

# ERNIE ELWELL

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**FAO: Mr. E ABBEY**

23<sup>rd</sup> September 1999

Dear Eric,

**DEBORAH SERVICES  
INITIAL PLANT SERVICES Ltd.**

Please find enclosed your approved copy of the PASMA Course notes for the above company, duly signed.

I have forwarded their copy on to them along with a reminder to sort out the Training Centre matter. I also pointed out that the certificate and brass plaque would not be forwarded until this is resolved.

I trust that this meets with your approval.

Regards,

Yours sincerely,

  
**ERNIE ELWELL**

ITEM NO : 90.031

# Initial

Deborah Services

REGISTERED SPONSORING COMPANY

INITIAL DEBORAH SERVICES



a Rentokil Initial company

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## **INTRODUCTION AND SCOPE OF P.A.S.M.A.**

**P.A.S.M.A. is an association consisting of full members who manufacture Mobile Access Towers (MATs) and who are licensed to manufacture MAT's to BS 1139 Part 3 1994 (HD1004), and which carry the current British Standard Kitemark or equivalent mark of approval (e.g. GS mark etc).**

**The Health and Safety Executive have published a tower scaffold guidance note GS42 which provides users with advice on the use and application of towers within the frame work of the Health and Safety at Work Act and the Construction Working Places Regulations 1996. In due course, we expect this guidance note to reflect the Construction (Health and Safety and Welfare) Regulations 1996, which revoke the 1966 regulations.**

**Where the regulations are in variance P.A.S.M.A. advises that the highest feature of safety is used. Therefore the P.A.S.M.A. Code of Practice has been written to particularly take account of the latest British / European Standard requirements.**

**This P.A.S.M.A. Code of Practice mainly relates to free-standing access towers manufactured from prefabricated components where the principal structural materials are aluminium alloys or glass fibre.**

**This type of prefabricated aluminium alloy tower system can also be assembled to form continuous façade scaffolds and special structures such as portal frames, bridges etc. but these special structures are outside the scope of this Code of Practice and users must consult their supplier for further information.**

## **INTRODUCTION AND SCOPE OF P.A.S.M.A.**

The scope of BS 1139 Part 3 1994 (HD1004) is limited to standard mobile prefabricated towers of height from 2.5m to 12m (indoors) and from 2.5m to 8m (outdoors).

This P.A.S.M.A. document is a code of practice and should be used in conjunction with the appropriate manufacturers instruction manuals. Their instructions are written in conformity with BSEN 1298, which is the British/European Standard covering the rules and guidelines for the preparation of instruction manuals for aluminium towers

## **COURSE OBJECTIVES**

**The course involves practical hands on sessions and a written exam to test your understanding of safe principles involved.**

**Trainees will demonstrate that they can erect/dismantle an aluminium access tower in accordance with the manufacturers erection guide.**

**Trainees to successfully complete a written examination which consists of 30 questions. The required pass mark is 88% i.e. 26/30, some important questions must be answered correctly.**

**Delegates will be issued with a copy of the course notes.**

**Successful delegates will be issued with a numbered P.A.S.M.A. Certificate and Competency I.D. card, forwarded to the employer (valid for 5 Years).**

**Successful delegates will also be issued with current P.A.S.M.A. Code of Practice for reference.**

## HEALTH AND SAFETY AT WORK ACT 1974

- Introduced various pieces of legislation into the legal frame work.
- Laid down certain duties on to various people such as employers, employees and directors whilst at work.

## THE HEALTH AND SAFETY EXECUTIVE

- Is a government appointed body to act as an enforcing authority and is responsible for enforcing the regulations and other relevant statutory provisions.
- It is responsible for appointing health and safety inspectors to ensure compliance.
- It may obtain any information it needs to carry out its duties.
- It may in initiate legal proceedings in the Crown Court or Magistrates Court.



## **SUMMARY OF THE RELEVANT STATUTORY INSTRUMENTS, STANDARDS AND RECOMMENDATIONS**

Mobile Access Towers are subject to one or more of the following sets of regulations. The same regulations could also affect the suppliers, users or any one who controls the way in which the work is carried out.

### HEALTH AND SAFETY AT WORK ACT Etc 1974

Section 6 places duties on the manufacturer and supplier of any articles to ensure that they are so designed and constructed to be safe when being set up, maintained and used by a person at work e.g.

- Equipment must be supplied with adequate information about the use for which they are intended and about any conditions necessary to ensure that they are safe for use without risks to health.

Section 7 states that every employee must take reasonable care for their own Health & Safety and that of others.

- They must also co-operate with their employer or any other person who has to comply with any relevant statutory duties.

Section 8 requires that no person shall interfere with any safety device or anything provided in the interests of health & safety.

Be aware that if an accident occurs, you and your fellow employees could be held legally responsible.

## CONSTRUCTION (HEALTH, SAFETY & WELFARE) REGULATIONS 1996

A mobile tower comes within the scope of these regulations and the relevant sections would apply to anyone constructing or using mobile towers.

- Every employer whose employees are carrying out construction work and every self employed person to comply with the provisions of these regulations insofar as they affect him or any person at work under his control or related to matters which are within his control.

## MANAGEMENT OF HEALTH & SAFETY AT WORK REGULATIONS 1992

- Every employer or self employed person shall make a suitable and sufficient assessment of the risks to health and safety of his employees whilst they are at work.
- Assess the risks to health and safety of persons not in his employment arising from the conduct of his undertaking.

## PROVISION AND USE OF WORK EQUIPMENT REGULATIONS 1998

- The requirements imposed by these regulations on an employer shall apply in respect of work equipment provided for use by any of his employees who is at work.
- The regulations imposed on the employer also apply to:  
  
Self employed persons in respect of the work equipment he uses at work to any person who has control to any extent of the premises and the equipment used in that place, or with the carrying on by him of a trade, business or any undertaking (whether for profit or not)

## MANUAL HANDLING OPERATIONS REGULATIONS 1992

- Every employer shall: -
- Avoid the need for his employees to undertake any a manual handling operations at work which involves a risk of their being injured.
- Where this is not possible to avoid, the employer must make a suitable and sufficient assessment of the risks, take appropriate steps to avoid the risk of injury to the employee and reduce the them to the lowest possible level.
- Where possible provide the employee with information on the size, weight etc.

## PERSONAL PROTECTIVE EQUIPMENT AT WORK REGULATIONS 1992

- Having considered all other options to reduce risks to the lowest possible level, as a last resort the employer has a duty to provide personal protective equipment such as safety helmets and safety harnesses.
- The employee has a duty to use personal protective equipment which has been provided by the employer. The employer must provide sufficient instruction and training to enable the safe use of personal protective equipment.

## REPORTING OF INJURIES, DISEASES & DANGEROUS OCCURRENCES REGULATIONS 1995

- Employers and self employed persons are required to report accidents at work in accordance with the relevant schedule of the regulations to the HSE.

## HEALTH AND SAFETY IN CONSTRUCTION HS (G) 150

- This is a guidance document prepared by the HSE with the aim of helping all those involved in construction to identify the main causes of accidents and injuries and how to eliminate them.

## **STANDARDS**

### **BRITISH STANDARD 1139 PART 3 : HD 1004 1992**

- Contains recommendations for the design and performance of aluminium alloy towers. Towers supplied by P.A.S.M.A. member companies conform fully with these requirements and are marked with the British Standard Kitemark of Approval or equivalent.

### **BS EN1298**

- Contains Rules and Guidelines for the preparation of instruction manuals.

### **HSE GUIDANCE NOTE GS42 1987**

- Contains recommendations for the safe use of aluminium towers.

The Construction (Health , Safety & Welfare) Regulations 1996, require that the installation or erection of Mobile Aluminium Towers (MAT's) should be carried out only under the supervision of a competent person. A competent person is considered to be a person possessing such training, technical knowledge or experience as may be appropriate having regard to the nature of the activity.

Under Health & Safety legislation manufactures and suppliers must provide information which enables their product to be safely used by competent people, e.g. erection guides for alloy towers.

It is very important that the instruction/erection assembly manual is specific to the brand and type of mobile aluminium tower which is in use at the time.

## TOWER CONFIGURATIONS

3 typical types of MAT are available.

