

# Tying Mobile Access Towers

Type	Setting Tool	General Application
Through Tie	Spanner	Simple method of tying a tower structure through a window or doorway opening, where these openings remain unsecured. Timber packing between anchor tubes & building should be used to ensure extra rigidity and to protect building walls.
Box Tie	Spanner	Arrangement of tubes formed in square or rectangle around a column or other fixed structure. Timber packing should be used to ensure extra rigidity and to protect column or building structure.
Reveal Tie	Spanner	Used in window recesses when the tube cannot pass through the window or where drilled anchors are not allowed. The anchor tube is wedged between the window frame and is fitted with a jack or reveal pin to allow the tie to be expanded. Timber packing must be used to spread the tie load and protect the building face. Not more than 50% of anchors should be designed as reveal ties. They must be inspected and tightened daily as the reveal screw can slacken with the dynamic forces caused as the structure moves in use.
Expanding Anchor	Spanner/ Special Hammer Set	For use only when it is permitted to drill into the building structure. Various brands are available – either proprietary tie or anchor ring. Provides improved lateral restraint for the forces parallel to the façade. Fixing of the base on insertion of an anchor sleeve into a pre-drilled hole, into which the coupler unit is screwed. Prior to using this type of tie, you must establish that the building material is suitable for drilling this type of anchor. Important – when using this method a mandatory pull-out test must be completed. (The tie hole should be sealed, using mortar, mastic or a plastic plug when the tie has been removed).
Butt Transom	Spanner	Alternative method used when a physical tie cannot be made to the building. Butt tubes, connected to both inside and outside frame verticals of free-standing tower and about the building structure. Correctly installed and positioned stabilisers ensure the structure remains rigid. Must not be used without stabilisers nor beyond the maximum freestanding height of the tower.
Lip Tie	Spanner	An arrangement of tie tubes with the anchor tube positioned behind an upstand beam, wall or horizontal steel channel section to resist outward movement. Tubes are positioned on either side of the upstand to prevent both inward and outward movement. Lip ties must be positioned on each tower leg. Additional arrangements may be needed to prevent lateral, (sideways), movement of the tower.
Use of Girder Couplers	Spanner	Where rolled steel joists (RSJs) form part of the adjacent building structure, girder couplers may be used to anchor the tie to the RSJ. They must always be used in pairs.

Tying in towers should be undertaken only after considering the options outlined in this guidance. The task should be undertaken by operatives who are familiar with the tools and equipment to be used. If you are in any doubt about the suitability of tying methods, you should consult your PASMA supplier, or contact a reputable and professional fixing contractor.

Towers and more complex tower structures utilising tower components should only be assembled, altered and dismantled by trained and competent operatives. PASMA Approved Training Centres offer training courses to equip users to safely assemble alter and dismantle such tower structures. PASMA has published a Code of Practice which should be read in conjunction with this Guidance Note, and produces other publications, DVDs and safety products. Please click on [www.pasma.co.uk](http://www.pasma.co.uk) for further details.

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PASMA, PO BOX 26969, GLASGOW, G3 9DR  
T: 0845 230 4041 F: 0845 230 4042 E: [info@pasma.co.uk](mailto:info@pasma.co.uk) W: [www.pasma.co.uk](http://www.pasma.co.uk)



# Technical / Safety Guidance Note

## GUIDANCE NOTE - TYING MOBILE ACCESS TOWERS

Mobile Access Towers, (towers), should be assembled in accordance with the appropriate and current Manufacturers Instruction Manual, and should comply with current regulations. The instruction manual will indicate the maximum free standing height, (both indoors & outdoors), to which the tower can be safely assembled, under normal conditions, without the need to tie, or secure, to an adjacent structure.

This document has been produced by PASMA to provide guidance to users where a tower is to be tied in to an adjacent structure. Remember that PASMA recommends towers should be tied in whenever possible, as it is good practice to do so. There are circumstances, however, when it is mandatory to tie in; for instance, when the desired height is greater than the maximum free-standing height of the tower, where it is not possible to fully deploy stabilisers or outriggers, or where other circumstances as indicated in the instruction manual are encountered, such as adverse weather conditions. This guidance note identifies the most common tie arrangements for securing towers, including Box Ties, Lip Ties, Through Ties, Expanding Anchor Ties and the use of Girder Couplers.

### IMPORTANT NOTES – Please read carefully

**Before Tying-In**  
Before tying in to any structure, you must establish that the structure is capable of sustaining the loads transferred to it by any form of tie.

