



Alternative Stabilisation

Technical Briefing Note

September 2025



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Introduction

Technical Briefing Notes (TBN) are produced by Lakeside Industries Ltd and are primarily for guidance in connection with ALTO Access Tower Products which are classified as either ALTO Medium Duty (MD) or ALTO Industrial (HD) aluminium mobile access towers. However, the information contained in this document may be of value to users of other makes of BS EN 1004-1:2020 compliant towers or BS 8620 podiums.

This TBN applies to mobile aluminium scaffold towers made from prefabricated elements having dimensions fixed by the design and four legs with castors, providing one or more platforms, as defined in BS EN 1004-1:2020, and to structures covered by BS 1139-6: 2022. It is intended to give guidance on specific aspects of good practice relating to stabilisation for the safe use of mobile access towers.

Unless covered by, and compliant with another relevant UK recognised standard - such as BS 8620 or BS 1139-6, we strongly advise against the use of towers, or devices for working at height which are not certified as complying with BS EN 1004-1:2020. A recent survey by PASMA has shown just how deficient and dangerous these can be.

An introduction to the PASMA investigation can be found here: <https://pasma.co.uk/scaffold-towers/the-dangers-of-diy-towers>

The full PASMA Report on DIY Towers can be read here: <https://nx30495.your-storage.de/s/GNFaZDYpT5cANAK>

Scope

Work at Height is, statistically, the most dangerous activity in the workplace in terms of serious accidents or fatalities in the workplace. The primary focus at all times when using access equipment of any make or format must be to ensure the safety of all concerned. For all work at height, a Risk Assessment and Method Statement must be undertaken before setting out on the task under consideration.

The primary objective of this document is to assist users in the safe utilisation of Alto Access Towers. It is not a definitive instruction manual, nor is it a substitute for adequate training or qualification.

All certified compliant towers will be sold with stabilisation solutions which meet the demands of the standard. However, there are times when either:

- The environmental situation or the specifics of the application mean that more stabilisation is required than is provided by a standard tower, or
- The situation in which the tower is located means that the standard stabilisation measures cannot be deployed.

These notes give generic guidance on non-standard stabilisation methods which can be used with Alto towers. They are not a substitute for your Risk Assessment and Method Statement, or for a proper design and plan for the temporary works concerned, nor are they a substitute for proper training. These notes do not constitute a definitive or comprehensive guide on the subject of stabilisation.

Only competent and qualified personnel should undertake erection, dismantling and alteration, organisation, planning or supervision of mobile access towers. The same applies to non-standard stabilisation of towers. In the case of any doubt, sufficient relevant additional training must be given beforehand to ensure safe use. For further information on the use of mobile access towers, consult PASMA (www.pasma.co.uk +44 (0) 845 2 30 4041).

A Risk Assessment and Method Statement must be undertaken before installation commences and should include the relevant stabilisation to be applied to the specific structure being built.

Regulatory Framework

In the UK, all work at height is subject to The Work at Height Regulations 2005. If you are using any item of work at height equipment in the workplace (including a scaffold tower) either as an employee or as a self-employed person, the Work at Height Regulations apply to you. You must ensure that not only the person building the tower is **competent**, but also those who specify, use, supervise or manage the use of a tower are **competent** to do so.

A competent person can demonstrate that they have sufficient professional or technical training, knowledge, actual experience, and authority* to enable them to:

- Carry out their assigned duties at the level of responsibility allocated to them; · Understand any potential hazards related to the work (or equipment) under consideration
- Detect any technical defects or omissions in that work (or equipment), recognise any implications for health and safety caused by those defects or omissions, and be able to specify a remedial action to mitigate those implications

* Note: “authority” here means delegated authority to the individual by his employer to carry out a certain function or duty.