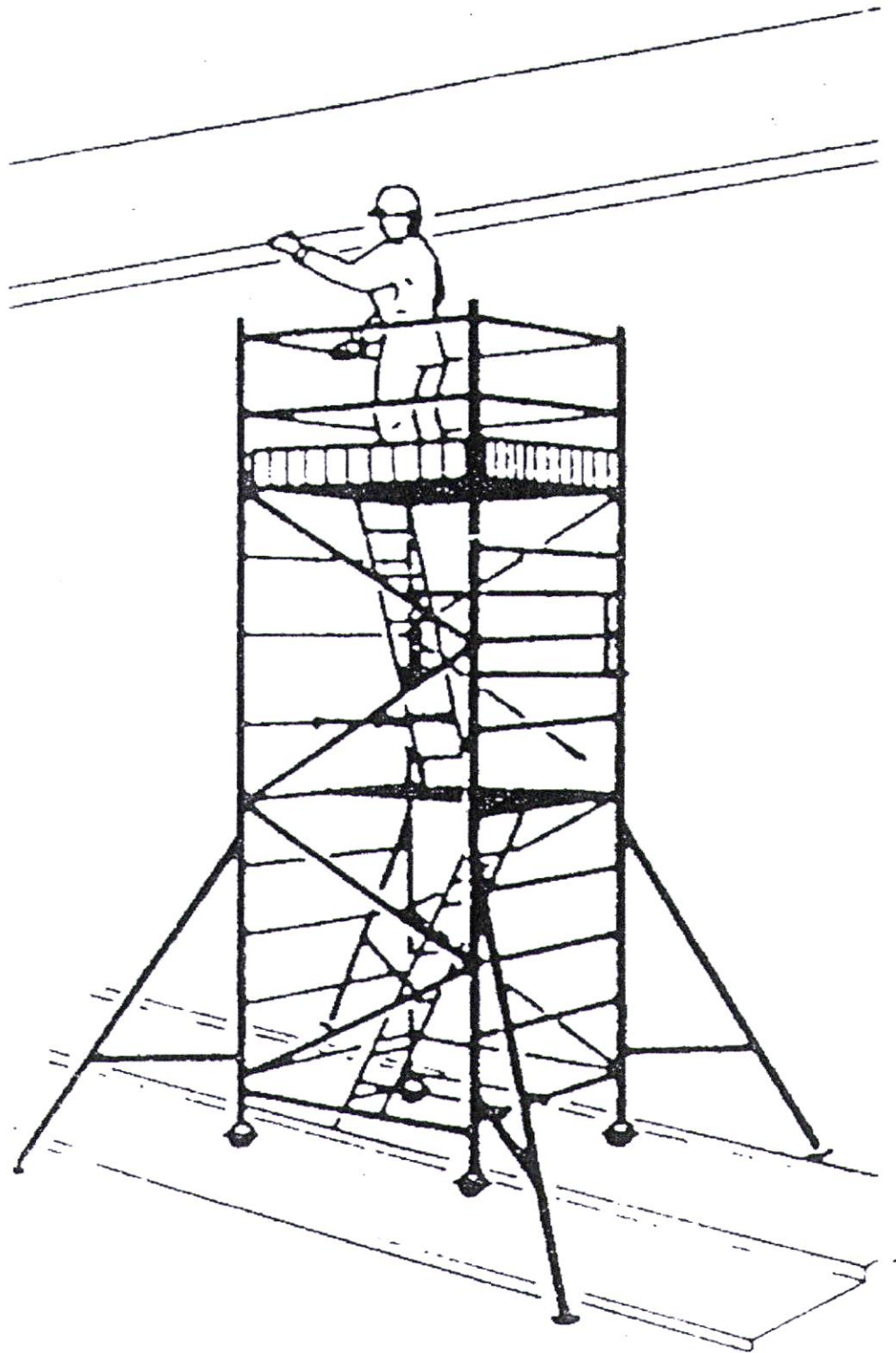
Span tower complete with inclined ladder access.

Ladderspan tower complete with built in vertical ladder access.

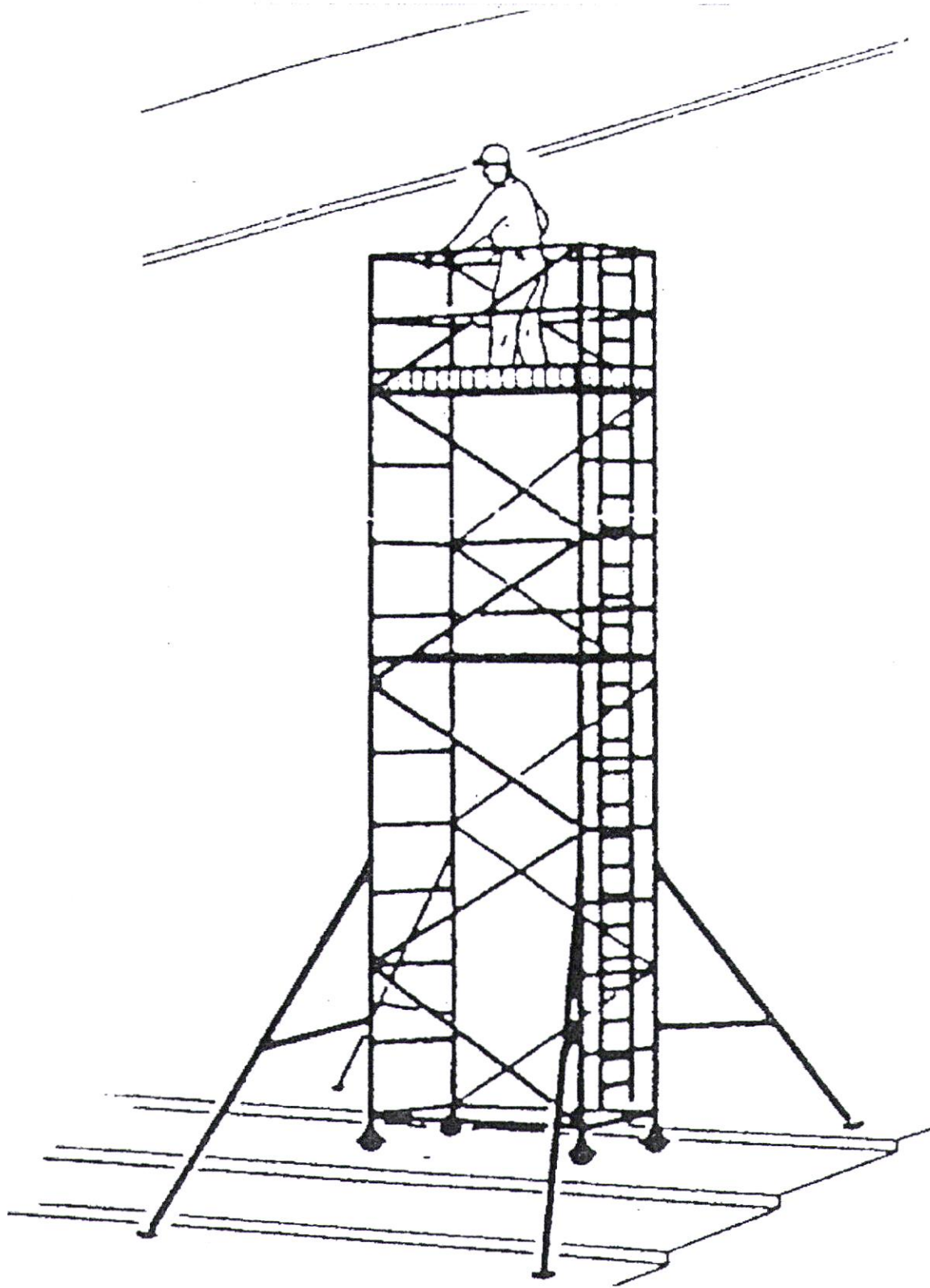
These towers are typically available in two widths – 0.8m and 1.4m, and in three platform lengths – 1.8m, 2.4m x 3.0m.

A third type of tower available is the stairway or stair ladder type, typically available with a base are 1.4m x 1.8m.

PLEASE SEE FOLLOWING DIAGRAMS.