**When to Position ties**  
It is essential during the erection of all tied tower structures, that ties must be fitted as soon as each tie level is reached. When dismantling, the same principle applies in reverse - ties must only be removed progressively as the upper sections of the tower have been removed, and the tower height has been reduced.

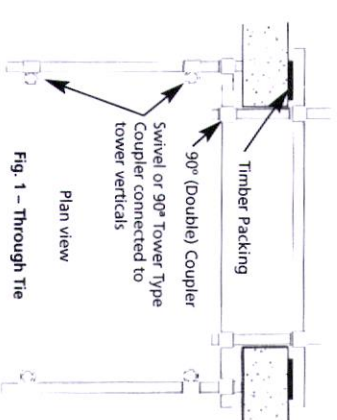
**Tall Structures**  
When erecting tall tower structures, you must ensure the maximum design load of the structure is not exceeded, whether it is tied in or not. Should the tower structure need to be moved or relocated, operatives must ensure the height of the tower is reduced according to PASMA recommendations. (Refer to PASMA Code of Practice)

### Through Tie (Fig.1)

A tube provides the anchor for this type of tie across the inside of an opening in a building or structure such as a window or doorway. Where the anchor tubes are placed vertically they should rest on the floor so that they cannot move downwards. Where the anchor tubes are placed horizontally the tie tubes should ideally rest on the sill.

Timber packing can be used between the anchor tube and the inside face of the building or structure to prevent movement and to protect interior decoration.

The outside tube should be positioned so that it is hard against the face of the building or structure. The tie tubes connecting the Anchor Tube and the Outside tube should be positioned as close to the edges of the opening as possible. (Where timber packing is used it should be regularly inspected to ensure that it has not moved or become loose.)



PASMA, PO BOX 26969, GLASGOW, G3 9DR  
T: 0845 230 4041 F: 0845 230 4042 E: [info@pasma.co.uk](mailto:info@pasma.co.uk) W: [www.pasma.co.uk](http://www.pasma.co.uk)



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## Box Tie (Fig. 2)

This type of tie is provided by an arrangement of tubes, formed in a square or rectangle fitted around a column or similar feature on a building or structure. The tie tubes should be positioned as close to the sides of the column as possible. (Where timber packing is used, it should be regularly inspected to ensure that it has not moved or become loose.)

## Lip Tie (Fig. 3)

These use an L shaped arrangement of tie tubes with the anchor tube positioned behind a feature of the adjacent structure or building to resist outward movement.

Inward movement is resisted by the use of other outside tubes positioned against the outside face of the adjacent structure of the building or by the use of Butt transoms. Lip Ties must always be used as opposing pairs. The tie tubes should be positioned as close to the edges of the opening as possible. (Where timber packing is used it should be regularly inspected to ensure that it has not moved or become loose).

## Reveal Tie (Fig. 4)

The anchor (reveal) tube of a Reveal Tie is fitted with a screw jack (reveal pin) at one end allowing the overall length of the anchor to be expanded. This allows it to fit tightly between opposing faces of an adjacent building or structure. Plates and/or timber packing should be used to spread the load and protect the building faces.

Reveal ties should only make up a **maximum of half** of the ties used to secure a tower to an adjacent building or structure as the security of this type of tie relies on friction to maintain the anchor and any shrinkage of timber packing is critical. All reveal ties should therefore be regularly inspected, on a daily basis.

## Girder Couplers (Fig. 5 & 6)

Where Rolled Steel Joists (RSJ's) form part of an adjacent building structure Girder Couplers may be used to anchor the tie to the RSJ.

The manufacturer's instructions for the use of Girder Couplers must be followed. This type of fitting must always be used in pairs with the fittings opposing each other.

## Expanding Anchor Ties (Ring Ties & Supa Ties)

Expanding anchor ties can only be used where it is permitted to drill into the structure or building, and the manufacturer's instructions must be followed in respect of testing and use. These will usually advise against mounting the fittings too close to the edge of a structure, and, when affixing to brick or block structures, to avoid fixing into the mortar joint or near the edges of the blocks or bricks.

It is also essential to establish that the anchor material is adequate to sustain the loads that will be transferred to it by the tie. This is normally achieved by the use of proprietary test equipment that can apply a proof loading to the anchor.

