Lightweight and pop-up tents at events

Background

Lightweight and pop-up tents have caused accidents and dangerous situations at public events as well as other types of events and services. These accidents and dangerous situations have partially been caused by insufficient manufacturer instructions, which have made the use of these temporary tents unsafe. The problems have occurred when lightweight or pop-up tents have shifted due to adverse conditions. In these guidelines, we present our view of the minimum requirements for achieving an acceptable level of safety for these structures. A similar level of safety can be achieved by solutions other than those presented in these guidelines. These guidelines are also applicable indoors.

The Finnish Safety and Chemicals Agency (Tukes) and the **expert network** of the **rescue department partnership network** instruct the manufacturers, importers, renters and sellers of lightweight and pop-up tents, as well anyone using these tents, including rental companies and event organisers, to ensure their safe use. These guidelines describe factors that must be considered in the instructions, marketing and use of these products.

These official guidelines are also a letter of recommendation by the National Steering Group for Public Events of the National Police Board https://poliisi.fi/en/public-events.

Guideline scope

In these instructions, “event” refers to the public events described in the Assembly Act, as well as events held at market squares, fairs, restaurants, shops and shopping centres that use these types of products.

These instructions may also be applied to and used for private events. In this case, private use excludes so-called private functions where external guests are present in addition to the personnel of a company or other organisation.

This guideline does not apply to larger tents (more than 50 m^2 in area), to the definition of structural requirements, or to aluminium-profiled tents assembled from parts on site. Professional tents must comply with the requirements of SFS-EN 13782:2015 and the manufacturer's instructions.

Who is responsible for safety?

Manufacturers, importers, renters and sellers are all responsible for ensuring that products, such as tents and awnings are appropriate for their purpose of use, and that their instructions are sufficient to guarantee safe use. All instructions must be clear and understandable. As a rule, the instructions must be presented in Finnish and Swedish (according to the Language Act). These products are covered by the EU's General Product Safety Regulation (GPSR) and national product safety regulations.

Tent users are responsible for ensuring that the tent is safe to use for anyone working or doing business in the tent, as well as bystanders. "Tent user" refers to the operator who offers their products or services in said tent. The responsibilities of the tent users are laid out in the Occupational Safety and Health Act, Construction Act, and the Act on Safety in Consumer Services.

Event organisers are responsible for, according to the Act on Safety in Consumer Services, instructing and monitoring the tents and structures present at their event, including their use, according to their manufacturer's instructions. Event organisers are responsible for ensuring that the tents pose no danger to people or property. According to the Rescue Act, event organisers must do their part to prevent fires and other dangerous situations. Any tents, awnings and similar structures used in public events must be appropriate for use in public events, standardised or otherwise achieve at least a level of safety equal to these guidelines.

Good practice: Event organisers are recommended to distribute this guideline to all parties involved in the event. It is good practice to make compliance with this guideline a condition of participation.

Good practice: Event organisers should inspect that the structures are appropriate before opening the event to the public. Any deficiencies that are discovered in the structures must be corrected or access to the structure blocked before the event begins.

Good practice: Event organisers should place orders for tents and other structures centrally to facilitate their supervision and safety. This reduces the organiser's workload.

Tent users and event organisers are responsible for all temporary construction at their event. The organiser must ensure that the tents, among other things, are suitable for their use, purpose, location and prevailing conditions. If the manufacturer's instructions

are not available, the tent user or event organiser must prepare such instructions to demonstrate sufficient durability, taking the Construction Act into account. For more information, see: The National Building Code of Finland – Ministry of the Environment.

Suitable tents

Public events must only use tents that are suitable for such events and intended for this purpose. **Products intended solely for consumers should never be used** outside private events, such as celebrations organised by private individuals in their home or garden. Tents with lighter structures and weaker mountings are intended for consumer use and may pose a risk to people or property if used in public events. Verify the intended use of the tent from the installation and operating instructions or package of the product, or directly from the manufacturer.

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1. General principles of use for lightweight and pop-up tents

- The responsibility for the safety of tents and their structures lies with whoever erects or uses them or acts as the event organiser. They are further responsible for ensuring that these pose no danger to people or property.
- Tents must be used according to their manufacturer's instructions and the instructions and regulations of the competent authority.
- In all conditions, the structures of a tent must be secured by anchoring or counterweighing them with the appropriate locking fastenings to prevent any dangerous movement of the tent.
- Environmental conditions must be monitored from weather forecasts and in real time during use. As necessary, measures must be taken to eliminate hazards: additional weights or fastening may be added, for example, or the tent may be taken out of use (closed or dismantled according to the manufacturer's instructions).

2. Risk factors and conditions affecting tents and their structures and how to account for them

- Wind will act on the walls of a tent from the side, pushing the tent sideways. Tents must be secured and supported so that they cannot move.
- Wind flowing under the roof of a tent will produce lift and push the tent upwards. Tents must be secured with counterweights or anchored to the ground to prevent them from rising up into the air.
- Rain and snow may cause walls and roofs to give, increasing the stress on the structure of a tent. This increase in weight may cause the structure to collapse. Water, snow and ice loads must be regularly monitored and removed well in advance during use, according to the manufacturer's requirements.
- Insufficient reinforcement may leave tent structures too loose and susceptible to flexing, tilting or even falling over in adverse conditions. Wall openings and roof ridges may be stiffened with guy ropes and other extra structures, as instructed by the manufacturer. The purpose of reinforcement is to make tents stiffer and more robust.
- A tent's structure may be designed to collapse, break up or separate in a controlled and useful manner to prevent the tent from moving due to adverse conditions. Likewise, walls and roofs may be designed to come loose to prevent the forces

acting upon them from moving or lifting the tent in a dangerous manner. In practice, these features are only evident in situations where adverse conditions would cause the tent to move even when counterweighed or secured as specified by the manufacturer. The manufacturer's instructions specify the values and limits for acceptable conditions when using different configurations and securing methods – once these are exceeded, the tent is unsafe to use. Limits indicate a danger that always requires the use of the structure to be stopped.

