl Marshal of Siege weapons or a deputy of his choice.

The logbook will be made available to the Earl Marshal, the D.E.M. for Siege, any Siege marshal, or an event Marshal in Charge upon request. It is advisable to carry a copy of the rules covering siege weapons, along with the logbook, by the builder/engineer of the engine to aid any Marshals unfamiliar with the specifics combat siege weapons.

The logbook should be utilized to track the history of that engine's use. Such as, dated entries concerning any change from the range noted during the initial acceptance inspection and reasons why the range has changed.

The logbook should also include any maintenance and repairs made, and any type of mechanical failures that occurred and the repairs or corrections that were made. These all should be dated entries to note the repair history of the weapon in combat.

Inspection of Engines at an Event

All siege equipment must be inspected for appearance, design, and structure, and tested for function and safety before being approved for use at an event.

At any event where siege weaponry is to be used, the Marshal-in-Charge must designate an authorized Siege Marshal that is qualified and competent to inspect the siege engine(s). The marshal will use the Siege engine logbook's inspection checklist in conjunction with the below requirements to approve the siege engine for use at that event.

Engines should be inspected systematically, such as front to back and top to bottom.

Engine inspections should include:

- o Preliminary Inspection to check structural integrity- look for cracked wood, loose nuts and bolts, loose wedges. The nuts and bolts need to be touched to check for looseness.
- o Structural integrity and stability, including: all nuts and bolts, prod, wedges, string and string serving condition, throwing arms, ropes, winch, windlass, trigger mechanisms, wheels and axles, yokes, stock, weightbox, metal plates, sling and frame.

Common Failures

The most common failures in engines are:

Strings and serving worn broken or loose. Loose bolts and nuts. Prod inserted incorrectly as in off center or upside down, poor wedging of a prod, rope failure of throwing arms on Onagers, Roman Ballistas, or catapults. Trigger failures. Sling failures.

Engine Inspection and Operation: General Rules and Guidelines

The Event Inspection will cover (but may not be limited to) the following requirements:

1. All siege engines must have their logbook with them at the time of inspection. The logbook must contain that engine's inspection checklist, a log of events it has been used at, changes to the engine or the engine's approved missile list, and any other notes added by the builder/operator or previous inspecting marshals.
2. A copy of the combat siege weapons rules must be made available by the builder/operator of the engine to assist marshals who are not familiar with rules covering siege engines.
3. The siege engine must have passed the initial approval inspection.
4. All siege engines must meet all construction requirements set forth in the handbook section "Construction of Engines." All other requirements as shown by the SCA or Middle Kingdom Marshalate must be met.
5. Prods and throwing arms must be free of large cracks and excessive damage.
6. All cords, ropes, strings, servings and hardware must be in good condition and free from excessive wear. **Strings may not use any form of tape as an alternate or repair for serving.**
7. The structure in the siege engine and base must be in good condition.
8. An engine is tested by firing 4 shots down range. 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. If a misfire occurs it must not endanger fighters, crew, marshals or spectators. If the engine misfires while being tested, it may be adjusted or corrected and tested again
9. The engine should be test fired at the event inspection (or daily at a multi-day event) for its maximum range and minimum safe range. Minimum firing range for all engines shall be 40 yards. Maximum range shall be 80 yards.
10. Any engineer of any siege engine must be able to show that they are familiar with the specific engine being inspected and all rules that apply to its use in a combat situation.
11. The marshal must mark their approval of this siege engine in the logbook, as well as listing who the approved operator(s) of the siege engine are for this event.

Siege Weapon Missiles

All siege ammunitions must be inspected by a Siege marshal before being used on the field.

The most important thing to remember is that the missiles' size and design determines the damage to fighters and structures, not the size or design of the engine firing the missiles. The missile determines the damage, regardless of the source of launch.

The greater power available to siege engines over hand thrown missiles should be sufficient to allow the fighters to correctly judge the impact the same as they would any other valid blow.

The following rules attempt to keep the combat balanced and playable by all parties equally:

- 1) Any Siege Weapon missiles bouncing off the ground or rolling shots from siege weapons will not be counted.
- 2) All siege missiles must be inspected by a Siege marshal before each battle and by the engineer after each battle if it was used.
- 3) All approved types of siege engine missiles (by Middle Kingdom standards) may be gleaned and used after a field inspection.