Other relevant regulatory considerations include:

- Health & Safety at Work Act (1974)
- Work at Height Regulations (2005)
- Provision & Use of Work Equipment (1998)
- Management of Health & Safety at Work Regulations (1999)
- Health & Safety in Construction HS (G) 150
- HSE Information Sheet CIS 10

If you are using a tower or any other form of temporary access equipment, in anything other than a work environment, then, although the Work at Height Regulations might not apply to you, it is strongly advised to treat them as if they did. Working at height is one of the easiest ways to seriously injure or kill yourself.

Principles of Stabilisation

Just like almost every form of temporary access for working at height, mobile access towers are, generally speaking, tall narrow structures. Consequently, in order to be safe for use, sufficient attention has to be paid to the stability of the structure to ensure that it is stable (i.e. will not tip over in use) under any of the conditions and loads that it can be reasonably expected to be impacted by.

Towers which are designed and certified in accordance with BS EN 1004-1:2020 have had stability solutions designed in, which are sufficient to deal with defined operational and environmental conditions, namely:

- That the tower is built vertically in the first place (to within 1 degree)
- Up to 8m – a wind speed of 45.5 km/h
- A lateral service load of approximately 0.3 kN (equivalent to 30.5 kg) pushing sideways against the tower at the top platform level.

If the tower is built correctly, it will withstand these de-stabilising loads without tipping over – with a safety margin of at least 50% for overloading.

Almost all standard towers achieve this by including stabilisers which are attached to the four corners of the tower at the base. These press down firmly on the ground, increasing the base area of the tower – thereby working against any overturning force applied further up the tower.

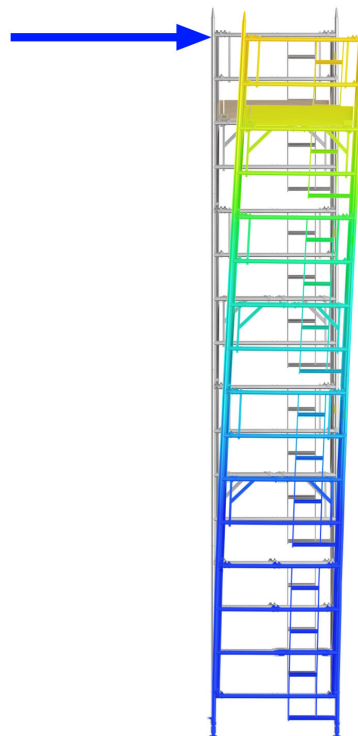
There are a few things inherent in a mobile access tower which govern the measures that need to be taken to stabilise it. These can be summarised as follows:

Turning Moments

Imagine a tower standing vertically with no stabilisers – say 10m tall.

A sideways force applied at the top platform of a tower is effectively magnified by the distance from the bottom of the tower to the point where the force is applied. This is called a turning moment.

Thus, for a given base area, the taller the tower – the bigger the effect on the tower - i.e. the easier it is to tip over. To compensate for this – as towers get taller, manufacturers specify larger stabilisers.

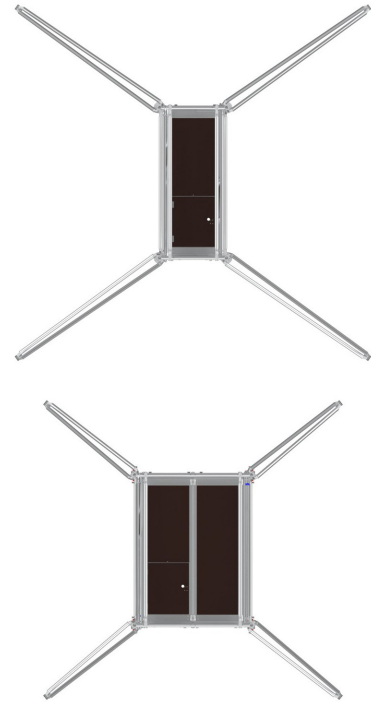


Footprint Size

This is the flip side of the point made above – the smaller the footprint of a tower of a given height, the easier it is to tip over. So, a single width tower requires large stabilisers at a lower height than a double width tower.