- As a rule, tents should always be erected on an even and stable foundation so that all their supporting points touch the ground evenly and the tent's weight is distributed among them equally. Sufficient anchoring is especially important when environmental conditions may compromise the stability of the surface, soil, snow or ice (flowing water, incline, loose soil, snowmelt, etc.).

- Consider and prevent any risk of tripping and collision with any guys and pegs above the ground surface. Mark and cover them as needed.

- Note and make sure that the legs of the support pole, which lie against the ground, is durable if weights are added to it or pegs are inserted through them. The legs are often made of plastic, or they may be detachable parts attached to the pole that cannot withstand the load.

3. Specific instructions and points to note in operating instructions and tent use

3.1. Using a tent

- Apply the same safety and weather resistance requirements to the furniture, equipment and other items used in the tent as you would to the tent itself. Electrical installations and extension cables inside the tent must also be suitable for outdoor use.

- Prepare for the possibility that the walls and roof may need to be removed in adverse conditions. Any structures and equipment under the tent must not pose a danger after this is done. For example, deep fryers, loose glass panes and unprotected electrical appliances may pose a danger if they are exposed to the elements. If a ground covering (tarpaulin, for example) is used, it must be secured with separate weights or by other means. Ground coverings may not be fixed to the tent's structure unless this is specifically instructed by the manufacturer.

- Never attach loose furniture or electrical wiring to a tent's structure if they may pose a danger when the tent or its structure moves or rises up and takes them with it.

Follow any and all manufacturer instructions regarding suspension and loads. Cords, leads and so on must detach from the structure if it moves.

- Do not leave the tent unattended after it has been erected. Event organisers and tent users are responsible for tents, their structures and the monitoring thereof whenever the tents are in use or left standing. This includes times outside the event's opening hours: construction, disassembly and nights, for example. Closing tents with side walls is usually a good way to reinforce the structure, if it is permitted by the manufacturer's instructions.

- Verify the fire safety of a tent – for example, keep a safe distance from other tents, buildings, structures, equipment and heat sources. Make sure that sufficient fire suppression equipment is available.

- Position tents so that they do not interfere with the escape routes, emergency access roads or service roads of the event or nearby buildings.

- Observe the maximum number of people specified by the authorities, event organiser or manufacturer during the use of each structure. According to the Ministry of the Environment's Decree on operational safety (käyttöturvallisuusasetus), the acceptable occupancy for meeting, exhibition and public tents is two (2) people for each unobstructed square metre.

3.2. Inspections, maintenance and periodic measures

- A person or persons in charge must be assigned for each tent and structure. They are responsible for their erection, commissioning, inspections and monitoring during use.

- For every tent, log its erection, maintenance and servicing.

- Follow the manufacturer's instructions and carry out the daily maintenance and servicing, as well as long-term inspections.

- Check that the fastening, counterweights, tent structures and mounting points are locked during erection and at least once a day during use, especially if the conditions change.

- Store tents according to the manufacturer's instructions; temperature, protection, etc.

3.3. Preparing for different conditions

- Verify each tent's operational limits from the manufacturer's operating instructions and monitor the local weather forecast and conditions during use – also outside the opening hours of the event.
- Investigate and identify the common wind directions and forces at the use site and assemble and use the tent accordingly.
- Check the manufacturer's instructions for warnings about the effects of cold or hot temperatures on the tent's structures.
- Check the manufacturer's instructions for warnings about lightning and using the tent during thunderstorms: for example, does the structure need to be earthed, is it possible to earth in the first place, and who is responsible for the earthing.
- Check the manufacturer's instructions for warnings about erecting and securing the structure on snow and ice (melting in particular).
- Only use tents on even ground, make sure that the soil is sufficiently firm, and also consider the soil's potential to shift, erode, capacity to absorb water, irregularities and gradient. If these are not covered by the instructions, consult the manufacturer as needed.

3.4. Monitoring the conditions and responding to changes

- Tents with partially open walls are generally more vulnerable to wind. Check the manufacturer's operating instructions for operational limits in different configurations (all walls, no walls, etc.).
- Compare the operational limits of the tent to the conditions and take measures as instructed by the manufacturer to prevent the tent and structures from posing a danger or causing damage. For example, you should remove canvases, tarpaulins and other tent surfaces that may produce pressure or lift as a result of wind. In the case of an emergency, you can make holes in the material if the manufacturer's instructions permit this, but never hold on to the structures. In some cases, the roof and walls may be closed completely to stop the use of the structure and protect the property inside the tent (with no people inside). The closing or dismantling of a tent must be done sufficiently in advance and not when the conditions have already turned dangerous.

- In dangerous conditions, never go into, under or behind (downwind of) a tent for protection or allow others to do the same – these are the riskiest places if the tent moves. Your first priority is to evacuate people to a safe distance before any other measures are taken.

- Never hold on to the structures of a tent or attempt to hold them down during foul weather.

3.5. Weights and securing (wind loads, lift and surface area)

- Always secure structures with anchors or counterweights regardless of the current weather.

- Tents must be secured against sideways and upwards movement. This is often done by using tent pegs and counterweights. See the manufacturer's operating instructions for their correct number and use. In particular, note if these methods should be used separately or simultaneously.

- Anchorage with ground pegs, anchors, threaded screws, etc. must primarily be done at approximately a 45° angle to the anchor points, unless the manufacturer instructs otherwise. The anchor strap, or guy, should be at approximately a 90° angle with the peg (see Figure A.). The ground should be tightly packed and firm when using pegs. Pegs have better holding and leverage in solid soil than in sand, etc. Pegs must be placed at the tent's support points, i.e. the poles, and tilted away from the tent.

- When using pegs, make sure that the soil is suitable and that the pegs will not damage buried structures (insulation, cabling, pipes, etc.). Make sure to obtain the landowner's permission to use wedges, etc.

