

Guide: safely securing a target boss

If a target boss is not properly secured it has the potential to fall, causing serious injury to archers and/or expensive damage to equipment.

To protect against this Archery GB rule 301 (c) requires that:

‘Each target boss shall be securely anchored so that it cannot blow off its stand. Likewise stands shall be anchored to prevent them from blowing over’.

This guide gives a brief explanation of the forces that can cause the boss to fall and the best methods of securing the boss against them. i.e. how best to comply with rule 301 (c) .

Whilst the illustrations used in this guide typically depict one style of stand (traditional tripod), the general principals also hold for other designs. In using this guide you should consider how the principals apply to your stand design and adjust accordingly.

The basics: When will a boss fall?

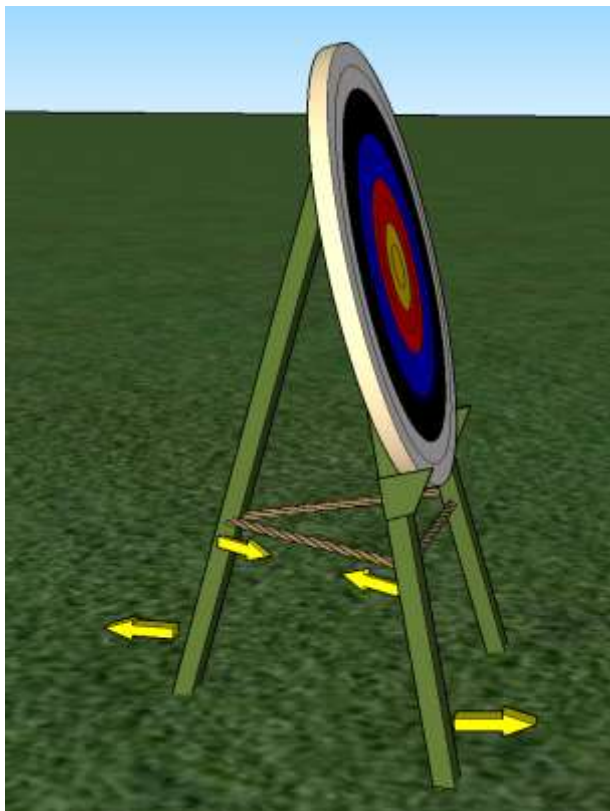
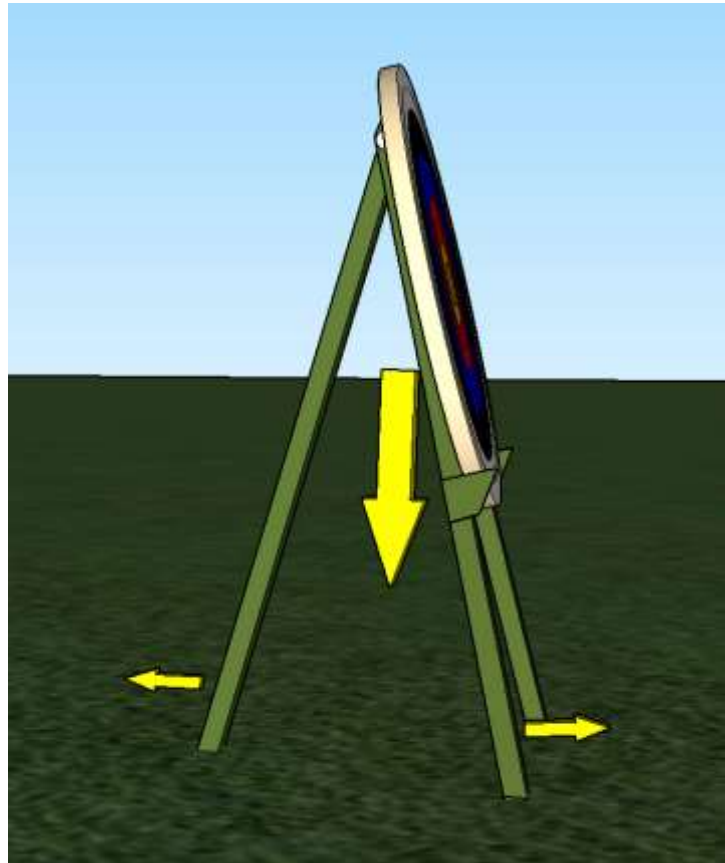
A boss will only fall if the forces that act on it exceed the stability of the stand. The centre of mass must be pushed outside of the area of the feet of the stand. The wider the feet are spread the further the boss has to move before it becomes unstable and falls.