This is commonly referred to as “the base to height ratio” – and it forms part of the physics behind the calculation of the required size of stabilisers.

There are some old rules-of-thumb about – for example, referring to a “three-to-one height-to-base ratio”. Please ignore these. They are crude measures which belong to history.



Joint Imperfections

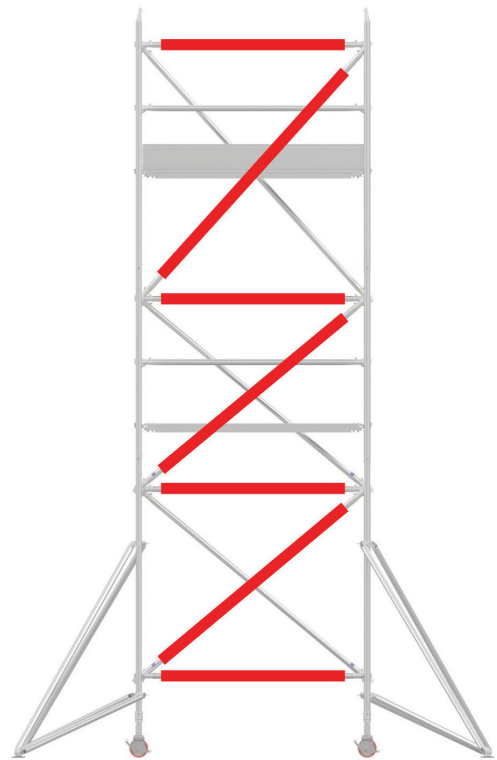
Towers are made in sections. Where frames are joined, there has to be some imperfection in the joint – i.e. a gap to allow the tube to fit over the spigot.

Inevitably, a joint imperfection (tolerance) creates some “play” in the structure. Designers have to take account of this when calculating the strength and stability of the tower.



Bracing Patterns

Bracing patterns affect the rigidity of a tower and hence have an impact on its strength and stability. Alto towers are designed with “nodal” bracing. This means that each end of a diagonal brace meets a horizontal element in the same plane – i.e. a platform or horizontal brace or guardrail. Consequently, Alto towers are much more rigid and can absorb lateral forces more effectively.



Inherent Strength

The material that a tower is made of affects its rigidity. Alto Towers are made of extruded tube either 3mm thick (HD) or 2mm thick (MD). Other brands use thinner tube – commonly 1.5 or 1.6mm thick and in some cases even use seam welded tube.

Similarly, some other towers use partial welds or crimping to connect frame and bracing components together. Our brace hooks and other structural fittings are fully welded with all-round welds. We do not use partial welds or crimping for structural joints.



Factors Affecting Tower Stability

In the real world, various factors, ranging from the surrounding environment to the way it is used, will influence how stable a tower is when it is actually deployed. A user must take these into account in assessing whether the tower is safe to use. These might be summarised as follows:

Height

As outlined above, the taller a tower gets, the more potential for instability arises. Any loads placed on the tower will have proportionately greater effect, and the measures required to counter them need to match this.

Verticality

The manufacturers' calculations & safety margins are all based on the presumption that the tower has been built vertical, to within 1%. If the tower is not levelled correctly or if the wheels and stabilisers are not all grounded properly, it has an unavoidable effect on the stability and safety of the tower.

Properly levelling a tower has a vital impact on the safety of the tower – and incidentally on how easy it is to assemble. If braces or platforms on an EN 1004 tower do not fit properly, the first thing to check is that the tower has been properly levelled.

Ground Conditions

Often overlooked – with usually serious consequences – the ground must be suitable for the tower's construction. All of the tower's self weight, plus any loads placed upon it will be transmitted down the tower's legs as point loads and transferred onto the ground directly underneath the wheels. If the surface is not hard enough and rigid enough to take these point loads, compensatory measures need to be taken, such as spreader plates placed under the wheels.

Similarly, if the stabilisers or outriggers do not have spreader plates where they meet the ground - and they are set on earth or lawn, for example - their effectiveness will be greatly reduced. Any load on them may result in the stabiliser tube simply driving into the ground and failing to stop the tower from overturning.