- Fasten tents by using the methods and tools indicated by the manufacturer's instructions. If you use third-party ropes, straps or other accessories, make sure that their strength and durability ratings meet the requirements of the manufacturer's operating and fastening instructions ("rated accessories" have been classified according to the relevant standard). Cable ties, string or similar materials are typically not acceptable for anchoring, as (verifiable) durability or load data is not available from the manufacturer.

- It is forbidden to use other objects, items or products such as stones, gas bottles etc. as weight. Their properties are unknown, and it may not be possible to anchor them appropriately. Avoid stacking several smaller weights to achieve the desired number of weight, as stacking weights may cause other hazards (e.g. risk of falling).

- Only use approved, locking and correctly rated hardware – hooks, shackles, etc. Always use tools and accessories according to their manufacturer's instructions. Follow the equipment manufacturer's instructions. All fastening equipment must be rated to meet the load requirements of the tent manufacturer.

- Do not use frayed or worn cargo straps, ropes, etc. Take the counterpart into account when attaching. For example, sharp brush steel may cause the strap or rope to rub and eventually break.

- Knots may weaken materials and even cause them to break under environmental stress.

- Never use hooks (including S-hooks) or other devices that cannot be locked – unlocked devices may work loose from lightweight structures and mounting points due to wind or other conditions. Make sure that the locks of any friction or quick-locking devices meet the manufacturer's requirements for the current operating values (load).

- When attaching to fixed anchor points, the guys or similar anchor devices must be at no more than a 45° angle downwards from the anchor point. Anchor ropes, i.e. guys, must not be vertical.

- Check that mounting points are locked before use and daily, as necessary.

- Use a sufficient number of weights with regard to the tent's wind surface area, noting the number of wall elements and the current wind conditions. Check the manufacturer's operating instructions for the number and mass of counterweights in different conditions and for different structural configurations (all walls, no walls, etc.).

- Check the manufacturer's instructions to verify if additional weights or fastening may be added to the structure compared to the instructions' base value or if this will compromise the structure's integrity.

- All poles must be secured with pegs or counterweights in accordance with the manufacturer's instructions to keep the structure balanced.

- When using loose counterweights (concrete weights, etc.), they must primarily be placed directly below the anchor points next to the support, i.e. the pole.

- Lock all counterweights to each other and to the structure so that they do not come loose if the structure shifts. Stacking weights, including crosswise stacks, is

insufficient to achieve such a lock. Weights placed on pole legs without locking will not keep the weight in place if the tent shifts.

- Do not attach weights with material that is more durable than the anchor point. For example, a steel hook will cut an aluminium tube when bent, causing it to come loose.

- If you use suspended weights, it is recommended that the weights are anchored to the ground.

- Lock all structures to each other and check the locking of the joints and mounting points before use (telescopic poles, for example).

3.6. Loads (suspension and masses)

- During use, remove any extra snow and water off the tent, as required for the conditions.

- Check the manufacturer's operating instructions regarding suspension and other structural mounting techniques for lights and heating, for example. Observe the correct mounting points and their load ratings.

4. Definitions

Lightweight/pop-up tent

Lightweight and pop-up tents are often self-assembled and movable, and their assembly requires no professional skill or qualifications. In many cases, they are excluded from standard SFS-EN 13782:2015 (tents or tent groups under 50 m^2).

Guy (rope)

An anchor rope, wire or similar item fixed to the ground or weights to secure a tent. Guys are typically installed at a 45-degree angle sideways from the tent's mounting point (see Figure A). A guy's nominal and ultimate strength must be sufficiently rated for the counterweights and mounting points used.

Guys may also be installed between the parts of a tent in the walls and roof to stiffen the structure.

Peg

Metal stakes for fastening guys. Typically, pegs are driven into the ground at a 90-degree angle relative to the guy, assuming the guy leaves the mounting point at a 45-degree angle (see Figure A). Pegs are usually light and short (20 to 30 centimetres) and used in suitable soil. When using pegs, make sure that the soil is suitable and that the pegs will not damage buried structures (insulation, cabling, pipes, etc.). Make sure to obtain the landowner's permission to use pegs, wedges, etc, as it is possible that there is underground infrastructure in the area (electricity, sewers etc.).

Poles may have loops at the base for holding down the corners and supporting points with pegs, which also stops any sideways movement. This is an unreliable method that is vulnerable to changing conditions.

Counterweight (ballast)

Weights that counteract the lift caused by wind. They act on a tent's vertical poles to counter vertical movement. Their purpose is to prevent the tent from lifting off the ground. Counterweights may not prevent the structure from moving sideways, so guys and extra weights should be used to prevent sideways movement. Extra weights can be placed close to the structure if they are sufficiently heavy or produce enough resistive force (friction).

Further information

https://pelastustoimi.fi/en/online-services/supervision-of-public-events

https://poliisi.fi/en/public-events

https://tukes.fi/en/products-and-services/services-for-consumers/public-events/products-and-services/services-for-consumers/public-events/products-and-services/services-for-consumers/public-events

Enquiries

Finnish Safety and Chemicals Agency Tukes
kari.erkko@tukes.fi

Rescue department partnership network event safety expert network
hannu.rantanen@varha.fi
jarno.kivisto@vakehyva.fi

Appendices

Example pictures of good and bad practices

Distribution	Lightweight and pop-up tent manufacturers, importers, renters, sellers and users, also event organisers
Notification	Supervising authorities Municipalities and cities, The Association of Finnish Cities and Municipalities Educational institutions