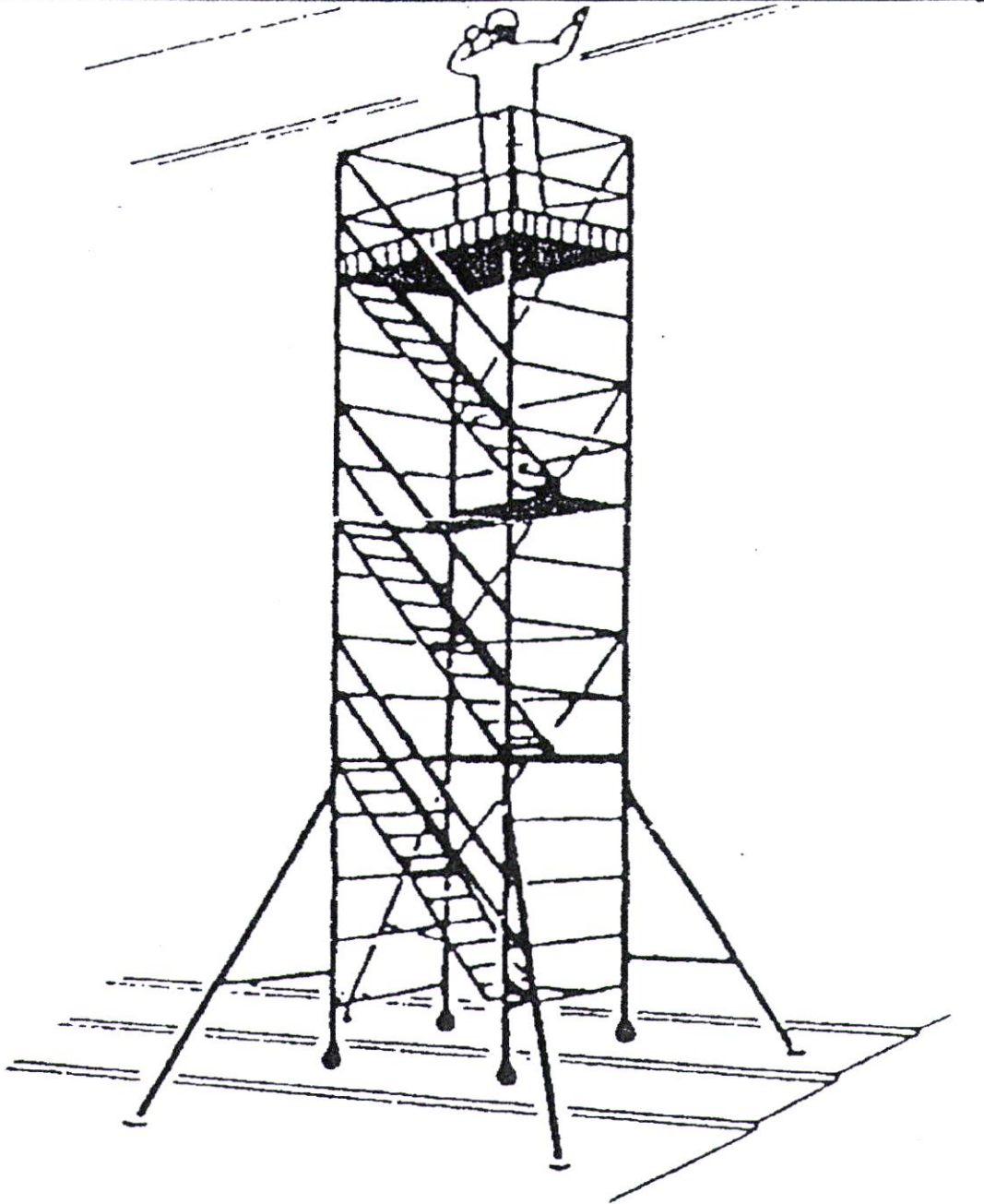


**INCLINED STAIR LADDER ACCESS  
FIXED LENGTH**



VERTICAL LADDER ACCESS





## STAIRWAY LADDER ACCESS

## **COMPONENTS**

The type of components used for the construction of a tower must be compatible.

They should be from the same supplier

They should be those recommended for the particular tower configuration.

Components should be inspected for damage prior to assembling a mobile aluminium tower.

Never attempt to make up differences by the use of alternative suppliers parts or random scaffold tubes, couplers or scaffold boards etc.

It is, therefore, important that all components, are identified correctly and that their use is understood.

The following diagrams illustrate the major components used in the construction of mobile access towers.

## IDENTIFICATION OF COMPONENTS

### CASTORS

- available in 150mm and 200mm diameter
- safe working load of 750kg
- should be used on firm ground only
- should always be locked unless moving the tower

### BASE PLATES

- normally used where tower is not required to move  
e.g. where tower is erected on a tiered surface

### ADJUSTABLE LEGS

- will accept a castor or base plate
- should be used for leveling the tower, not to gain extra height
- when erecting a tower one leg should remain fully retracted
- a mechanism prevents the adjustable leg from falling out of the frame
- some legs have a quick release mechanism for rapid adjustment, others have a turning collar for infinite adjustment

### DOUBLE WIDTH FRAMES

- generally 1.4m wide
- available in 2 rung to 6 rung height range
- will accept two standard platform boards side by side one of which must have trapdoor access.

## SINGLE WIDTH FRAMES

- generally 0.85m wide
- available in 2 rung to 6 rung height range
- will accept one standard platform board which must have trapdoor access.

## INTEGRAL LADDER FRAME

- includes a built in ladder section for access
- available in 2 rung to 6 rung height range

## GUARDRAIL FRAMES

- supplied either as dedicated frame to suit width of tower.
- otherwise formed by allowing sufficient frame height above platform level to meet guardrail height requirements.

## HORIZONTAL BRACES

- have locking hook mechanism which engage with horizontal or vertical frame members
- are the same length as platform boards
- hook mechanism should face outwards when located on vertical frame member

## DIAGONAL BRACES

- similar to horizontal braces
- available in different lengths to suit length of tower

## VERTICAL CLIP IN LADDERS

- ladder section designed to clip vertically onto frame members internally to provide access

## 45 DEGREE STAIR LADDERS

- stairway ladders locate in towers at 45 degree angle complete with bannister type brace.

## 16 INCLINED STAIR LADDERS

- stair ladders complete with lower platform tread and steps.

## STANDARD PLATFORMS

- generally available in 1.8m, 2.4m and 3.0m lengths
- include hooks at each end to locate onto the horizontal members of frames
- include wind lock device which should be engaged
- slip resistant decking (BS1139), all have Maximum Design Load (MDL) Uniformly Distributed Load (UDL) irrespective of length

## SMALL HATCH PLATFORMS

- available in lengths as above
- provide access to the working level through a hatch – min. size 400mm x 600mm
- the hatch was designed for vertical access

## FULL HATCH PLATFORMS

- designed for use with type of towers where stairway or stepladder access is installed.
- allows access to fully boarded out working platform
- Hinge must be located on outboard side.

## TOEBOARDS

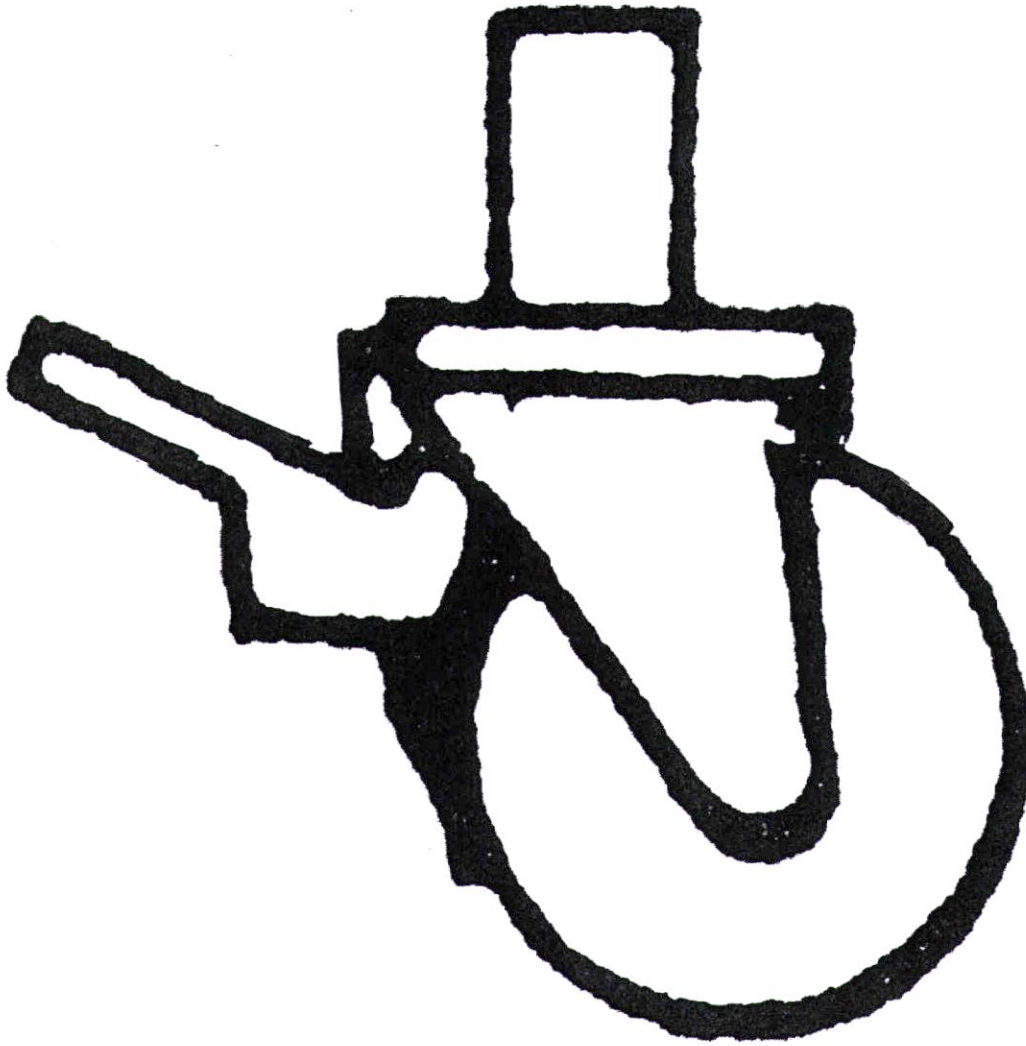
- available as hinged set or by individual length to suit platform size and width of tower frame.
- minimum height must be 150mm.