The following Siege Missile Specifications Chart gives the specifications for each type of missile weapon.

Siege Missile Specifications Chart

General Specifications for Missiles

1. Yellow tape is used for all siege engine missiles to differentiate them from the standard red color of combat tube arrows and thrusting tips on weapons. This is to aid fighters and marshals in knowing the difference between a siege engine missile versus a combat arrow.
2. All tower rocks must be 50 % yellow taped.
3. Missiles must be constructed of a durable substance that will not shatter, splinter, or break apart. See the SCA rules on the use of plastic tubing, siloflex or their equivalents. The standards are also included in this document.
4. Rocks must be securely taped together with strapping tape and duct tape.
5. No counterweights of any type may be inside or outside of the missiles.
6. All missiles, both shafted and non-shafted, must be marked with a printed label in plain text containing the Owner's name and Kingdom. This label should be covered by clear packing tape.

Ammunition Inspection

Siege marshals should know the current construction requirements for the three types of ammo. To inspect them you must use the digital scale to weigh then mark each piece of ammo.

Test the compression of any foam from several directions. They should be firm and not collapse when you try to bend them- particularly siege bolts. Be sure that the heads are properly constructed and firmly attached. Rocks of any size need to be well taped so they will not fall apart and have no tennis balls collapsed.

In each case the weight of the object has to be marked on it with a Sharpie Marker –Usually the collar just below the head on a bolt, or someplace on the rock where it can be seen.

Ammunition

**IN ALL CASES, SIEGE AMMUNITION MUST BE IN A 'DRY' CONDITION
IT CAN NOT BE WET OR WATER SOAKED.**

Bolts for arbalests/ballistas

- o May not weigh more than 1 pound when measured on your scale
- o Must be at least 48" long end to end
- o Must be made of approved black plastic water pipe , or yellow gas pipe per SCA standards (When in doubt consult the rules for the specifications.)

Two types of BLACK plastic water pipe are approved for use:

- 100 psi ASTM D2239, 1 inch (2.5cm) formula PE3408 or PE3608 and a SIDR rating of 15
- 125 psi ASTM D2239, 1 inch (2.5cm) formula PE3710 or PE4710 and a SIDR rating of 15
- o Black plastic pipe must be covered 1/3rd of the length in yellow tape.

One type of yellow plastic gas pipe is approved:

- 160 psi ASTM D2513; 1 inch (2.5cm) formula PE2406 or PE2708 and an SIDR of 11.
- Please note that shafts made from yellow Siloflex may NOT be covered with tape, and the markings must be visible.

For all Siege Bolts:

- o Tip must have 3" of foam and 1" progressive give taped over all with yellow tape

□□ See: http://www.thesiegeshop.com/Pool_Noodle_Assm.html for assembly instructions.

Bolts may be equipped with fletching made from 1 ½ inch foam pipe insulation covered with tape, Fletch may be either one or two pieces, attached firmly to the shaft with strapping tape.

All ballista bolt ammunition must have a printed label (not hand written) with the owner's name and Kingdom affixed to it. The label must be in English utilizing a legible/readable font and be completely covered with clear wrapping / shipping tape.

How to inspect Bolts

- Look at the length- be sure it is the correct length and correct type of plastic tubing.
- Find the label. The bolt must have a label.
- Look for loose tape that flaps. This must be removed or repaired.
- Any fletching used must be firmly attached to the shaft and not loose.
- Inspect the head. It must be firmly attached. You should be able to feel the head base disc.
 - 1) The head should feel uniformly solid and firmly attached to the shaft. Gently pull on the head.
 - 2) The pool noodle foam must not bend or able to be bent over more than about 30 degrees from straight or it fails.
 - 3) If it does not feel firm and feels as if it has crumbled inside, the bolt does not pass.
 - 4) If the head is mushy at the tip, it does not pass.
- **If the bolt passes all these points, proceed to weigh it.**

- **Weigh the bolt. It must weigh no more than 16 ounces.**

Place the bolt on the scale centering it on the platform so it is balanced and does not want to fall off the scale. Take your hands off it and determine the weight. The bolt may already be marked with a weight from a previous inspection, do **NOT** assume that is the correct weight of the bolt.

- **IF THE BOLT IS OVER:**

You can allow no more than one or two tenths of an ounce over 16 ounces. Any more than this fails. Sometimes removal of a piece of non vital yellow tape will reduce the weight enough to put it back to 16 ounces or less. Allow the owner the time to make the adjustment and re- weigh the bolt.