Example pictures of good and bad practices

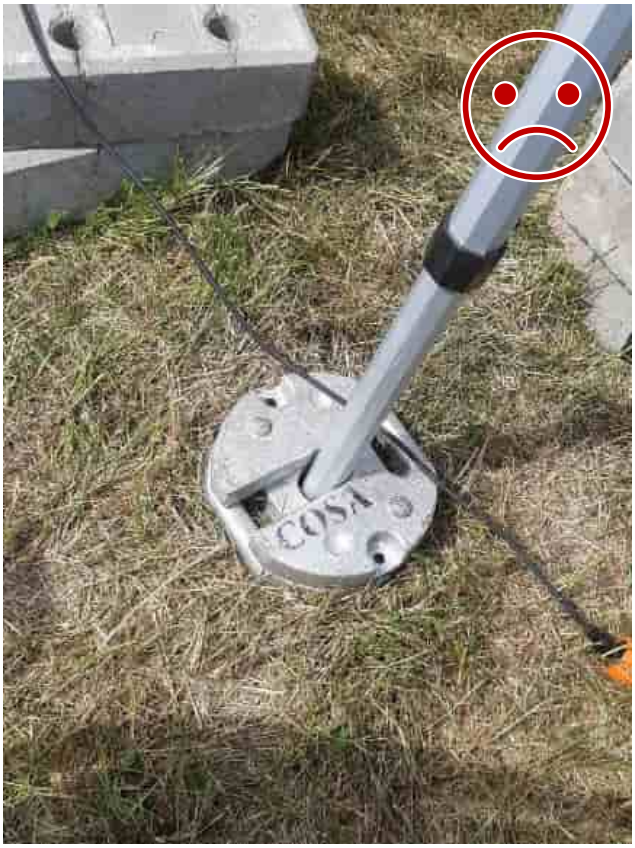

Figure 1 WRONG. The weights are not interlocked. Gravity will cause the weights to come loose, and they will not secure the pole while the wind shakes the tent.

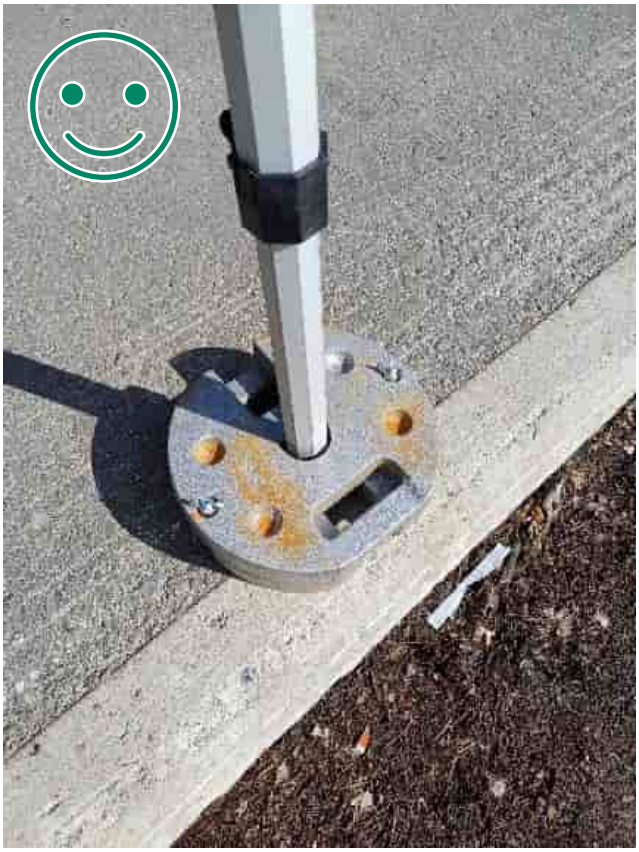

Figure 2 RIGHT. Both weights are secured on both sides with a wing nut. Opposite horseshoe weights prevent the pole from coming loose as the structure shifts. The feet of a corner pole must be able to withstand this weight.

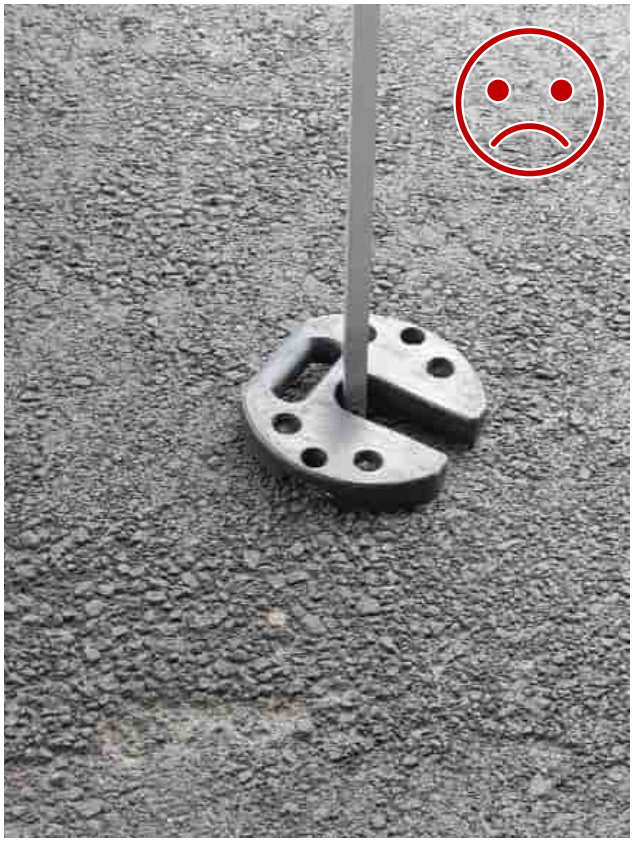

Figure 3 WRONG. The weight is not locked to the structure. It is necessary to have an additional weight on the other side and to lock the weights together.

Figure 4 RIGHT. Two layers of weights in opposing directions lock the layers around the pole when a sufficiently large, solid bottom plate is used. The feet of a corner pole must be able to withstand this weight.

