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Information Sheet	4
Title	SECURING INFLATABLES ON HARD STANDING OUTDOORS GUIDANCE
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GUIDANCE ON SECURING INFLATABLES ON HARD STANDING OUTDOORS

The stated opinion of the HSE is as follows:

- If ground stakes cannot be used because of the surface (eg tarmac) use ballast with anchor points each weighing at least 163 kg and with suitable fixings to attach the guy ropes.
- Anchors are of two types:
 - i. Ground anchors to tightly secure the inflatable base, such that wind is prevented from getting underneath and causing lift
 - ii. High level anchors to support guy ropes in sufficient tension that assists in retaining the shape of the inflatable

PIPA, represented by the Pipa Leadership Group, wholly support this statement by the HSE.

Inflatables are often requested for locations where anchorage by BS/EN 14960 approved peg types is not possible. In these circumstances it is the duty of the controller to ensure that the inflatable is suitably and safely secured in line with BS/EN14960 requirements and will provide a similar level of anchorage while not creating new hazards or increasing risks from known hazards.

The wording of the HSE statement clearly indicates that any ballast system chosen for the purpose in place of any ground stakes must allow the angle of tether to the ground to be maintained, this being between 30 and 45 degrees and capable of withstanding a force of 1600 N or 163Kg to **each** of the anchor points provided.

Although high level anchors may provide some level of ground securing, their primary purpose is to retain the shape of the inflatable (especially on tall inflatables, slides, etc)

Suitable ballast

Suitable ballast could be made up of (for example)

- Sealed, secure water filled containers – with appropriate fixing point & weighing a minimum of 163kg
- Ballast bags, sandbags or similar – with appropriate fixing point & weighing a minimum of 163kg
- Concrete blocks – with appropriate fixing point & weighing a minimum of 163kg (see fig 1)

These should either individually weigh a minimum of 163kg, or if made up of separate sections should be secured together by suitable means, such as a suitable containment bag or webbing strap as appropriate.

The anchor point must be positioned as close to the ground as possible to prevent wind getting under the inflatable device (see fig 2).



Figure 1
Concrete blocks – with appropriate fixing point & weighing a minimum of 163kg

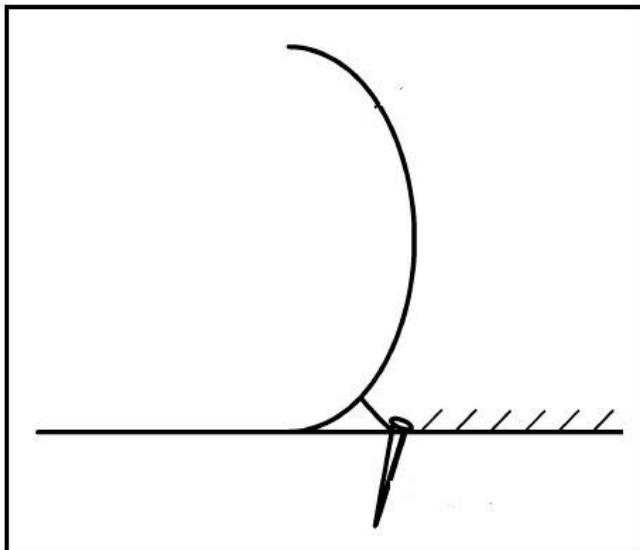


Figure 2
The anchor point must be positioned as close to the ground as possible to prevent wind getting under the inflatable device



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The use of large mobile objects

The use of large mobile objects such as cars, vans, and lorries etc will have an unknown load tolerance and for these reasons we do not recommend their use.

In addition, there are other potential issues, including;

- Vehicle could be moved and release guy rope
- Tie points on the vehicle may not have the required anchor point positioning or load tolerance i.e., bull bars/wing mirrors
- Angle of anchorage is likely to be insufficient
- Ropes may pull through
- A trip hazard could be created
- Vehicle, or aspects of, could be a hazard
- Object could be damaged

The use of fixed structures

The use of fixed structures such as fence posts, park benches and other street furniture have an unknown load tolerance and for these reasons we do not recommend their use.