- IF THE BOLT PASSES ALL of the above:

Write the weight of the bolt on the side of its head on the tape with the Sharpie.

Large rocks

- o May not weigh more than 1 pound
- o May only be constructed as a fabric sphere filled with light foam
- o Be a minimum of 6 ½ inches in diameter
- o Must covered by at least 50% yellow tape
- o Intended to simulate 250 lb sandstone rock
- o Intended as anti armored structure (castle, town wall)

How to inspect Large Rocks

- Make sure the rock is bigger than 6 ½ inches in diameter.
- It should have no protrusions and be smoothly taped in Yellow tape.
- Nothing should be moving around inside it nor rattle when shook. It should be uniformly firm.
- All ammunition must have a printed label (not hand written) with the owner's name and Kingdom affixed to it. The label must be in English utilizing a legible/readable font and be completely covered with clear wrapping / shipping tape.
 - It may have a weight written on it from a previous inspection. Do not assume this is the correct weight.
- Flappy bits of tape need to be removed or replaced. They are a safety hazard to the eyes
- **If the rock passes all these points, proceed to weigh it.**

- Weigh the rock. It needs to be 16 ounces or less.

IF IT IS OVER by more than one or two tenths of an ounce- it fails

Allow the owner a moment to correct the weight by removing of some tape and re- weigh
If it is 16 ounces or less- Write the weight on the rock with a Sharpie.

Typical failures of Large rocks: Exposed foam. Flappy tape pieces, foam has hardened due to age and exposure to heat, foam has gotten wet, tape has deteriorated.

Small rocks

- o May not weigh more than 1 pound
- o Should be constructed of 4 tennis balls taped or tied together, then covered by duck tape
(They should look like a small triangular pyramid)
- o Must covered by at least 50% yellow tape
- o Intended to simulate 10 lb sandstone rocks
- o Intended as anti light structure (house, hut) or anti personnel weapon

How to Inspect Small Rocks

- Small rocks should be uniformly firm with all 4 tennis balls inflated and well taped with strapping tape covered by yellow tape. Be sure to check all 4 tennis balls- they should not collapse.
- The tennis balls should not be loose or able to shift very much at all.
- All ammunition must have a printed label (not hand written) with the owner's name and Kingdom affixed to it. The label must be in English utilizing a legible/readable font and be completely covered with clear wrapping / shipping tape.
- It may have a weight written on it from a previous inspection. Do not assume this is the correct weight.
- Flappy bits of tape need to be removed or replaced. They are a safety hazard to the eyes

- If the small rock passes all these points, proceed to weigh it.

- Weigh the rock. It needs to be 16 ounces or less.

IF IT IS OVER by more than one or two tenths of an ounce- it fails

Allow the owner a moment to correct the weight by removing of some tape and re- weigh
If it is 16 ounces or less- Write the weight on the rock with a Sharpie.

Typical failure of tennis balls rocks would be- Uninflated tennis balls, deteriorated tape: either strapping or duct tape, which would cause the balls to flex or become loose in the assembly.

Tower Rocks

1. Check that the tower rock has a minimum diameter of 24 inches and a maximum finished weight of five pounds.
2. The tower rock must be covered with 50% yellow tape.
3. Check that the tower rock has at least 6 inches of progressive give from any point on its surface.
4. Check that each rock has a printed label (not hand written) with the owner's name and Kingdom affixed to it. The label must be in English utilizing a legible/readable font and be completely covered with clear wrapping / shipping tape.

The maximum weight for any shafted or non-shafted missiles to be fired from a siege weapon can be no more than 1 lb.

Marshalling Combat with Siege Engines

Safety of Marshals, and Spectators

The primary duty of any Marshal is overall safety. This becomes even more important around machines that could fail and injure others. Engineers and crew members need to be sure to facilitate what the Marshals do by calling HOLD and Cease firing activity if they find a safety problem.

1. Make sure everyone, including spectators and especially photographers, knows that there are siege engines in use. Marshals on the field during combat should consider the possibility of accidental strikes and should take whatever steps they feel are necessary for their personal safety.
2. In the Middle Kingdom, eye protection is required for all marshals on a battlefield that has combat missile weapons. Some form of hard head coverage and throat coverage is strongly advised.
3. Move the crowd or individuals back when they are in danger from missile fire.
4. Redirect missile fire from siege engines away from crowds.