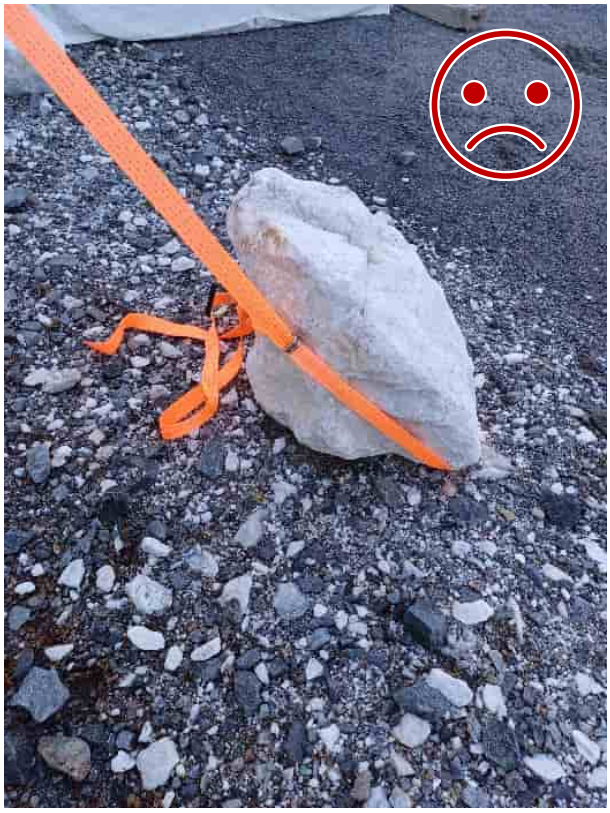

Figure 5 WRONG. The strap is not locked to the stone, which also features sharp edges.

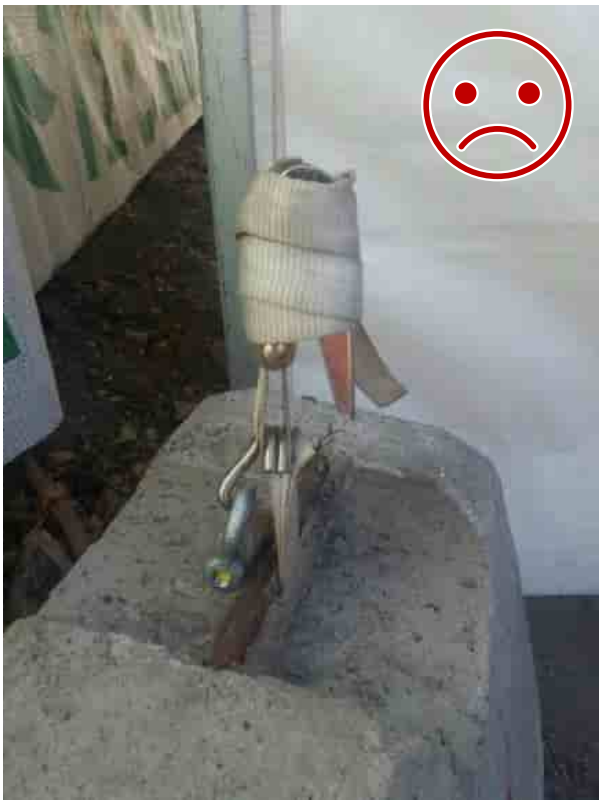

Figure 6 WRONG. The hook is not locked, should be locked with a shackle to the fixing point.

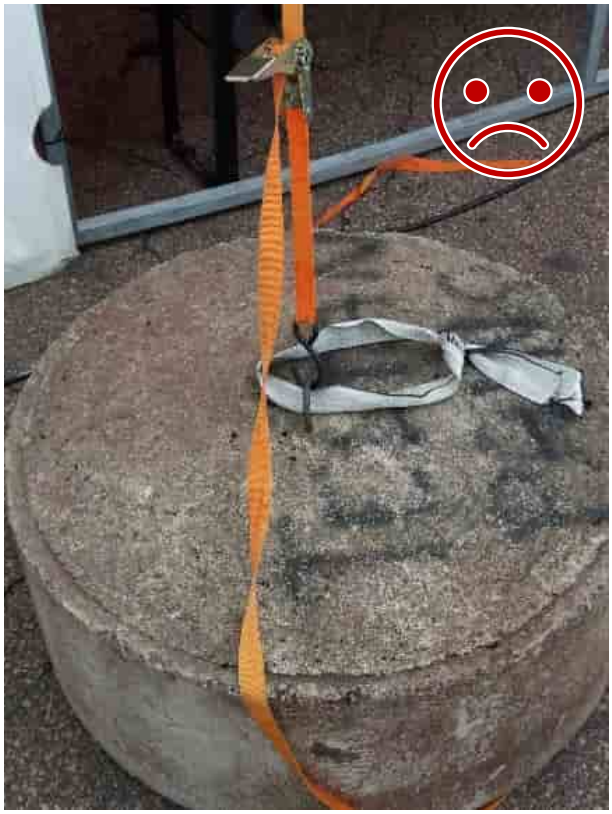

Figure 7 WRONG. The S-hook is not lockable. The hook will come loose as the structure shifts.

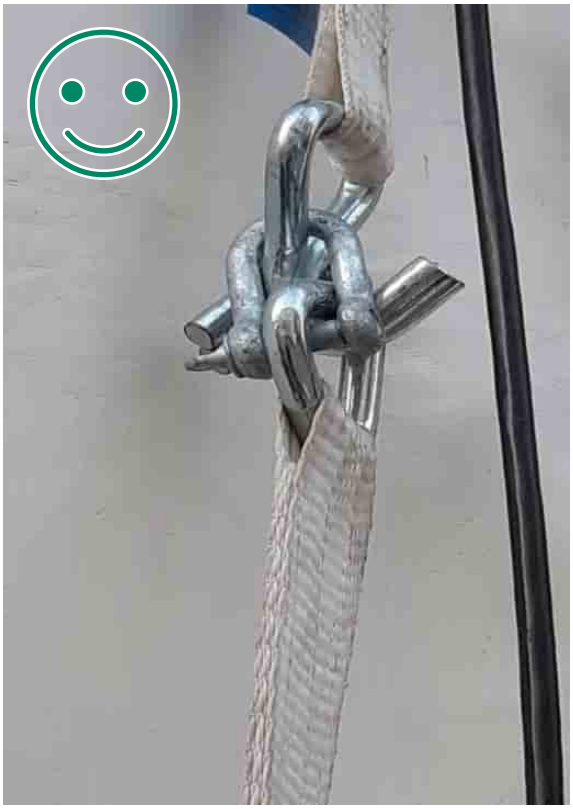

Figure 8 RIGHT. Hooks locked with a shackle.