## STABILISERS

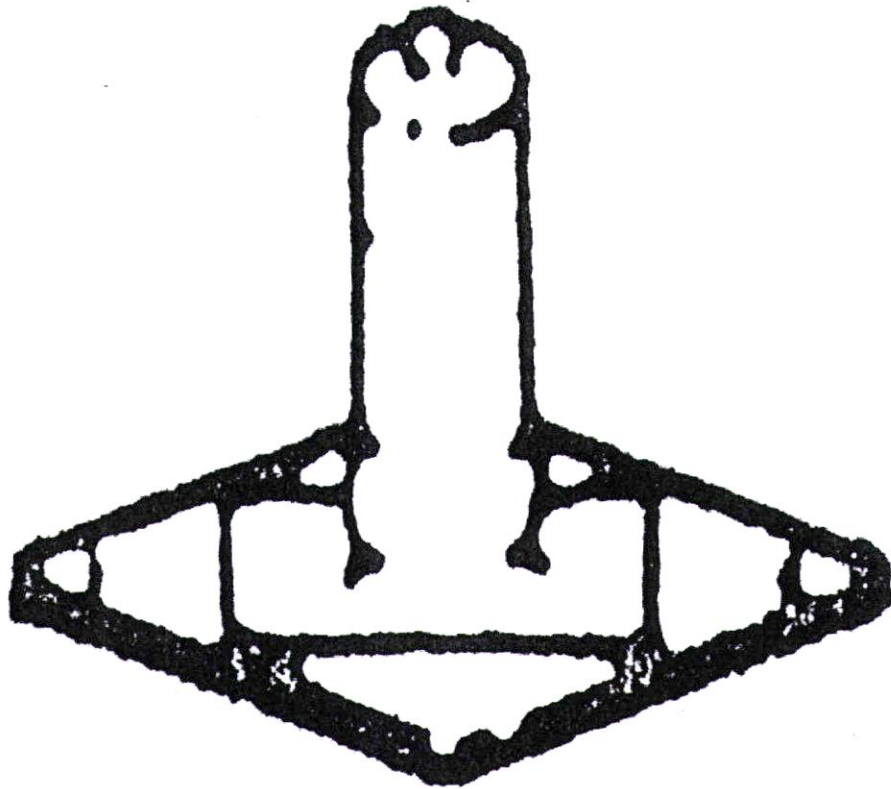
- have pad feet – non mobile.
- available as a fixed length (standard) or as telescopic which should be extended to full length when in use.
- stabilisers should be fitted to the tower as soon as possible after the first lift has been erected.

## OUTRIGGERS

- have adjustable legs, castors and bracing, therefore, mobile.
- this provides an advantage when a tower is frequently moved.

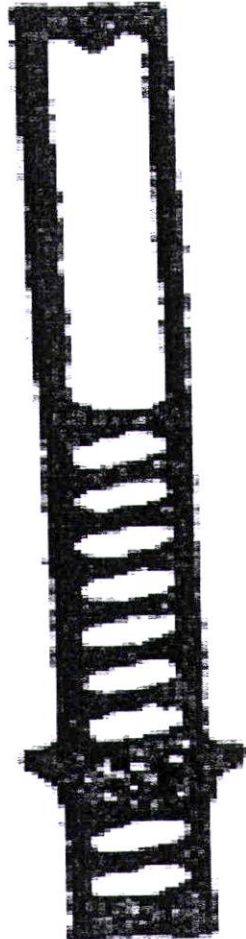


- **CASTORS**
- AVAILABLE IN 150MM AND 200MM DIAMETER
- SAFE WORKING LOAD OF 750KG
- SHOULD BE USED ON FIRM GROUND ONLY
- SHOULD ALWAYS BE LOCKED UNLESS MOVING TOWER

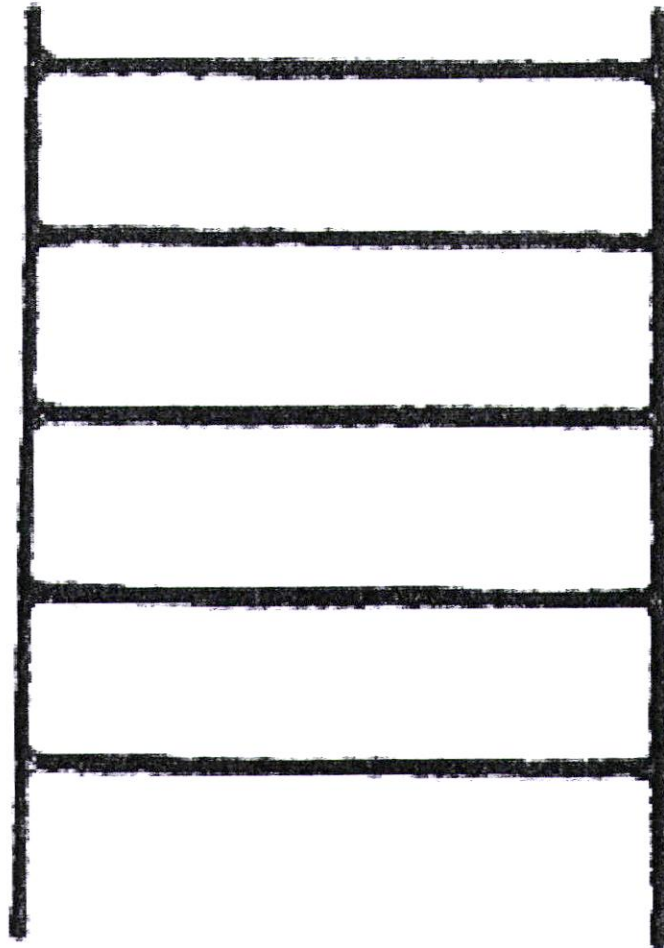


- **BASE PLATES**
- NORMALLY USED WHERE TOWER IS NOT REQUIRED TO MOVE
- E.G. WHERE TOWER IS ERECTED ON A TIERED SURFACE

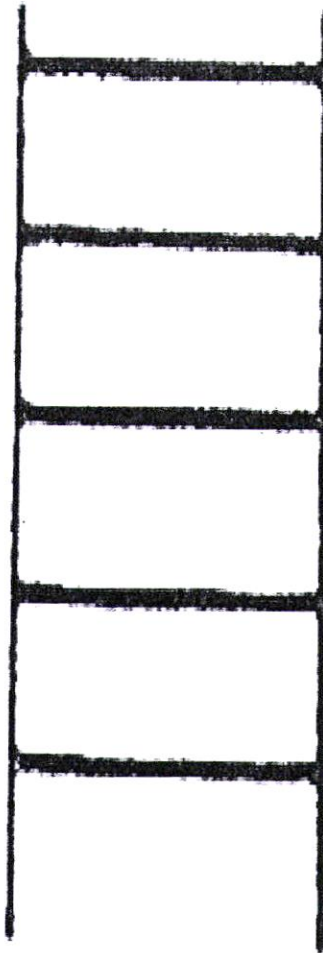




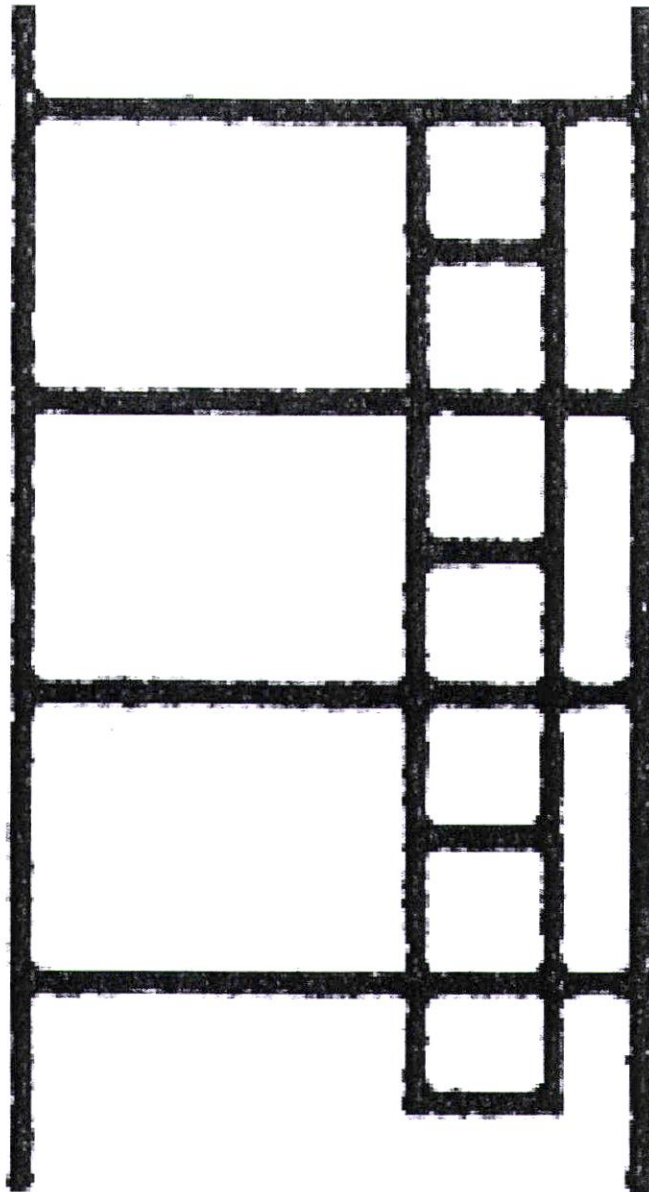
- **ADJUSTABLE LEGS**
- WILL ACCEPT A CASTOR OR BASE PLATE
- SHOULD BE USED FOR LEVELING THE TOWER, NOT TO GAIN EXTRA HEIGHT
- WHEN ERECTING A TOWER ONE LEG SHOULD REMAIN FULLY RETRACTED
- A MECHANISM PREVENTS THE ADJUSTABLE LEG FROM FALLING OUT OF THE FRAME
- SOME LEGS HAVE A QUICK RELEASE MECHANISM FOR RAPID ADJUSTMENT, OTHERS HAVE A TURNING COLLAR FOR INFINITE ADJUSTMENT



- **DOUBLE WIDTH FRAME**
- GENERALLY 1.4M WIDE
- AVAILABLE IN 2 RUNG TO 6 RUNG
- WILL ACCEPT TWO STANDARD PLATFORM BOARDS SIDE BY SIDE ONE OF WHICH MUST HAVE TRAPDOOR ACCESS
- SLIP RESISTANT DECKING (BS1139), ALL HAVE MAXIMUM DESIGN LOAD (MDL) UNIFORMLY DISTRIBUTED LOAD (UDL) IRRESPECTIVE OF LENGTH