So what are these forces and how can we secure the boss against them? The following pages illustrate each of the forces acting on a boss and the methods available to minimise the risk that they cause the boss to fall..

Gravity:

The weight of the boss creates a downward force. Normally this weight actually acts to stabilise the boss (makes it harder to push over). However the force also acts to spread the legs of the boss.

If the legs are not held together they will eventually spread and the stand will collapse.



Ropes are effective at preventing the legs moving too far apart. Ensure that the ropes are strong enough to provide the necessary support and that they are securely fastened.

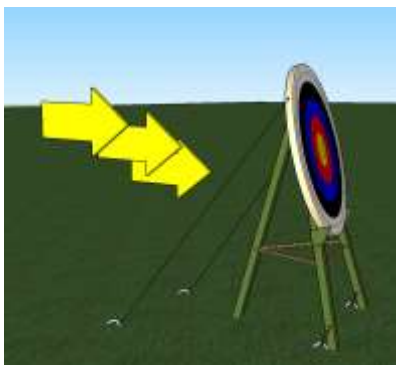
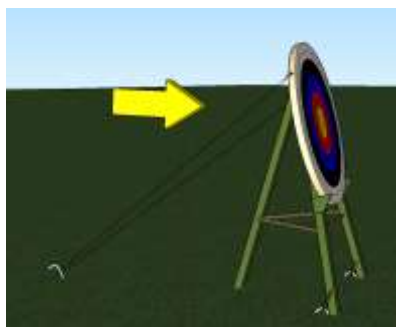
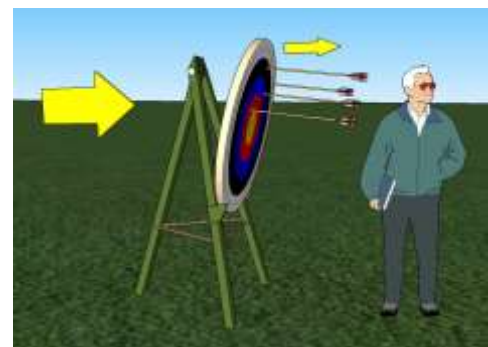
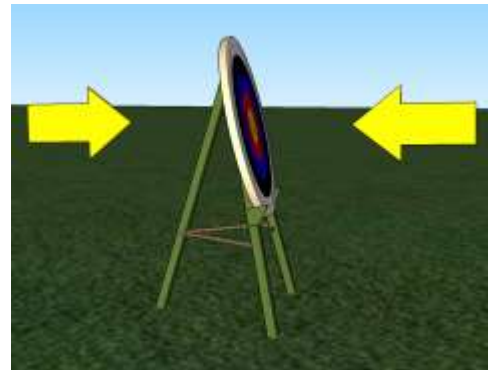
You should also ensure that the legs are sufficiently far apart to make the stand stable.

Wind:

Wind may act on the front, rear or side of the target. The greater the boss surface area (and wind speed) the greater the force, making front and rear wind directions the biggest risk.

If the boss is not secured to the stand it may be blown forward (off the stand) toward the shooting line.

Note: the greatest physical danger is from a target boss falling onto an archer during scoring or pulling arrows. This is particularly dangerous if there are arrows still in the target.



Since the greatest risk is the boss falling towards the archer we apply the greatest protection against this. The upper part of the boss (not just the stand) should be anchored to the ground using rearward facing guy ropes.