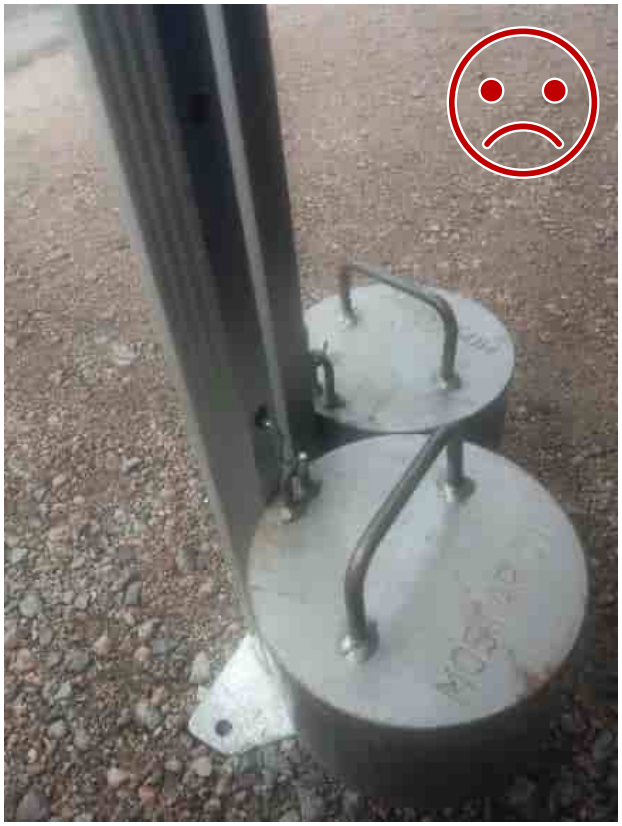

Figure 9 WRONG. The steel hook does not lock into the structure, and the steel will cut the aluminium as lift shakes the tent.

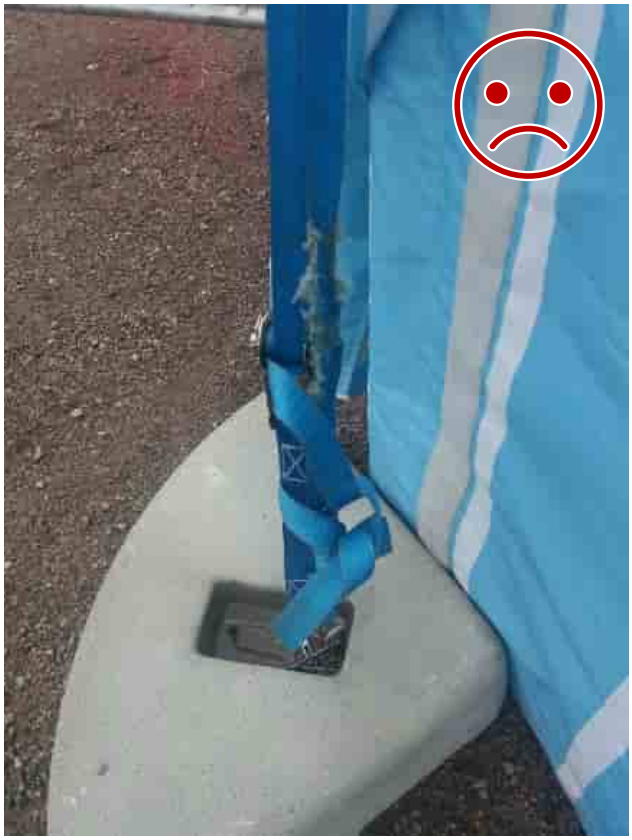

Figure 10 WRONG. The strap is worn.

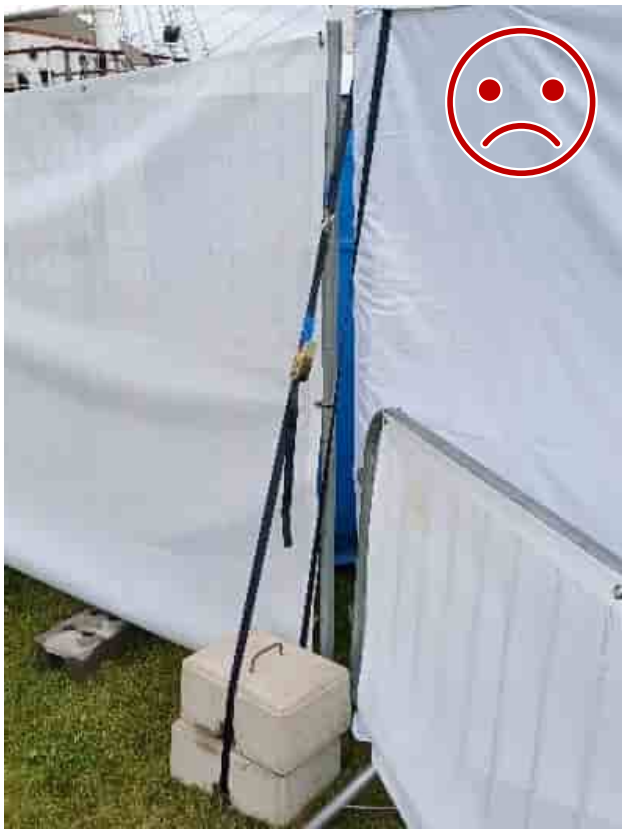

Figure 11 WRONG. The weights are not locked to the strap or to each other. The stack will fall, and the strap will not hold as the structure shifts.