- **SINGLE WIDTH FRAMES**
- GENERALLY 0.85M WIDE
- AVAILABLE IN 2 RUNG TO 6 RUNG HEIGHT RANGE
- WILL ACCEPT ONE STANDARD PLATFORM BOARD WHICH MUST HAVE TRAPDOOR ACCESS
- SLIP RESISTANT DECKING (BS1139) ALL HAVE MAXIMUM DESIGN LOAD (MDL) UNIFORMLY DISTRIBUTED LOAD (UDL)



- **INTEGRAL LADDER FRAME**
- **INCLUDES A BUILT IN LADDER SECTION FOR ACCESS**
- **AVAILABLE IN 2 RUNG TO 6 RUNG HEIGHT RANGE**

# BRACES



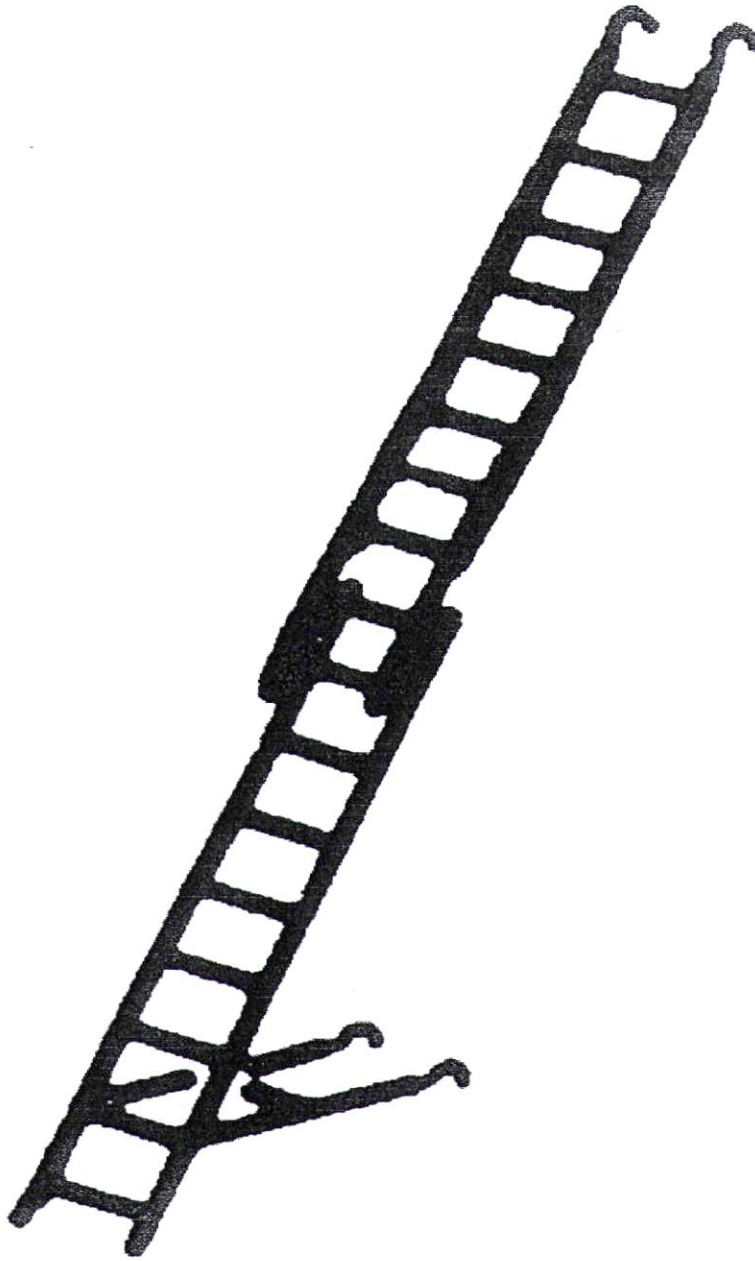
- **HORIZONTAL BRACES**
- HAVE LOCKING HOOK MECHANISM WHICH ENGAGE WITH HORIZONTAL OR VERTICAL FRAME MEMBERS
- ARE THE SAME LENGTH AS PLATFORM BOARDS
- HOOK MECHANISM SHOULD FACE OUTWARDS WHEN LOCATED ON VERTICAL FRAME MEMBER



- **DIAGONAL BRACES**
- SIMILAR TO HORIZONTAL BRACES
- AVAILABLE IN DIFFERENT LENGTHS TO SUIT LENGTH OF TOWER

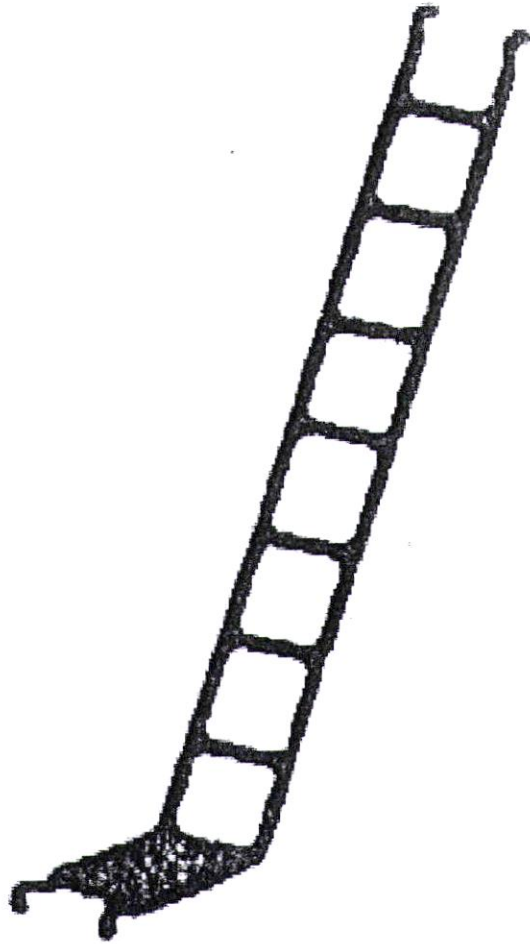


- **VERTICAL CLIP IN LADDERS**
- LADDER SECTION DESIGNED TO CLIP VERTICALLY ONTO FRAME MEMBERS INTERNALLY TO PROVIDE ACCESS



## EXTENDING INCLINED LADDER

- TOP OF LADDER LOCATES BENEATH HATCH PLATFORM VIA LADDER HOOKS
- BASE OF LADDER LOCATES BY CLIP IN STAND-OFF ARMS
- LADDER IS EXTENDED TO SUIT HEIGHT REQUIRED



- **45 DEGREE STAIR LADDERS**
- STAIRWAY LADDERS LOCATE IN TOWERS AT 45 DEGREE ANGLE COMPLETE WITH BANNISTER TYPE BRACE
- STAIR LADDERS COMPLETE WITH LOWER PLATFORM TREAD AND STEPS