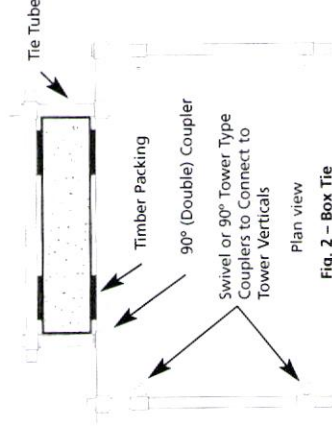


Fig. 2 – Box Tie



Fig. 3 – Lip Tie

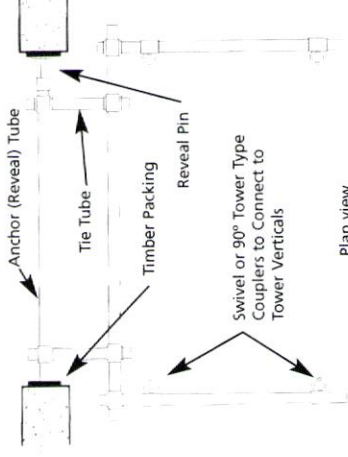


Fig. 4 – Reveal Tie



Fig. 5 – Girder Couplers (vertical)

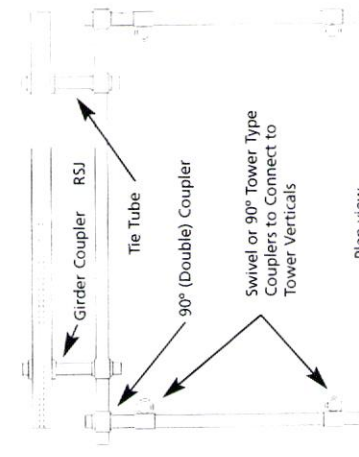


Fig. 6 – Girder Couplers (horizontal)

## Ring Tie (Fig. 7)

The most common type of expanding anchor, this tying method uses two or more rings (aligned horizontally) fixed to the building or structure at each tie level. A horizontal scaffold tube is passed through the rings forming the basis of the tie.

This type of tie requires additional coupler fittings to be attached to the tube which passes through the rings to act as check fittings and prevent lateral movement. They must be positioned accurately, especially where more than 2 rings are used at each level. The tolerance between the ring and scaffold tube will permit a small amount of movement.

## Positioning & Frequency of Ties

All ties should preferably be connected to the inside and outside frame verticals, at both ends of the tower structure, as close to a casting or joint as possible. Generally, ties should be located at intervals of not greater than 4.0 metres.

## Butt Transoms (Fig. 8)

On their own, Butt Transoms are not strictly ties. However, they are often used within tie arrangements and can also be used on free standing towers positioned adjacent to buildings or structure.

## Safe Working Loads

The Safe Working Load, (SWL), on most tie couplers is typically 5kN (c. 500kg). The SWL will be marked on the fitting. However, users should note that the Safe Working Load of a Reveal Tie is only 3.5kN.

## Selection of Ties

A physical tie consists of tubular members – preferably aluminium – used in conjunction with proprietary fittings (see Fig. 9) which are specifically designed for the purpose of tying tower structures to buildings or fixed structures.

## Selection of correct fittings (Fig. 9)

Make sure that the fittings used for tying in towers are suitable for the purpose. The majority of aluminium towers available in the market are manufactured from 50.8mm outside diameter tube. Standard scaffold tube used for the tie is 48.3mm in diameter. Where tying tubes are clamped to the tower, the most suitable fitting will be a 50.8mm x 48.3mm double or swivel coupler. Tower systems manufactured from 48.3mm diameter tube may utilise an ordinary scaffold fitting.

Fittings such as Kee Clamps, putlog couplers and parallel fencing couplers must **not** be used in forming ties.



Fig. 7 – Ring Tie



Fig. 8 – Butt Transom

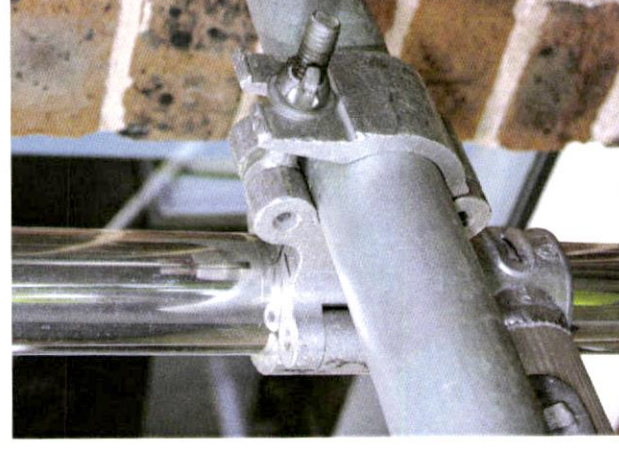


Fig. 9 – Proprietary fitting for use with towers