The Combat Bubble Rule:

If there is heavy combat within 5 feet of any engine, a HOLD must be immediately called by any of the Crew, Engineer, Fighters, or a Marshal and the engine is declared dead. This is to assure the safety of all combatants. This rule OVERRIDES all other rules below.

Monitoring the Actions of Fighters around Siege Engines

1. Fighters are not allowed to advance upon the crewmembers position with their backs turned to avoid being killed by missiles. First warn the fighter/s that they cannot do this, then declare that they are engaged by the siege engine and marshal the combat as if they are legally engaged by the crew.
2. Fighters may not touch a siege engine in an attempt to disrupt the crew from firing. Warn any fighters that do so, and remove them if they continue.
3. Archers, fighters and crewmembers that show a blatant disregard for the rules may, as always, be asked to leave the field.
4. A fighter may not purposely stand inside the no-fire zone to prevent use of the siege engine. The area is defined for safety reasons and should not be abused. Marshals near the engine should police this.

Rules of Effect

These conventions cover the action on the field and are typical of rules used or enforced by Siege Marshals and the Marshals as a whole during melee and War combat. See item VI. A on siege ammunition damage below.

1. All combatants are considered to be ENGAGED in melees that include Siege and Combat Archery with ALL missile weapons at ALL times until they leave the field of combat.
2. Fighters, archers or crewmembers may not intentionally turn their back on missiles in flight to negate the effect of being hit.
3. NO missile can kill after bouncing off the ground or glancing off a shield or structure.
4. If a siege munition hits the fighter in a legal area, they are dead. There are no glancing or "wounding" shots.
5. If a munition hits a fighter or archer holding, carrying, or moving a shield or pavise, the shield or pavise is destroyed and the fighter is dead.
6. If a munition hits a free standing pavise, the pavise is destroyed. The fighter or archer standing behind – but not holding carrying or moving the free standing pavise - is NOT dead.
7. If a missile during a misfire hits a crewmember or other fighter, he must take the hit as if the missile was fired correctly even if he is inside the no-firing range of the engine.
8. Arrows, axes and hand-thrown javelins do NO damage to siege engines.

9. Scenarios may have different rules on damage effect. The default is the SCA Siege rules unless Middle Kingdom rules say otherwise. Marshals, Engineers and Crews should be well aware of any and all rule changes.

The following block quote of SCA rules were in effect as of April 2014.

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.

Conduct of Archers, Fighters and Siege Engine Crew

Attacks Upon Siege Engine Crews by Fighters

1. Fighters may not grasp, strike, or swing at a siege engine or missile to disrupt crewmembers from shooting.
2. Fighters may not purposely damage siege engines or missiles to remove them from combat.
3. Fighters may only strike a crewmember or engineer who has a weapon in their hand, has been properly engaged, and has not yielded. If the crewmember or engineer picks up a weapon, or throws an object at an opposing fighter he is considered a heavy fighter and subject to the applicable rules.
4. Fighters will NOT strike a crewmember or engineer who is not holding a weapon. Unarmed crewmembers or operators (i.e., holding no weapons) are considered a touch kill.
5. Fighters will NOT strike a crewmember that has given a cry of "YIELD," Fighters may not demand that a crewmember yield or die. They may, however, offer the crewmember an opportunity to yield.
6. Crewmembers may yield by crying "YIELD!" and either falling to the ground or holding their hands above their heads. Unarmed crewmembers approached by a fighter who has a clear and unimpeded path to them are strongly encouraged to "YIELD" instead of forcing the fighter to strike them.
7. A crewmember may not block a rattan weapon with any siege engine missile.
8. A fighter may not purposely stand inside the no-fire zone to prevent use of the siege engine. The area is defined for safety reasons and should not be abused. Any "dead" fighter should try to move from this area if he can safely do so. Marshals near the engine should police this.

Attacks Upon Fighters by Siege Engine Crewmembers

1. A crewmember can pick up a weapon and fight if he meets all applicable rules for that weapon (armor standards and rules of engagement), has been inspected for use of that weapon, and has proper hand protection.
2. If the Siege engineer is holding a hand weapon, the siege engine cannot be fired.
3. Siege Crew members may defend themselves with thrown weapons per SCA or Middle Kingdom rules.