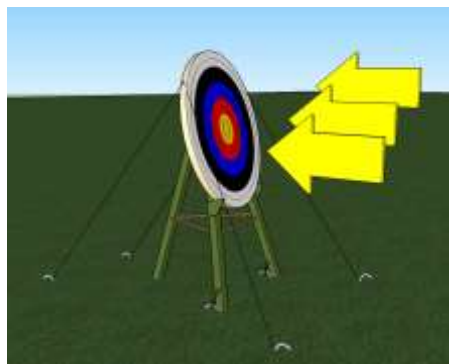
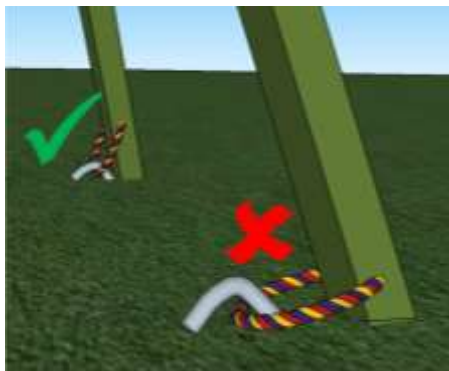
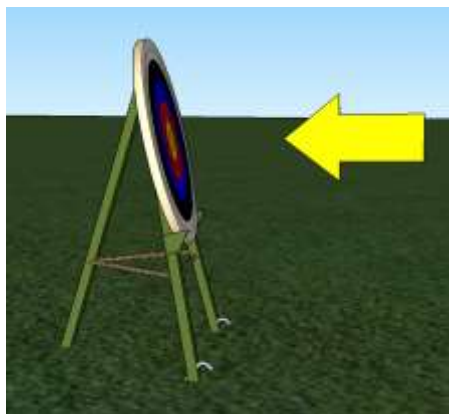
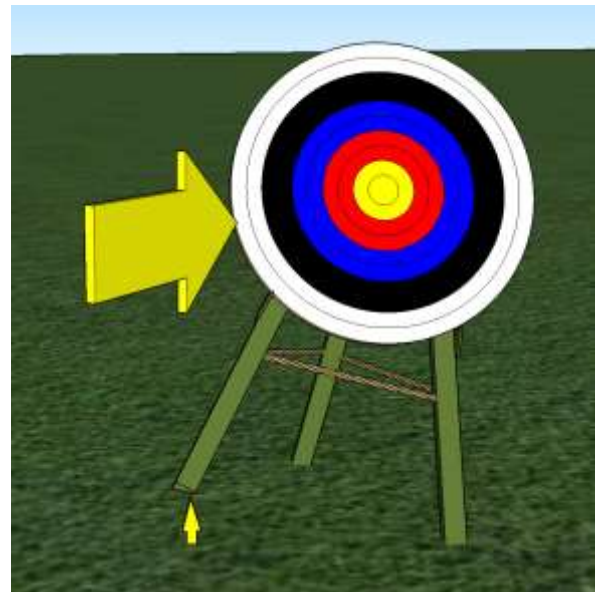
A single ground anchor point is acceptable in low to medium wind, but high wind may require more than one anchor point to avoid the pegs being pulled out. The pegs need to be strong enough to avoid bending or pulling out.

The ropes should extend downwards as close to 45 degrees as is practical. This arrangement also pulls the boss back against the stand.

Wind (continued):

A wind blowing on the face of the target will tend to try and blow the boss and stand over backward.

Note: when the boss and stand tip together one or more legs will move vertically up off the ground.



We could adopt the approach of using forward facing guy ropes on a stand to protect against wind pushing on the target face, but this can create a trip hazard for archers and should where possible be avoided.

Because of this combination we tend to secure the boss against a face wind by securing the legs of the boss firmly to the ground.