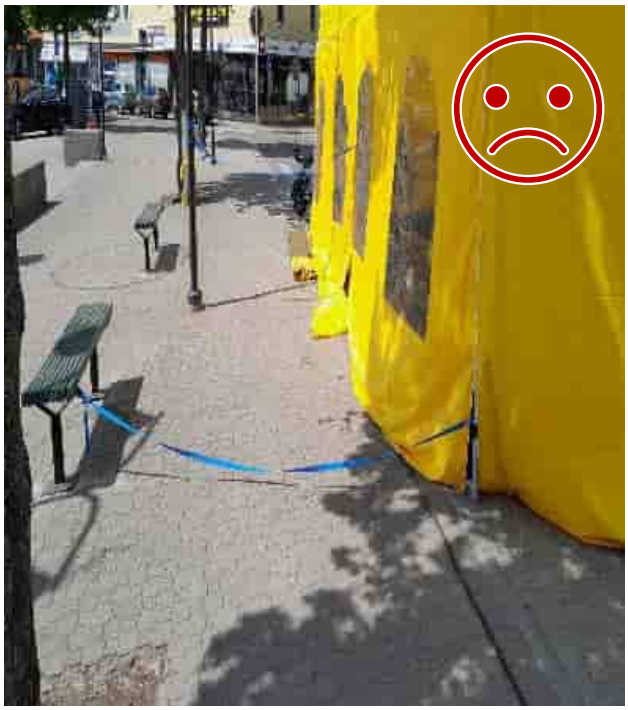

Figure 12 WRONG. Horizontal attachment that does not prevent the tent from rising into the air. Furthermore, the strap is a tripping hazard.

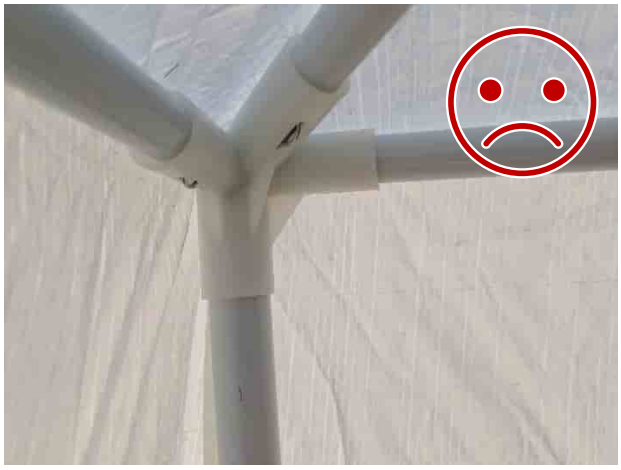

Figure 13 WRONG. Consumer structure. The pipes do not lock into the joint.

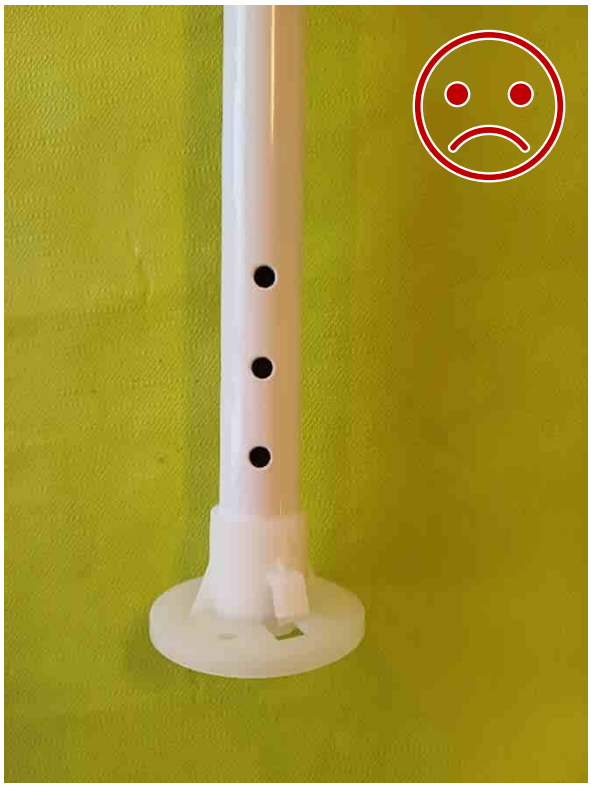

Figure 14 WRONG. Consumer structure. The support leg is plastic, not locked to the pole, and cannot withstand stress.

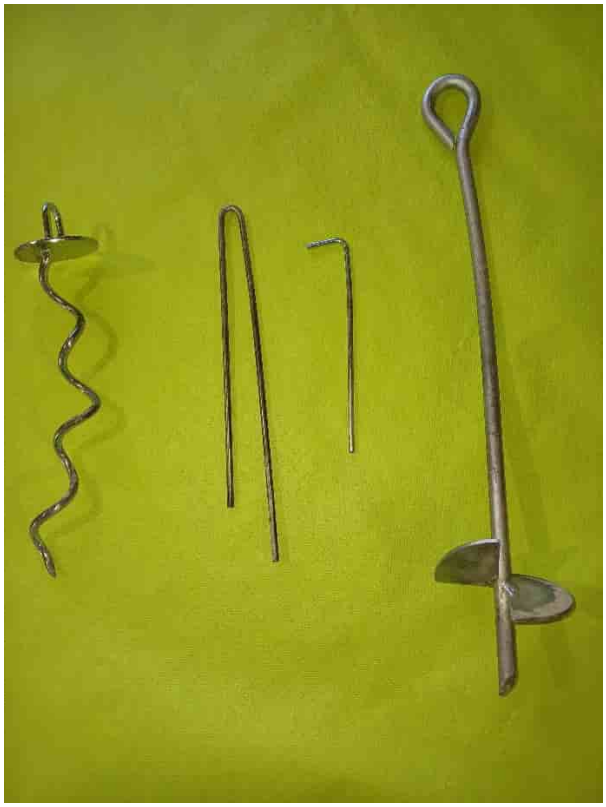

Figure 15 Various structural pegs. Basic models in the middle and threaded models on the sides.

