

# MISSILE WEAPONS -TREBUCHETS

## Introduction

Trebuchets by virtue of their size and purpose, whether traction or counterweight machines, are intrinsically dangerous. The following guidelines are designed to minimise the risk posed by such weapons to all, by promoting what is current best practice.

Please note that the Guidance notes relating to Combat and Drill Rules, Disciplinary Action, Accident Records, Equipment storage and transport and the Review Process, in the NAReS Drill and Training Guidelines, are as relevant to trebuchets as to other weapons. The following guidelines are designed specifically for trebuchets.

The following notes are based upon experience of manning, captaining and shooting trebuchets ranging from a 16ft high 1ton model to a 60ft 20 ton full-scale example. The smaller example has been shot on seventeen separate occasions at or from nine castles in the context of sieges.

## Definition

There were and are many names given to machines employing the lever principle in siege warfare. This document is designed to provide guidance for crew served weapons that use either human power or a counterweight to hurl the projectile. It does not therefore include staff slings. Most engines hurl objects varying in size from oranges to large cabbages, weighing at maximum about 1kg.

## Construction

Trebuchets irrespective of size are all potentially dangerous to their crews and targets. The stresses in the machines involved are often very great and unless care is taken in design and regular maintenance undertaken, then there is the real possibility of major components failing. It is not the intention of this document to provide guidelines relating to design principles but it is strongly recommended that for any large-scale reconstructions a person with a good working knowledge of engineering projects should be involved in the design and construction, ensuring a good margin of safety in its operation. Any modification of the design should also be assessed by someone suitably qualified.

**All counterweight trebuchets should be fitted with a safety catch/rope and not rely solely on the trigger system.**

## Training

The Captain of the trebuchet should ideally be someone who has been closely involved with its construction and its operation over several years. He or she should be aware of the peculiarities of their machine and its performance at different ranges or with different ammunition.

All training and assessments should be supervised by a recognised training officer, who has been certified as competent to conduct training. This would in most cases be the trebuchet captain.

Only individuals who have been carefully briefed by the Captain should crew the machine. They should be made aware of the potential dangers posed by its operation. In the fixed weight machines this is principally the space where the counterweight moves and for both types the behaviour of the sling after shooting. The large crews needed for the traction trebuchet should be well practised, to avoid collision with machine and each other while at the same time producing a consistent effort.

**At no time should an untrained member (except for members who are undergoing supervised training), or any non-member including members of the public, be allowed to crew the trebuchet**

#### **Practice on site.**

**It is essential that prior to the opening of the event that the crew should safely emplace the trebuchet and range it in. The same safety standards employed when the public are present should be applied. Where necessary traction trebuchets should be staked to the ground to avoid any change in line during operation. A safety zone around the machine should also be clearly identified both around the machine and to the rear.**

#### **Projectiles**

The projectiles shot from these machines vary. Oranges, grapefruit, melons and cabbages, water-filled rubber balls and cat-litter filled papier-maché balls as well as 'fire balls' of various patterns have all been used. The Captain and organisers should consider the suitability of the use of such machines, taking into account:

- Accuracy. This is of paramount importance. If the machine is consistent and can operate safely in the presence of re-enactors and the public only then does the choice of projectiles become relevant. **If it cannot be certain of achieving consistent accuracy, then its use should be reconsidered while taking into account the 'safe' space available.** A projectile dropping short or overshooting the target may still be acceptable as long as it does not pose a risk to anyone. Traction trebuchets can perform erratically, a grapefruit falling short on open space is acceptable, a grapefruit landing at speed on the audience is clearly not.

- The target. Targets vary from the castles themselves to wooden structures representing fortifications. **People should never be the target** unless the lightest possible projectile is used and the re-enactors well drilled. The consequences to the target and projectile of a strike should be considered. Damage to historic building is not acceptable and the detritus caused by numerous disintegrated cabbages or grapefruits needs to be collected.
- Lethality of the projectile. Melons, cabbages, water-filled balls and fire balls all constitute a serious danger to life. They should never be shot where they may hit someone.
- Communication. As with archery there must be a clearly understood chain of command and easily understood signals to ensure that the trebuchets can conduct their shoot safely, pausing, ceasing or continuing to shoot as required. Good communication between those inside and outside the castle/target area is essential. This can be achieved with easily visible signs and/or by 'walkie-talkies'.

### **Personal Protective Equipment**

If crews are working on the battlefield they should be subject to the same rules as other combatants. If they are not 'in range' they may choose for comfort and safety to dispense with heavy gambesons, helmets etc. They should wear PPE that matches the potential risks posed by the machine. The probability of a trigger/safety failure should be taken into consideration as well as the benefits of wearing PPE. In the two full-scale trebuchets at the Danish Middle Ages Centre no PPE is worn by the individual loading the projectile as he/she must be able to quickly move out of the way and no PPE could protect from the impact of the counterweight!

### **Command and responsibility**

A useful distinction may be made between the experienced trebuchet operator who would be responsible for emplacing and ranging in the weapon and an operational captain who is well versed in the loading and shooting of the weapon. The person responsible for emplacing and ranging in the machine has ultimate responsibility for its safety. The crew have a responsibility to conduct the loading and shooting of the projectile safely.

### **Emplacement.**

**The trebuchet captain should ensure that shooting is conducted in a safe area taking into account the propensity of these wonderful machines to occasionally shoot backwards.** Overshoot distances depend upon the machine and its projectile and can only be established by experience. Counterweight trebuchets are usually very precise in terms of both line and distance, their

mechanism and weight ensure this. Traction trebuchets need to be firmly fixed in place to avoid the, usually light, structure being twisted by an over enthusiastic crew. A well-trained crew should ensure that a consistent force is applied.

At all times, environmental conditions should be considered. This should include, but not be limited to, the temperature, footing conditions, and especially wind speed.

**Where conditions are deemed to exceed safe parameters shooting should not be permitted.**

The trebuchet captain must have clear sight of all areas down range which are within the reasonable range of the trebuchet. There should be no areas that are so obstructed as to allow other persons to approach and enter unseen. Where blind spots occur such as moats, a spotter, who can communicate directly with the captain, should be employed to ensure the blind spot is clear. **The captain should also look to the rear before shooting to ensure that no-one is behind the machine.**

**A halt must be called immediately if the range is encroached upon.**

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