Attacks Upon Siege Engine Crew members by opposing Crew members

1. The siege engine crew may fire at any other siege engines or crew that is on the field.
2. All crew members should consider themselves engaged by all other siege weapons.
3. Crew members may be protected from archery fire by pavises

Capture of a Siege Engine by Opposing Forces

1. A siege engine overrun by opposing forces is considered captured and disabled for that battle. Opposing forces may not move it or use it unless there are rules in the scenario that allow it.
2. A captured siege engine is to be unloaded made safe or have the trigger removed and left in an un-cocked position. It should be removed from the combat field when possible.
3. Fighters may not strike or thrust at any siege engine with any hand weapon (including thrown objects and thrust throw javelins) or they will be removed from combat. Any siege engine struck by a fighter, even accidentally, should be checked to ensure that no real damage was done that would cause a safety concern.

Construction of Siege Engines

It is suggested that before you make your siege weapon you do some research to determine the type of weapon that you want to make. Once you have determined what you want to make, you might check in with the D.E.M for Siege and share you plans. Either the D.E.M. or one of his deputies can help ensure that you don't make a siege weapon that doesn't meet specifications and can't be used. Nothing is worse than spending large amounts of time and money to find out that something won't pass the initial acceptance inspection for use.

The simplest method is to find already established and available engine plans or talk to someone who owns and engine of the type you wish to build. Using proven methods creates the least amount of trouble in building and operational issues you may face and that speeds the process of getting yourself on the field.

1. You must have documentation as to the design and size of your siege weapon and the period it was used (at least one primary source, or two good secondary sources). You should do this before you start building your siege engine. All Siege engines must make a reasonable effort to approximate a siege engine of the SCA period (in use prior to 1600). The basic shape of the siege engine should "look" like the type of siege engine it simulates. I.e., no rocket launchers and no bright pink spandex tubing.
2. The relative size of a siege engine must be appropriate for use in a combat setting. Direct-firing siege weapons should approximate (give or take) the size of the original, while indirect-firing siege weapons may be scaled back but should still be of sufficient size to identify as such.
3. The minimum footprint of your siege engine must be at least TWELVE square feet for Type B engines and EIGHTEEN square feet for Type A engines. A siege engine's footprint is the width of the engine's base multiplied by the length of the base. Allowances will be made for unusual designs if they are made for valid safety reasons. The minimum footprint rule became necessary when an oversized crossbow was mounted on a small stand and called a siege engine. The siege engine must be designed to be a siege engine. (see the Inspection requirements below)

4. The structure of the siege engine and base must be sound and stable. All siege engines must be mounted on a freestanding base of some sort. No handheld siege engines shall be allowed. If it is handheld, it is not a siege engine.
5. Siege engines must have some sort of locking trigger mechanism, enabling them to remain cocked without human contact. This mechanism must be used for every firing. The only exception to this rule is a perrier (a man-powered trebuchet). This exception will be determined on a case by case basis by the D.E.M. for Siege, or a deputy of his choosing.
6. All siege engines must be designed to be lockable or easily disabled any time they are left unattended. They must be locked or disabled if left unattended.
7. No pyrotechnics, gas, or chemical propellants may not be used with siege engines, nor may any cannon, shooting any type of projectile by any means be used. All cannons are illegal in the Middle Kingdom.
8. No siege engine may use a compound style prod or bowstring.
9. The siege engine must be able to fire consistently without mishap and be reasonably accurate when aimed. If a misfire does occur, it must not endanger the crew, or others nearby.
10. The engine must be safe to the target (general rule of thumb, it hits no harder than a spear thrust to the body.) It will not knock someone down or stagger him or her. The builder/operator must be willing to be hit by the missiles at the siege engine's minimum safe distance to demonstrate this safely.

The Docmo Arbalest Inspection

As the Docmo style Arbalest is the most common engine on the field, Docmo offers his own inspection regimen for this engine. This regimen can be applied to similar engines of the type. This document was gladly included in this handbook verbatim at his request. The SCA Siege community as a whole owes a great deal to this man and his work with siege.

Note his mention of materials and what NOT to use.

A Specific Marshals Guide To Inspecting a Docmo Style Arbalest for S.C.A. combat.

By Docmo Kincaid.

All material specifications described herein must be adhered to. Any deviance from the specs should constitute failure of the Engyn to pass inspection.

The "Draw Rope."