The use of masonry/concrete bolts

In recent years, the use of ground anchor bolts has become increasingly popular. The use of anchor bolts can be a suitable solution for tethering on a hard surface, but only if they can achieve the required 1600 N (163kg) of resistance. Care must be taken that this solution does not create new hazards, and if incorrectly fitted may not provide the required security to each individual anchor point.

The following must be considered:

- If a carbine hook or carabiner are used it must be of the 'screw gate' type, these must also meet the load rating of 1600 N (163kg) as must D shackles or similar items
- Open hooks must not be used
- Anchor bolts must be of the 'eye bolt' variety and the eye must be of suitable size
- The bolt must be fitted by a competent person and set to the manufacturers recommended torque rating
- A suitable 'pull test' should be undertaken to confirm that the bolt will withstand 1600 N. Regular checks of the surface condition around the anchor bolt should be undertaken, and if changes are noted i.e., cracking or enlargement of the hole then a new 'pull test' should be undertaken to confirm that the bolt will withstand 1600 N.
- A spreader plate may need to be fitted underneath the head of the anchor bolt to adequately secure it to the inflatable tie point



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Potential issues:

- Ground and sub surface conditions need to be acceptable
- Anchor bolt may fail to meet the correct torque in the ground
- Installers could over tighten, this greatly lowers the load ability of the bolt
- Anchor bolts may work loose without regular checks by the operator/ supervisor
- The anchor bolt could work loose as the inflatable moves during use
- A trip hazard could be created
- A sharp protruding hazard may be created and should be covered with suitable covers

The use of ropes or webbing straps

While using the above methods of anchorage it may be necessary to employ ropes or webbing straps to connect the anchor point on the inflatable to the ballast or anchor bolt. Such ropes or webbing straps must be able to meet or exceed the required load of 1600 N (163Kg) as must shackles, linkages, fasteners or knots that may be employed.

It must be ensured that the ropes or webbing straps are suitable for use in the anchorage system and should be chosen to give a safety margin in excess of the minimum load requirement of 1600 N (163Kg), this because even new ropes are greatly weakened at the point that they are knotted or tied. Operators must ensure that they take this into account when selecting ropes (general purpose ropes, car tow ropes, and bungee cords should not be used).

Webbing straps must not be knotted, or hand tied, Webbing straps should utilise machine stitched loops and suitable hardware to tension and connect to ballast or ground anchors without risk of 'falling' free. Open hooks are not suitable.

Ropes and webbing straps must:

- Meet or exceed the required load rating of 1600 N (163Kg)
- Be of sound condition without fraying, chafing, melts, compression points or any other visible damage
- Must have no superfluous knots. Knots weaken the rope, such knotted rope must not be used
- If a carbine hook or carabiner is used it must be of the 'screw gate' type, these must also meet the load rating of 1600 N (163kg) as must D shackles or similar items
- Open hooks must not be used

Potential issues:

- Angle of anchorage could be incorrect
- A trip hazard could be created



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All standard precautions and guidance

All standard operating procedures should be followed rigorously, these are in most cases more important because of the heightened risk from the hard standing.

These include, but are not limited to:

- Suitable soft matting to prevent exposure of anchor heads, especially at all points of access and egress
- Suitable barriers to prevent access to blowers, anchor points and provide crowd control.
- Ground sheeting to prevent damage i.e., puncture
- Suitable levels of supervision by trained and competent operators/attendants
- Regular inspections of equipment (especially anchor points and blowers)
- Site specific risk assessments and method statements
- Inspections of equipment & bolts after each use
- Use of an anemometer to measure wind speeds at regular periods
- Use of a manometer at regular intervals to measure internal pressure
- Survey area for suitability before commencing set up i.e., ground condition/ angle of slope and general site features including large buildings, structures or natural features such as hills which may affect wind conditions