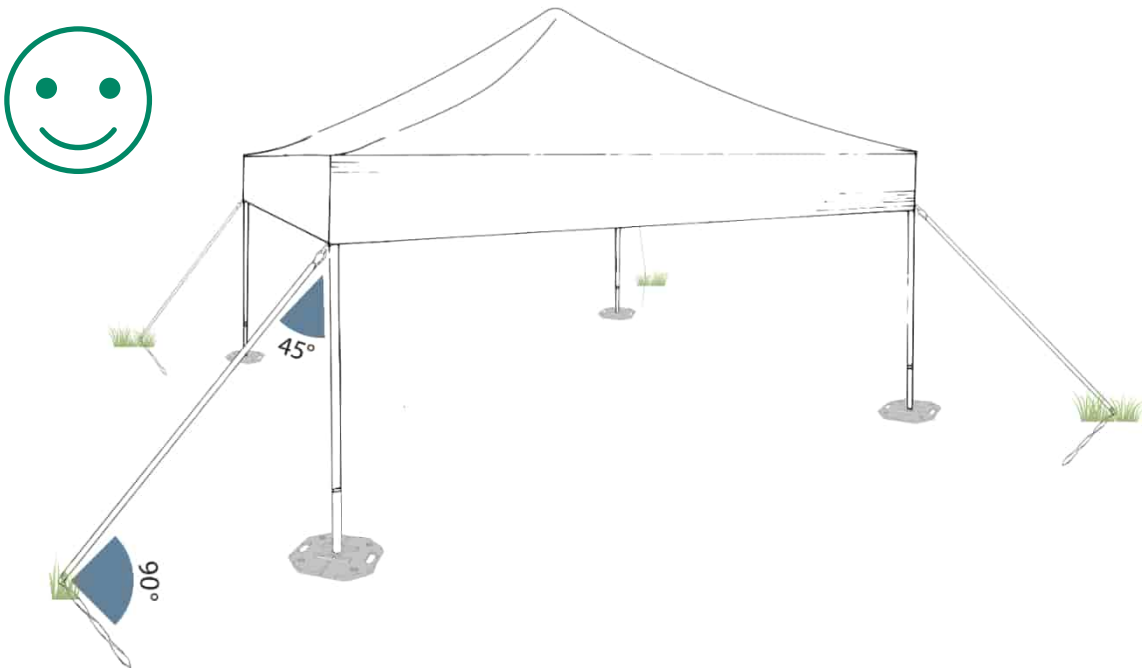

Image 16 MASTERTENT tent erection guide, demonstrates correct attachment of guys, pegs and structures

APPENDIX 1 Quick Guide to Participants – Summary reference guide

Stop using the structure if the conditions get worse before it is too late. Always follow the equipment manufacturer's instructions. Do not use consumer products that do not have locking parts or attachments.

Supervision and maintenance

- Consult the manufacturer's instructions for the operational limits of the structure you are using, such as the wind, rain and snow loads.
- Always check and monitor the conditions of the site from weather forecasts and in real time during operation. Take the necessary measures to avoid danger.
- An erected tent must be under continuous supervision, even when the event is inactive.
- Designate the person(s) responsible for the set-up, commissioning, inspections and operational supervision of the tent. Follow the manufacturer's instructions and carry out the daily maintenance and servicing, as well as inspections. For every tent, log its erection, maintenance and servicing.
- Check and refer to the manufacturer's instructions for lightning and thunderstorms, and for possible erection and anchoring on snow or ice (especially thermal melting).

Erection, attaching and use

- Regardless of the weather, the structure must always be fixed to the ground with counterweights or anchors.
- Always place tents on a level and stable surface so that all support points, i.e. pole feet, are in even contact with the ground.
- Each structural pole must be sufficiently attached to the ground.
- Attachment must always be made with a lockable device and solution (shackle, carabiner, etc.), not hooks or other gravity-based methods.
- Fasten tents by using the methods and tools indicated by the manufacturer's instructions. Cable ties, string or the like are typically not acceptable fastening tools.
- Do not use frayed or worn cargo straps, ropes, etc.
- Lock all counterweights to each other and to the structure so that they do not come loose if the structure shifts. Stacking weights, including crosswise stacks, is insufficient.

- Lock all structures to each other and check the locking of the joints and mounting points before use (telescopic poles, for example).
- Anchor pegs etc., should primarily be placed at an angle of 45° to the fixing points (see figure A). The use of pegs requires permission from the landowner (underground infrastructure).
- When using loose counterweights (concrete weights, etc.), they must primarily be placed directly below the anchor points next to the support, i.e. the pole.
- When attaching to fixed anchor points, the guys or similar anchor devices must be at no more than a 45° angle.
- During use, be sure to always remove any snow or water load from the structures of the tent without delay.
- Find out the event rules and the orders and instructions issued by the authorities, and follow them.
- Furniture, equipment and other items used in the tent must be suitable for outdoor use. Electrical installations and extension cables must also be suitable for outdoor use.
- Never attach loose furniture or electrical wiring to a tent's structure if they may pose a danger when the tent or its structure moves or rises up and takes them with it.
- Verify the fire safety of a tent – for example, keep a safe distance from other tents, buildings, structures, equipment and heat sources. Make sure that sufficient fire suppression equipment is available. Position and furnish tents so that they do not interfere with the escape routes, emergency access roads or service roads of the event or nearby buildings.
- Stop using the structure if the conditions get worse. Please note that taking shelter behind or inside the tent is not allowed, as it is possible that the structure shifts and hits people during particularly strong winds, for example.
- Do not hold on to the tent structures or hang on the structures to hold the tent in place.