(The twin lines running from the Windlass to the Trigger)

The Draw Rope must be constructed of minimum 1/4"-5/16" twisted nylon rope. Anything smaller is not allowed.

There must be two Draw Ropes mounted such, that in the event of failure of one rope, the second will prevent the Trigger from flying down range.

No Hemp rope.

No Manila rope.

No Polypropylene rope. (Hard twisted nylon or ski rope }

No Cotton rope.

No Parachute cord.

Braided rope of any thickness is not allowed.

It is the nature of on nylon rope to “Fuzz” as it wears. The ideal wear pattern is an even coat of fuzz along the whole length of the Draw Rope, this also indicates a good time to replace it, but if the three rope strands cannot be seen through the fuzz the rope should have already been replaced.

Look for premature Fuzz, especially where the Draw rope enters the Windlass. The problem must be rectified, and the rope replaced immediately.

The “Bowstring”

NO STEEL CABLES ALLOWED

The Bowstring must be a minimum of 1/4”-5/16” twisted nylon rope. Anything smaller is not allowed. While exceeding the minimum may sound reasonable, this action can actually cause poor performance or even malfunction. It is best to use exactly what is described in the instruction book. Serving on a nylon rope Bowstring is optional.

Bowstrings made of B-50 or other modern string material must have a minimum of 80 strands, or 40 loops. The Bowstring must have at least two layers of serving on the bow knock ends and in the center. Serving material such as “Fast Flight” is OK, but I recommend serving with B-50. All Servings must be intact. Any fraying or loose windings should constitute failure until repairs are made. A little fuzz is ok as long as the windings are tight. The presences of fuzz indicates a dry string and the string should be well waxed before use. The main windings or Skeins should all be tight. Occasionally with a new (never fired) Bowstring a few skeins may appear slightly loose. These should tighten after a few shots. A Bowstring with several broken skeins or one that repeatedly breaks skeins should be failed.

No Flemish style strings, or any other string that is not “round” at the center serving. A string of this style will cause poor release, “dryfire” and misfires.

(Authors note- Double serving the center of the string with serving of contrasting colors –lower layer a different color from upper- helps indicate wear and makes the string last much longer. A brand of serving called HALO which is part Kevlar has proven to be very durable on this type of engine.)

The “Nut Hook”

(This is the steel pawl that holds the Trigger in the charged position,)

The Nut Hook must be a minimum of 14 gauge- (.080) steel. Softer metals such as aluminum, brass or copper must be a minimum of 1/4” thick. The Draw Rope must pass over the Nut Hook hinge pin, not under it. To do otherwise will cause excess strain on the Draw Rope and even dryfire.

The “Trigger”

(This is the device that is used to draw the Bowstring back, and fire the weapon)

The Trigger must be a minimum of 3/8” diameter (steel). The Trigger hooks section must be one piece and not welded together pieces, the Trigger handle is typically a separate piece welded to the Trigger hooks. The Trigger hooks should be free of burrs where they contact the Bowstring.

The “Prod”

(The Bow)

The Prod must be mounted tight in the Stock, no “wobble” is allowed. The entire Prod mounting hardware, be it wood or steel, must also be tight, and remain tight throughout the inspection. A Prod that consistently loosens should be failed.

The Prod should be free of cracks or other imperfections.

The Prod must be a single piece of steel, no bolted or welded together pieces are allowed.

There may be a 3/8 hole, seemingly purposeless, on one side of the Prod. This is OK as long as the Prod is symmetrical at rest, and when charged.

A second shorter piece of steel, a “Backer”, is often added behind the Prod. This too is OK. The Prod and Prod Angles should be mounted so that the Prod knocks are nearly even with the top of the Stock, not well below the top of the Stock.

Operating concerns

While the use of half gauntlets is required for combat, a minimum of leather gloves should be required at all times, whether it be on the target range or the inspection field.

The Windlass should be cranked backwards for charging. This means that when the Windlass handle is at the top of the rotation, it should be being pulled back towards the operator, not being pushed forward. To crank it incorrectly will cause excessive strain on the Draw Rope, and the Draw Rope will rub on the Stock causing even further wear.

Observe the Trigger while the weapon is being charged. The Trigger should remain square to the string. It should not twist or canter to either side. This is usually just a matter of centering the Draw rope on the Trigger, but it could also indicate an improperly adjusted Trigger hook.