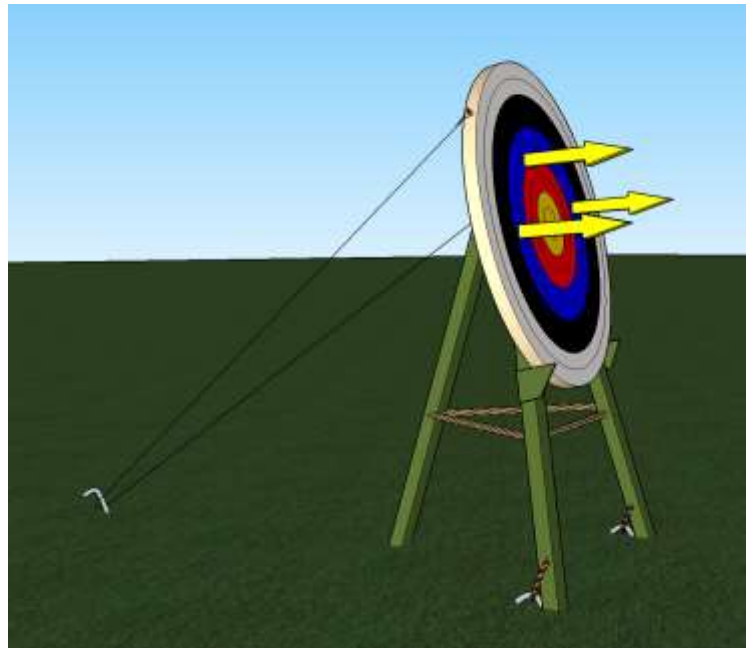
This can be done by drilling the legs and directly pegging them to the ground, or by putting rope through the legs and pegging this down towards the ground.

In extreme winds forward guy ropes may be required. Archers should be warned of the trip hazard when this method is used.

Arrow pulling:

As archers pull their arrows from the boss this also applies a force that tries to pull the boss towards the archer.

The harder it is to pull the arrows the greater the force on the boss.



If the boss has been effectively secured against a rear wind this will also prevent the boss moving as arrows are pulled.

If the boss moves when you pull arrows it is not properly secured! Fix it before the next end of shooting.

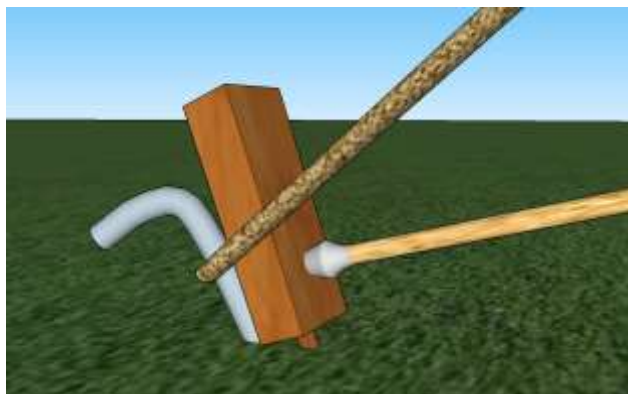
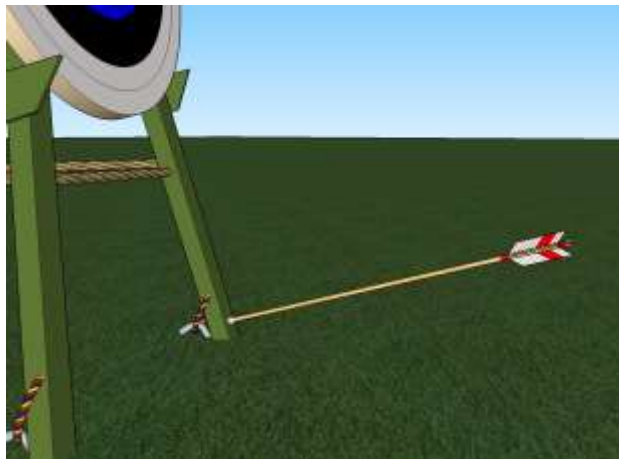
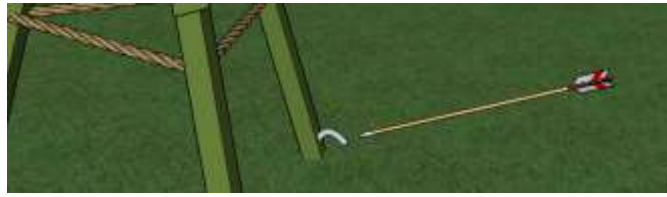
It is always good practice to place a restraining hand on the boss when pulling arrows. This reduces the force on the boss and minimises risk of injury.