The ground on which the tower is deployed may be significantly sloping. Although the adjustable legs may have been set to ensure that the tower is vertical, the degree of slope may cause some concerns for stability.

Wind Loads

Unless a tower is being deployed indoors, it can be expected to experience a wind load. Although the wind can and will pass between the various tubes, rungs, braces and platform edges, it will also act upon those surfaces. EN 1004 certified towers are designed to resist wind speeds specified in the manufacturer's instructions, which is why a wind speed table is always given in the instructions.

However, it needs to be remembered that winds can gust and change speed & direction rapidly. In windy conditions, a tower can become dangerous unless preventative measures are taken, which is why all users need to be aware of weather conditions and the short-term forecast. The effect of wind can be magnified by other factors – see Sheeting and Tunnelling below.

Sheeting and Tunnelling

All EN 1004 tower manuals will include an instruction stating that the tower must not be sheeted. This is because any sheeting effectively adds a “sail” like panel to the tower, greatly increasing its surface area and magnifying the effect of wind loads. Signage panels and articles placed on working platforms can also have similar effects. Users need to be aware that ignoring this instruction can lead to wind loads on a tower that the manufacturer did not anticipate.

Similarly, if a tower is deployed in a narrow gap between two structures, wind speed will increase as the wind that is displaced by the end wall of the buildings is forced through the gap. Think of the effect of squeezing the end of a running hosepipe. In these circumstances, the wind speed impacting the tower may be much higher than the general prevailing wind speed. A similar effect can occur on a tower at the top of an exposed hill or within an open-ended building—such as a hangar or a building under construction, where the glazing or cladding panels are not yet fitted.

Lateral Working Loads

Towers are generally constructed to perform specific tasks, often related to the construction or maintenance of a building. For example, this might include drilling into a wall. When using a powerful drill pressed against a wall, it applies an equal and opposite force on the tower through the operator.

A surprisingly large force can also be imparted when a tower is used to reach another location, by walking on or off the tower. This is why it is subject to special requirements in any properly prepared manual.

Top Loads and Asymmetric Loads

Towers are typically constructed to a specific height to carry out work at that level. It is uncommon to build a tower taller than necessary. This implies that operatives, along with their materials and equipment, are usually positioned at the top of the tower. Therefore, from a stability perspective, a tower in use resembles an upside-down pendulum.

Tower assembly manuals often refer to Uniformly Distributed Loads (UDL) when specifying maximum load capacities. This measurement assumes that all weight is evenly distributed across a platform. However, in most cases, this is not the reality. Materials and tools are likely to be concentrated in one area, and operatives may be working together on one side or in a corner of the tower. Any lateral force exerted on the tower can be amplified or offset by these asymmetrical load distributions.

Ways Of Increasing Stability

So, we have now identified aspects of the tower's design and use that may compromise its stability. The next step is to explore the actions that can be taken to reduce or eliminate these issues.

The most common & standard method of increasing the stability of a tower is by using stabilisers. These form part of the standard set of components for any given brand of certified EN 1004 tower. All EN 1004 towers shall be equipped with stabilisers of the appropriate size and quantity, in accordance with the tower's basic design parameters. Once installed, they should be positioned to maximise the footprint of the tower, in both length and width. **All stabilisers that are supplied with a tower are mandatory. These are not optional extras that can be left off during assembly. These must be installed as per the manufacturers instructions.**

In some situations however, installing stabilisers on a tower as per the assembly guide may not be practical or sufficient enough for the task being undertaken on the tower. For example:

- Environmental considerations
- Unusual/uneven loads being imposed on the tower, due to the nature of the work being carried out on it
- The space where the tower is being deployed doesn't permit the stabilisers to be fitted where specified

If any of these circumstances arise, there are several other methodologies to choose from that could be adopted to increase the towers stability. These include:

- Alternative stabiliser designs
- Bracing off adjacent structures
- Buttresses
- Tying In
- Ballast or Kentledge

Alternative Stabilisers

Any certified tower will include stabilisers of a set size for a given height of tower. If, for any of the reasons referred to above, they are insufficient or impracticable, a good starting point is to consider applying larger stabilisers.