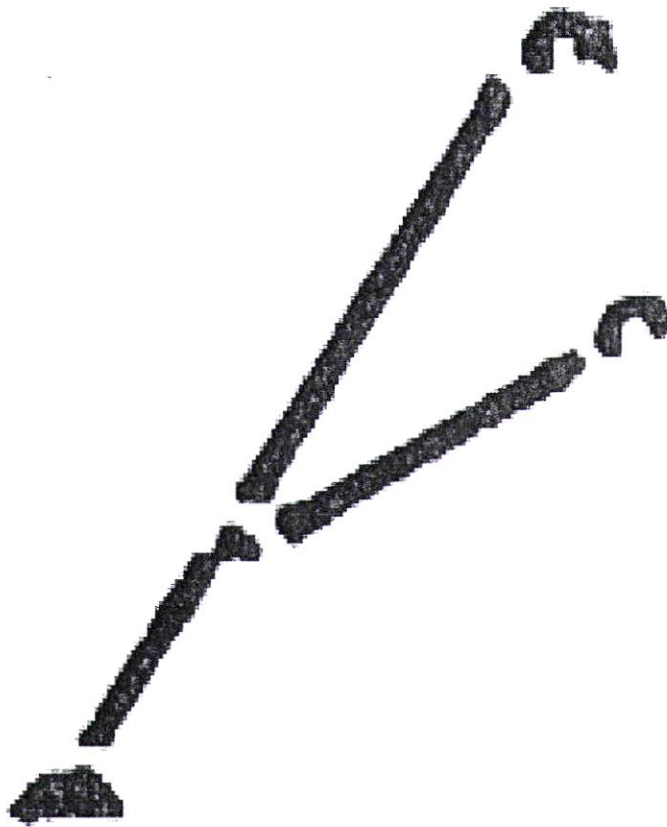
# PLATFORMS



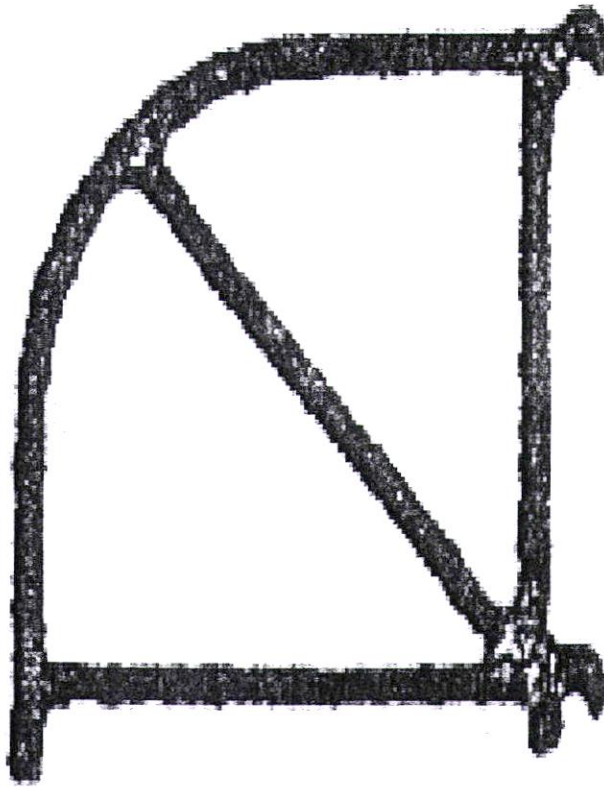
- **STANDARD PLATFORMS**
- GENERALLY AVAILABLE IN 1.8M, 2.4M AND 3.0M LENGTHS
- INCLUDE HOOKS AT EACH END TO LOCATE ONTO THE HORIZONTAL MEMBERS OF FRAMES
- INCLUDE WIND LOCK DEVICE WHICH SHOULD BE ENGAGED
- SLIP RESISTANT DECKING (BS1139) ALL HAVE MAXIMUM DESIGN LOAD (MDL) UNIFORMLY DISTRIBUTED LOAD (UDL) IRRESPECTIVE OF LENGTH

- **SMALL HATCH PLATFORMS**
- AVAILABLE IN LENGTHS AS ABOVE
- PROVIDE ACCESS TO THE WORKING LEVEL ABOVE THROUGH A HATCH – MIN SIZE 400MM x 600MM

- **FULL HATCH PLATFORMS**
- FOR USE WITH TYPE OF TOWERS WHERE STAIRWAY OR STEPLADDER ACCESS IS INSTALLED
- ALLOWS ACCESS TO FULLY BOARDED OUT WORKING PLATFORM



- **STABILISERS**
- HAVE PAD FEET – NON MOBILE
- AVAILABLE AS A FIXED LENGTH (STANDARD) OR AS TELESCOPIC WHICH SHOULD BE EXTENDED TO FULL LENGTH WHEN IN USE
- STABILISERS SHOULD BE FITTED TO THE TOWER AS SOON AS POSSIBLE AFTER THE FIRST LIFT HAS BEEN ERECTED



- **OUTRIGGER**
- HAVE ADJUSTABLE LEGS, CASTORS AND BRACING, THEREFORE MOBILE
- THIS PROVIDES AN ADVANTAGE WHEN A TOWER IS FREQUENTLY MOVED

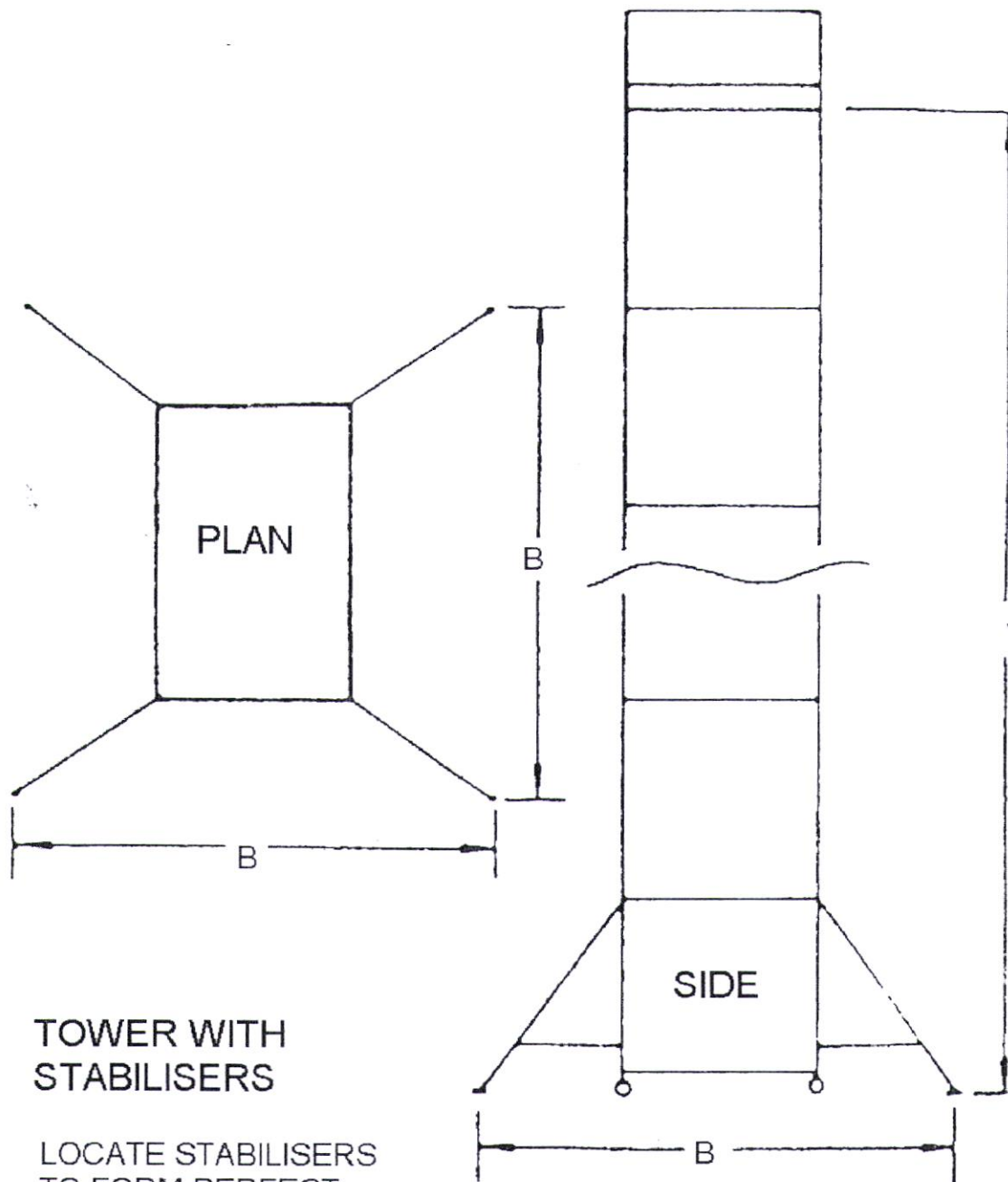
## **STABILITY**

The height of a tower affects its stability.

The effective base dimension of the tower is the smaller of the base dimensions of the tower when measured between the castors/base plates or between the stabiliser/outrigger feet when they are being used on a tower.

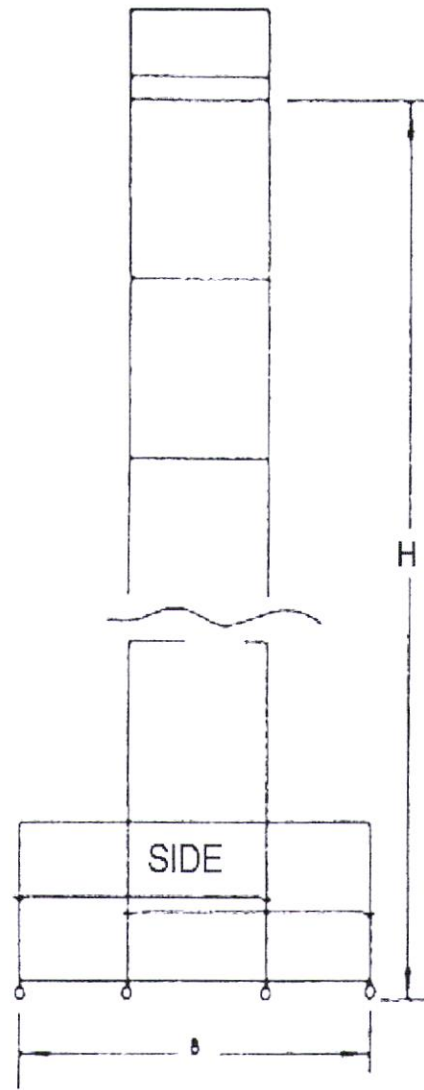
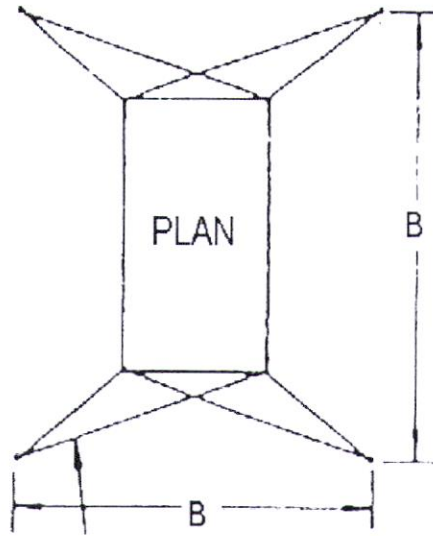
The effect of using stabilisers or outriggers is to increase the effective base dimension of the tower, therefore increasing stability.