The Nut Hook must engage automatically, if it requires excess effort by the operator to make it latch, or if the operator’s hands go in front of the Trigger, the Engyn should be failed.

Reason: pushing the hook down by hand puts the operators hand in dangerous vicinity of the charged Bowstring, with added danger of “dryfire”. It also leaves only one hand on the Windlass.

This may be easily solved with a rubber band or hair tie attached from the small lever on the Nut Hook to the top of the steel Nut Hook frame. More serious cases indicate a defective “Nut Hook” or a Prod mounting problem.

All stands or frames should follow the simple guidelines laid out in the Siege Engyns Handbook. They should meet the minimum square footage for the Engyn type. They should be constructed of sturdy enough material to withstand the forces of Engyn operation and movement. They should not lean or twist to the point where they need to be held or assisted by a human. All bolts, fasteners, and hardware must be kept tight. Creaking or squeaking during operation should be minimal to null. Some creaking and squeaking is normal as in the case of a wood on wood joint, such as a gimble or yoke, or on a Docmo steady stand where the uprights pinch the stock and often squeak during elevation. Creaking and squeaking from the frame during movement over uneven ground is normal with most any style of frame. Unlike a Trebuchet, where the wheels bear the forces of the moving counterweight during firing, the wheels on an arbalest need only support the static weight of the Engyn and frame, yet they need to be sturdy enough for the task. A wheel that buckles or bends must fail. A wheel that cambers excessively (leans on it’s axle or wobbles) must be failed. If the tire of the wheel can lean past the end of the axle it is unsafe and must be failed. If the axle is bent, this indicates that it is too light for the duty and must be failed. - Docmo Kincaid

Glossary of Siege Weapon Terms

A few quick definitions are necessary to explain just what is meant by "siege weapons." This will help you to better understand the program as a whole.

Siege weapons are divided into two types: Non-firing and firing.

Non-Firing Siege Weapons

Non-firing siege weapons are ladders, ramps, platforms, etc. These non-firing types will not currently be used in the Middle Kingdom. These are governed not only by S.C.A. rules and conventions, but by federal safety regulations as well. Example: ramps, towers and the like which might place combatants 3 feet or higher from the ground must have railing or walls around their edges at a height of 40 inches or higher to help prevent falls, etc.

Firing Siege Weapons

Firing siege weapons are divided into two categories: Direct Fire and Indirect Fire. This is where all Middle Kingdom siege weapon activity will be concentrated.

Direct Fire

Direct Fire means that the siege engine fires in a low arc, more or less directly at the target. This type of engine is designed to fire its missile at less than 40 degrees. These types of engines normally fire small "rocks" or "arrow"-like projectiles. Ballistas are a prime example of a direct firing weapon. (If a ballista fires at more than a 40-degree arch it is still considered a direct fire weapon by category).

Indirect Fire

Indirect Fire means the siege engines launch their missiles in a high ballistic arc (more than 40 degrees). Trebuchets, catapults, etc. will be classified as indirect firing engines. These types of engines normally fire small or large "rocks."

Bolts: Javelin-like projectiles made of plastic pipe, used in direct fire siege weapons.

Crew: any member of a siege engine's operating team, including engineer, missile handlers/loaders, spotters etc. All members of a siege engine crew must be authorized heavy weapons fighters.

Crushed bodies: Applies only to tower rocks dropped in the defense of a structure.

Fortifications: Protective barriers, real or represented, per the scenario. Examples include actual structures (wall gates), collapsible representations of the same, and structures represented by hay bales or markers.

Non-Shafted Missiles: anything that comes out of a siege weapon that does not have a shaft. I.e., stones or boulders.

Engineer: That crewmember responsible for the actual operation of the siege engine, cocking and/or discharging a firing engine, or directing the use of it.

Rocks: Monolithic projectiles such as stones or boulders, commonly represented by four tennis ball "rocks," sport balls, taped-foamed boulders, etc. (Non-shafted missiles)

Shafted Missiles: Those siege weapons missiles that have shafts. I.e., ballista bolts and other combat archery bolts or arrows.

Siege Engine: Any mechanical device used in the waging of war. Examples include ballistas, catapults, and trebuchets.

Siege Tower Rocks: a special class of non-shafted missiles that can only be dropped from a higher level to the ground. These may not be picked up and thrown, only dropped. Tower rocks may only be dropped in the defense of a structure. (See the Siege Engine Missile Reference Chart.)