Larger Stabilisers

Unless the largest available stabilisers supplied by the manufacturer are already being used, the simplest solution may be to use the next size up.

Larger stabilisers will give a larger base area or footprint. This should improve the tower's stability response to imposed loads.



Rakers

These are essentially even larger stabilisers fabricated using scaffolding components to form an extra-large triangular brace at the corners of the tower. Most tower brands are not really compatible with scaffolding, so it is usually only appropriate to consider this method when using Alto HD towers, which use 48mm diameter extruded tubes for the frame uprights. These frames are capable of accepting traditional scaffold couplers, fitted with the correct torque levels. Rakers can also be particularly useful if the ground adjacent to the tower is at a lower level, making the use of standard stabilisers less practicable.



Bracing off adjacent structures

This technique is based on the assumption that the tower can be used in conjunction with scaffolding elements; however, this is not generally the case for brands other than Alto, due to differences in tube diameter and reduced wall thickness used in their manufacture. It also presumes that there is a convenient adjacent structure capable of withstanding the imposed loads.

Stub Stabilisers

Using two scaffold couplers, loosely connect a horizontal scaffold tube to both uprights on the side or end of a tower. Slide the tube outwards until it presses firmly against the chosen supporting structure. Tighten the couplers to the required torque.

Some types of specialist towers (most commonly stairwell towers) use a purpose-designed lateral stub brace as a standard component to brace off the stairwell walls.



Inverted Stabilisers

If the stabilisers being used are of the triangular type - as used in Alto HD and MD towers - these can be mounted in a reversed position, with the shorter arms at the bottom, and the foot arranged in such a way that it presses against the adjacent structure.

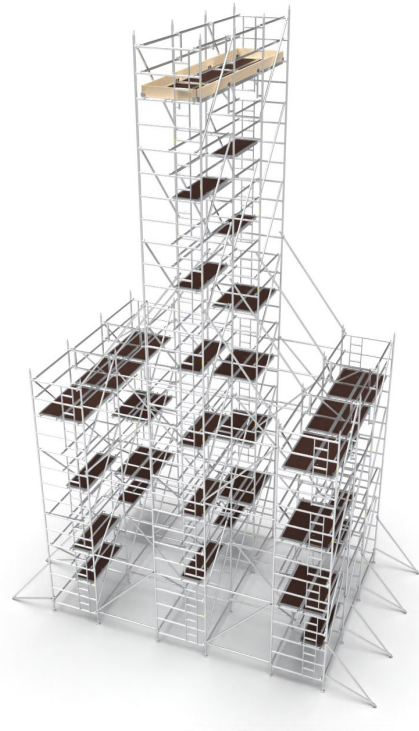


Buttresses

A buttress involves constructing one or more extra tower bays at the base of the main tower to increase its footprint size and its stability. These bays can be constructed either at the sides or ends of the main tower. These additional sections might be only one bay tall or could extend partway up the main tower. The design of a buttress should be undertaken by an engineer to determine the appropriate size for the specific application.

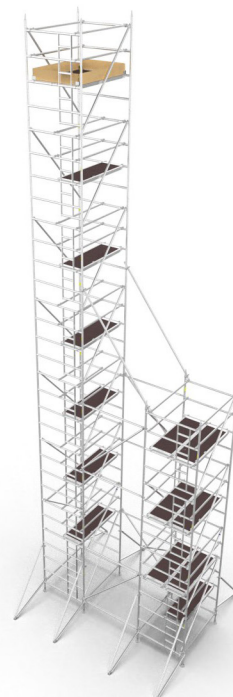
Double Buttress

This method increases the footprint of the tower in one or more directions. Stabilisers can also be added to the buttress corners to increase the footprint size even further.