The following illustrations show the optimum method of use for stabilisers and outriggers.



**TOWER WITH  
STABILISERS**

LOCATE STABILISERS  
TO FORM PERFECT  
SQUARE TO GIVE  
OPTIMUM STABILITY



**TOWER WITH  
OUTRIGGERS**

OUTRIGGERS  
REQUIRE PLAN  
BRACING TO ENSURE  
RIGIDITY

## HEIGHT CALCULATIONS

It is no longer appropriate to apply the traditional measure of 3 x minimum base dimension for external use (or 3.5 for internal use)

The recommendation now is to refer to the suppliers assembly instructions which will show the quantities of material required for each height of tower and the stabiliser requirements.

As a general rule, stabilisers or outriggers will be required once a tower has been built beyond its first frame level.

## SAFE WORKING LOADS

The suppliers instructions manual (erection guide) will give the maximum loads that the tower can support.

They will show the Maximum Design Load (MDL) that can be supported on any one platform and the maximum design load that can be supported by the tower as a whole – i.e.

The sum of the working loads + the sum of the tower self weight = the total load as a whole.

Generally,

A standard platform has a typical SWL of 250-Kg (U.D.L.) e.g. 2 men and light tools

A complete tower structure has a typical SWL of 750 Kg (U.D.L.).

The net maximum design load (load capacity) is calculated by deducting the total self-weight of the tower components from the maximum design load of the tower structure.



## WIND

Wind imposes a horizontal load on a mobile tower tending to overturn it. In normal safe working conditions this tendency is counteracted by the self weight of the tower and the stabilising effect of any outriggers or stabilisers.

If the wind speed should exceed 17mph (Beaufort Scale 4), you should cease to work upon the tower.

The following is a guide to assessment of wind speeds: -

Wind description	Beaufort scale	Beaufort No	Speed in Mph	Speed in meters/s
Medium breeze	Raises dust and loose paper, small branches are torn off	4	8 – 12	4 – 6
Strong breeze	Large branches in motion, telegraph wires whistle	6	25 – 31	11 – 14
Gale force	Twigs snap off Walking is difficult	8	39 – 46	17 – 21

If the wind speed is forecasted to reach 40mph, the tower should be dismantled.

Other horizontal loads can also act upon a mobile tower such as: -

- When using hand tools e.g. Drilling
- Water jetting
- Shot blasting

- **Such forces should be avoided as much as possible and in no circumstances should they exceed 20kg (44 lbs) on a free standing tower.**

**Be cautious about the use of towers in open ended buildings such as hangars or unclad structures where the wind may create a funneling effect.**

**Never sheet a free standing tower with tarpaulin etc.**

## ERECTION GUIDELINES

### METHOD STATEMENT

A method statement must be written to guide a person in how to perform the required task.

This may include the following for example: -

- Access / egress to the workplace
- Number of people employed to carry out the task
- Any safety precautions necessary is highlighted by a risk assessment.
- The general principle to abide by before erecting a mobile tower is that if you cannot do what is dictated by safety considerations. Do not do the job until you have sought advice from your employer.

## PRE- ERECTION SURVEY

When ordering a tower, remember to :-

- specify either double (1.4m) or single (0.85m) width.
- specify mobile or static.
- specify the platform height or the working height
- specify the platform length (1.8m/6ft., 2.4m./8ft, 3m./10ft.)
- check loading capacity for suitability.

Once the height and the platform area of the tower is established, and that the loading capacity is suitable, refer to the instruction manual/erection guide to identify the number of components required.

Check that ground conditions are firm and level.

Sole boards may be required under castors, base plates, stabiliser feet and outriggers.

In the case of mobile towers, check any intended route on site for potholes, ducts, kerbs, trenches and overhead obstructions.

Check all components for compatibility ( all made by the same manufacturer ), any damage and quantity by referring to the suppliers checklist e.g. delivery ticket.

## ERECTION/ DISMANTLE CHECKLIST

Inspect all tower components before erection commences.

## HOW MANY PEOPLE ARE REQUIRED?

- Although it is possible for a single person to erect low level aluminium towers, we recommend that 2 people are needed to erect and dismantle any tower over 2m high.

## ERECTION PROCEDURE

1. Site survey, risk assessment.
2. Erect base section in accordance with the erection guide.
3. Locate tower in working position, lock castors and level tower.
4. If using, fit stabilisers/ outriggers at this stage. Locate in accordance with the manufacturers erection guide. Obtain the maximum extension on stabiliser by having the lower arm as close to horizontal as possible.
5. Position temporary platform deck at mid frame height to locate additional frames.
6. Use rope to pull up components from floor level.
7. Locate additional bracing and ladder access as required by erection guide. Move temporary handrail braces up as erection proceeds.

## ERECTION PROCEDURE cont.

8. Locate guardrail frames and braces before locating top working platform level.
9. Locate first top working platform deck.
10. Stand on this deck to complete guardrails if necessary.
11. Locate second top platform deck if double width tower is being erected.
12. Locate toe boards to working platform level

## REMEMBER

- **Ensure correct instruction manual/erection guide is available prior to any tower being built.**
- **Fit temporary handrail braces across any open gaps whilst erecting towers.**
- **Locate interlocking frame clips immediately after placing one frame on top of another.**
- **When using trap platform, make sure the hinge side is on the outboard side of the tower.**
- **Never over reach / over balance.**
- **Never climb up the outside of a mobile tower. Personal access should be via the method advocated by the manufacturer, but ALWAYS on the inside.**
- **The distance to the first step or rung of the ladder access in use should not exceed 400mm (16ins) unless the first step is to a platform when it should not exceed 600mm (24ins).**
- **Towers should be tied in to a rigid structure wherever and whenever possible, preferably using tube and fittings.**
- **Refer to the instruction manual/erection guide to establish at what height the tower must be tied in.**

**CHECK BEFORE USING TOWER, OR WHEN ERECTING A TOWER OR AFTER A TOWER HAS BEEN MOVED THAT: -**

- The tower is square
- The tower is vertical from all sides.

When erecting towers, care should be taken to position towers in accordance with the manufacturers erection guide. Be aware that some platform units have offset platform latches.

When erecting towers platforms should be roped up the inside of the tower. If platforms are being raised manually then the face of the platform should be rested against the tower frame.

When raising/lifting a trap platform, check that the trapdoor is locked and that it is at the lower end of the platform.

When lifting platform from the ground, remember to keep a straight back and bend the knees.



## DISMANTLING PROCEDURES

- **Inspect tower before dismantling. Check that bracing is located properly and that stabilisers/outriggers are in contact with the ground.**
- **Follow steps 1 to 12 in reverse order.**
- **Pass components down the tower or use rope to lower them.**
- **Never use force on components**
- **Ensure braces are kept in line when one end has been removed.**

## TYING IN METHODS

Various methods of tying in mobile towers may be used.

The following diagrams illustrate the various approaches to tying in mobile towers.

A brief description of each method is: -

### REVEAL TIES

Formed by attaching the mobile tower to the building by means of a tube wedged or jacked tight between two opposing faces of a building surface e.g. a window opening.

As this type of tie relies upon friction, reveal ties should only form a maximum of 50% of all ties used in a particular situation.

### THROUGH TIE

Formed by tube and fitting located through an opening in a building.

### SUPA TIES/RING BOLT

Formed by the use of a sleeve which is secured into the building structure and a bolt which locates into the sleeve. There are 2 typical bolts which are; -

- ring bolt through which a scaffold tube will pass to allow a tie assembly.  
Some ring bolts have a smaller diameter eye and rely on a 6mm wire lashing / steel banding to form a tie assembly.
- "SUPA TIES anchors which include a standard scaffold tube clamp for rigid ties.

## **TYING IN METHODS cont.**

- **KENTLEDGE**

formed by connecting weight / ballast to a mobile tower to provide stability.

If used, the ballast must be of solid materials, i.e. no sand or water, and must be securely attached to the tower structure.

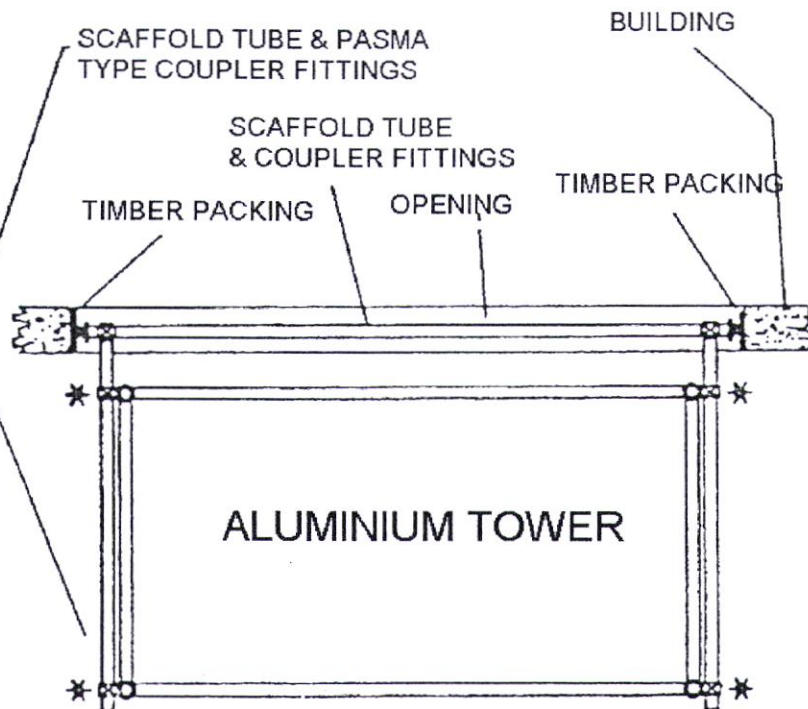
Your supplier should specify the correct amount of ballast weight and give advice to see that the total safe load on the structure, and particularly the castor, is not exceeded.

