

## Complex Tower Configurations



# INTRODUCTION

BS EN 1004-1:2020 is the definitive general standard covering prefabricated access towers. However, it only covers mobile towers (i.e. on wheels) of up to 8 metres outdoors and 12 metres indoors. These may be regarded as the standard basic tower, used in a wide variety of situations.

Any structures outside of this description (i.e. any tower which is not a standard straight up tower, on wheels of up to 8 metres outdoors and 12 metres indoors) created using parts from mobile tower systems are regulated by a different standard – BS 1139-6:2022.

In reality there are many applications which call for something more complex than a standard tower. It is also a reality that these applications almost invariably place greater demands on the structure than the majority of simple standard tower uses do.

Just as many tower brands claim to be capable of class 3 loadings, or claim to be compliant with standards – when they really aren't – some towers claim to be able to safely create these types of structure when they are simply not suitable.

This is the territory where Alto HD starts to really show its design and manufacturing credentials. The Alto HD system was designed from the outset by a team of specialists with a wealth of experience in modular scaffolding to have the capacity to execute these structures without compromise.

Complex towers can take a huge variety of forms and are often designed to suit the situation of an individual site. However – there are several basic variants which are referred to in BS 1139-6 and can be considered as categories of complex towers.

These types are as follows:

- Tall Towers
- Cantilever Towers
- Linked Towers
- Bridge Towers
- Large Deck Towers
- Stepped Towers

There are standard manuals for each of these types of towers in Alto HD available from our website. In this document we will set out a basic introduction to each type in turn.

# TALL TOWERS

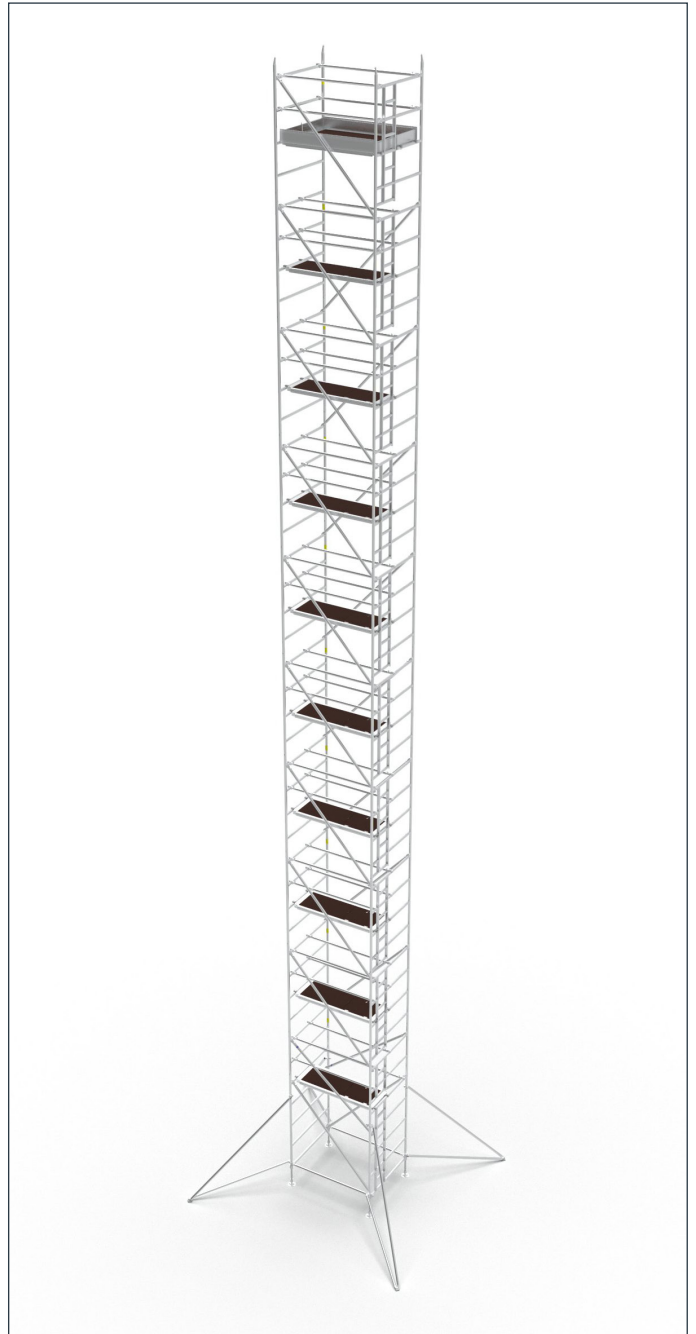
Tall towers are essentially towers that are taller than envisioned in BS EN 1004-1:2020 – most commonly taller than 12m to the topmost platform.

Quite apart from the additional rigidity required to safely engineer taller structures, other towers run out of basic safe working load (SWL) capacity quite rapidly as the tower gets taller.

Thanks to the use of a fully welded construction methodology, 3mm extruded tubes and its nodal bracing design, Alto HD can easily be used in standard form for towers up to 30 metres tall providing appropriate stabilisation measures are taken.

As standard, we issue manuals for double and single width towers to 20m based on stabilization by tying in.

The use of 48mm diameter tubes in our towers means that readily available low-cost standard scaffold fittings can be used to execute the tying in.