Arrow damage & trip hazards:

Any metalwork that can be struck by arrows creates a risk of arrow breakage.

Any pegs or ropes that are in the area where archers stand or walk present a trip hazard.

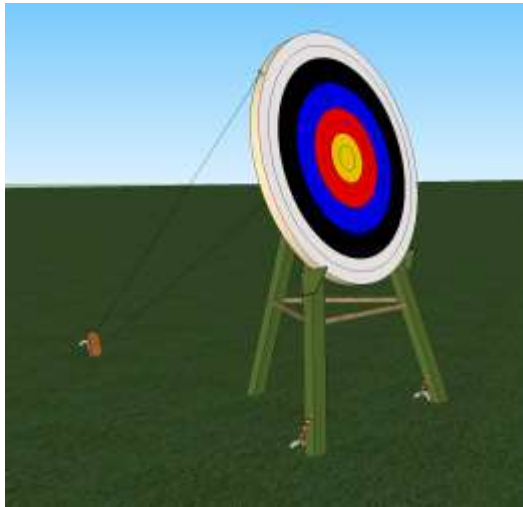
If an archer trips and falls onto a boss full of arrows there is a risk of very serious injury.



Careful placement of pegs behind the legs greatly reduces the risk of arrow breakage from unfortunately placed shots and trip hazards for archers.

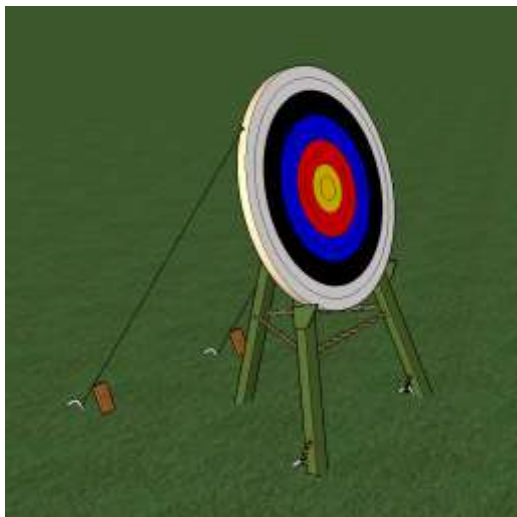
Where a peg has to be in the line of arrow flight a protective wooden cover or stake can be used to provide arrow protection.

Summary: Recommended Securing methods



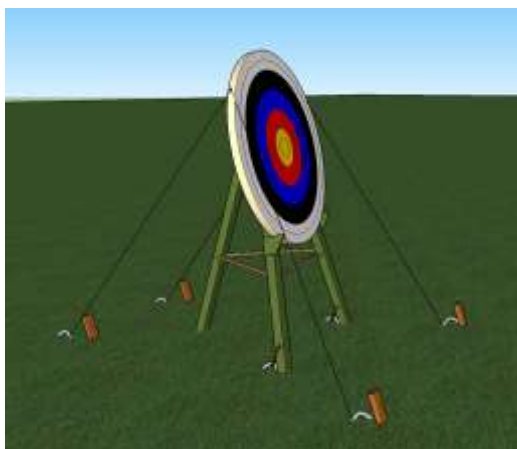
Low / Medium wind

- Wind protection ✓
- Arrow pulling ✓
- Trip Hazard ✓



Medium / High wind

- Wind protection ✓✓
- Arrow pulling ✓
- Trip Hazard ?



Very High wind

- Wind protection ✓✓✓
- Arrow pulling ✓
- Trip Hazard ✗