Tall Tower Buttress

This method is used to reduce the unsupported height of a tall tower. For example, a 16m tower with a 4m buttress on each of its four sides can be considered as a 12m tower for the remaining height. However this method should only be used if the tower design can naturally support the extra loads implied by the increased overall height. Additionally, the top of the buttress bays offers an ideal location to anchor raker ties, that extend further up the central tower, enhancing the rigidity and stability of the entire composite structure.

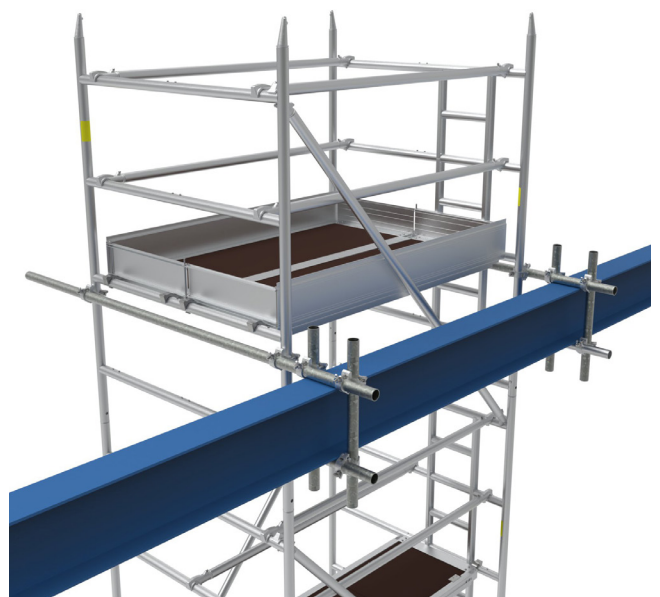


Tying In

Rather than gaining stability by pushing against the ground or an adjacent structure, the alternative approach is to tie the tower to it. **This is a significant technical matter and has its own TBN exploring the technique in more detail.**

For the purposes of this introduction, it is important to note that:

- The structure needs to be strong enough to absorb the forces
- If anchor fixings are to be used, it is vital that the correct ones are chosen and are correctly installed and tested
- The ties need to be rigid both in tension and compression (DO NOT USE ROPE, CHAIN OR RATCHET STRAPS)



Ballast or Kentledge

Most commonly used with standard configurations of cantilever towers as an additional stability solution, adding ballast or kentledge at the base of a tower increases the mass at the base, offsetting the loads and forces applied at the top of the tower.

Ballast or kentledge also applies its force at the base of the tower, i.e., close to the hinge point in relation to the turning moment for overturning forces. As a result, it is relatively inefficient, requiring a substantial mass to counteract even fairly small lateral forces at the top of the tower. Incorporating ballast within a buttress located on the opposite side of the tower is almost always necessary to improve this situation.

Calculation of ballast weights and positions requires quite sophisticated understanding of the particular tower structure and the forces in operation. Ballast will seldom be safe to rely on in isolation. We would recommend always seeking manufacturers' advice if ballast is to be used in anything other than a standard "as per manual" application. Ballast must also be solid – ie not granular or liquid materials. In practice, this makes using ballast quite a difficult material-handling issue as the quantities can be significant – typically in the hundreds of kilograms even for quite modest heights of towers.



In common with all advisory information provided in our technical briefing notes, this document provides only general guidance on the subject. It is not a substitute for appropriate training and qualification. If in doubt, seek advice. The company and the authors disclaim all responsibility for any use made of this information.

If you are using or considering using towers in applications which require adaptation in any way, we strongly recommend obtaining sufficient relevant training to ensure your competence and maximise your safety. You could consider contacting PASMA for more help and support or your tower supplier. For more information on the Alto range of advanced structure solutions, please call 01527 500577 or email sales@altoaccess.com.

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Get in touch today to learn more about how the Alto system can be used to keep you and your colleagues safe whilst working at height.