# LINKED TOWERS

Joining towers together is one of the basic ways of creating complex towers. Towers joined together “longways” in a tower-bridge-tower-bridge-tower form are commonly used along the frontages of buildings. Sometimes called a façade tower, these allow construction, maintenance or renewal works in a convenient, safe, cost effective manner.

Alto HD linked towers can be built in various forms as wheeled structures, or on base plates, either tied in or with stabilisers. The structures can incorporate ladder or stair access and be double or single width. The suite of parts includes different types of walkthrough frames for both ground and upper levels and toeboard components to allow creation of compliant toeboards for every format of structure.

Separate guidance is available for the safe and compliant creation of façades linked at the corner of buildings. Although not part of the standard linked tower range, structures can also be constructed using span decks to create extremely versatile solutions.



# BRIDGE TOWERS

Bridge towers can be either longitudinal or laterally linked. They are essentially a form of linked tower where the linking platforms are at the top level only.

If access is only required along the length of the structure at the top level, this format uses less components compared to linked towers.

Laterally linked bridge towers are commonly constructed as mobile structures at relatively low levels for internal works. Longitudinally linked bridge towers are more common. They are generally used along the frontage of a building where access is only required at the top level, or access to entrances and exits at ground level needs to remain unobstructed whilst the structure is in situ.



# LARGE DECK TOWERS

Large deck towers are probably the least common of the complex tower applications and essentially provide access to a raised area such as a ceiling so that works can be carried out without relocating the structure part way through the operation.

Structurally, the towers are arranged in parallel runs of bridge towers which are joined together by lateral infill decks at the working level.

The suite of components includes special lateral diagonal braces to ensure that the structure is dimensionally correct and perpendicular at the outset, to ensure that the lateral decks fit correctly. Special decks, infill panels and toeboards provide an uninterrupted compliant work area.



# CANTILEVER TOWERS

Cantilevers are one of the most difficult towers to create safely, as the establishment of an external platform imposes considerable tensions and sway forces in the structure. Alto HD, with its higher resistance to tensile and bending stresses copes with these far better than any other tower.

Side and end cantilevers can be created using double width Alto HD towers safely using standard access brackets and infill plates. Again, complete toeboard sets are available for every format.

A variety of stabilisation methods may be used to ensure the safety of cantilever towers. Examples include tying in; buttresses and butt transoms.



# STEPPED TOWERS



Towers on stepped surfaces or on severely sloping ground can be built using a variety of techniques with Alto HD tower equipment. Alto HD towers can be built in both orientations on stepped structures. Here we see an example tower arranged longitudinally.

Towers can also be built transversely by utilizing drop leg structures incorporating additional standard scaffolding components to produce a safe stable solution.

For confined internal stairwell and lift shaft situations we also have a specialist medium duty stairwell product incorporating walkthrough base frames with removable ladder units.

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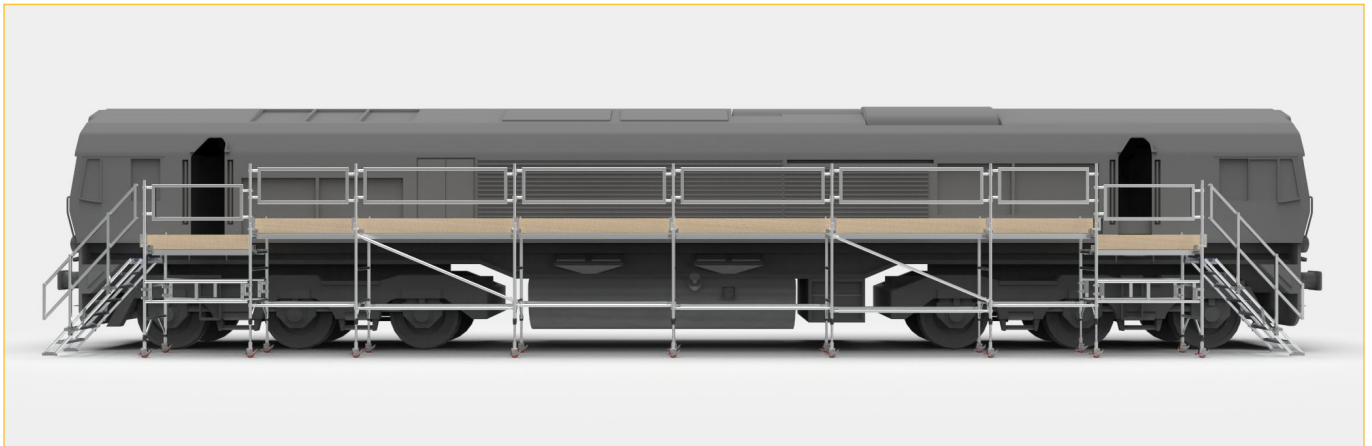
The above are some examples of the standard advanced towers that Alto has created to meet the framework identified by PASMA for the commonest types of advanced towers. These designs are certified as compliant to BS 1139-6 and have specific assembly guides to support users in safe and compliant deployment of the equipment.

Alto can also be used to produce bespoke structures to meet a huge array of requirements. Here are some real-world examples of site specific tower based structures in general construction and maintenance applications.



## CUSTOM APPLICATIONS

The Alto HD tower system is also used in some industry specific applications – particularly in the rail and aerospace industries to create temporary or demountable structures which provide safe access for working at height.



For more information on the Alto range of advanced structure solutions, please call **01527 500577** or

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.

# THE HEIGHT of SAFETY

For further information regarding our range of access products and services, please get in touch with us:

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