- **GUY ROPES**

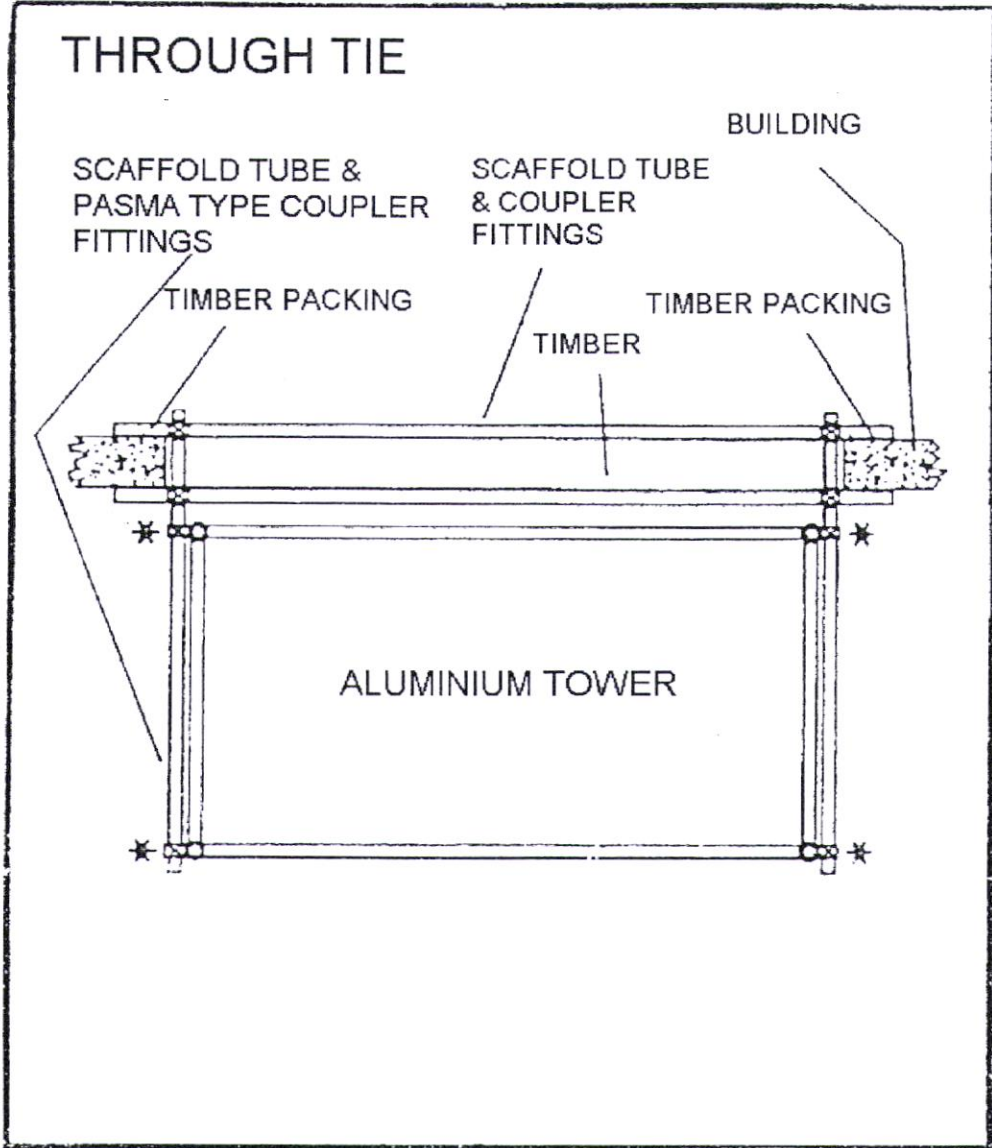
Formed by connecting wire ropes to node points on mobile towers to provide stability.

- Advice on the use of guy ropes and ground anchors and their method of attachment to the tower should be specified by the supplier.

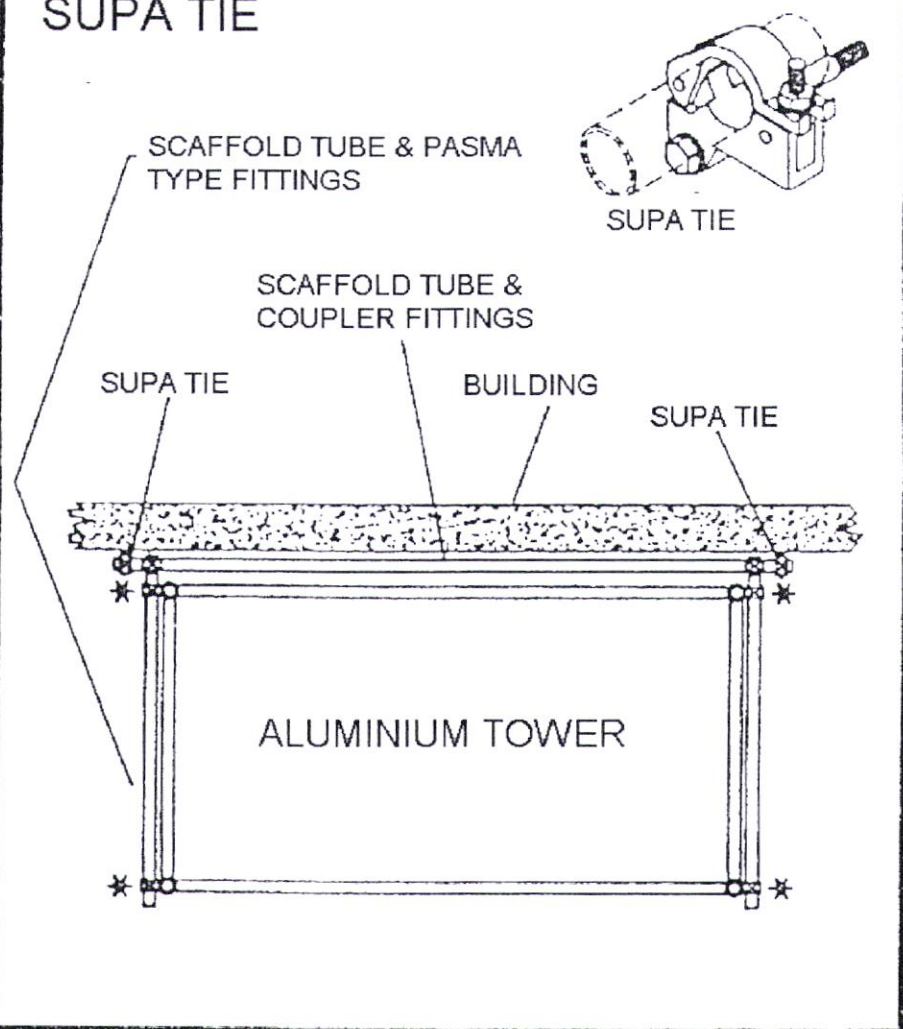
## REVEAL TIE



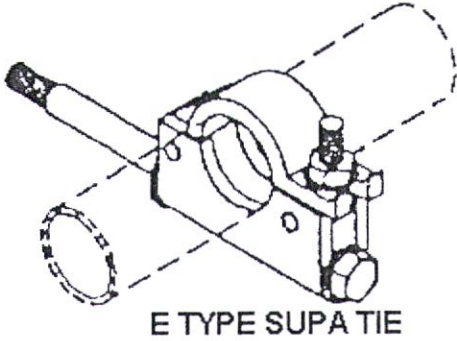
A MAXIMUM OF 50% OF TIES SHOULD BE REVEAL TIES, UNLESS SPECIALLY DESIGNED. BECAUSE REVEAL TIES DEPEND ON TIMBER PACKING FOR THEIR ANCHORAGE THEY SHOULD BE CHECKED FREQUENTLY FOR THEIR TIGHTNESS



# SUPA TIE



# E TYPE SUPA TIE

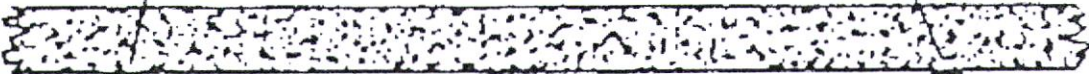


SCAFFOLD TUBE & PASMA  
TYPE COUPLER FITTINGS

E TYPE SUPA TIE

BUILDING

E TYPE SUPA TIE



ALUMINIUM TOWER

## TYPES OF BOLTS

There are three principal groups of bolts all of which depend for their strength on the sleeve in the building structure since the mechanical value of the bolt is normally greater than that provided by the sleeve fixing.

### 1. Ring bolt

A typical ring bolt anchor is shown in figure 3. The eye of the bolt has an internal diameter of between 50mm and 55mm. A scaffold tube may be passed through the eye to form a tie assembly.



Fig.3

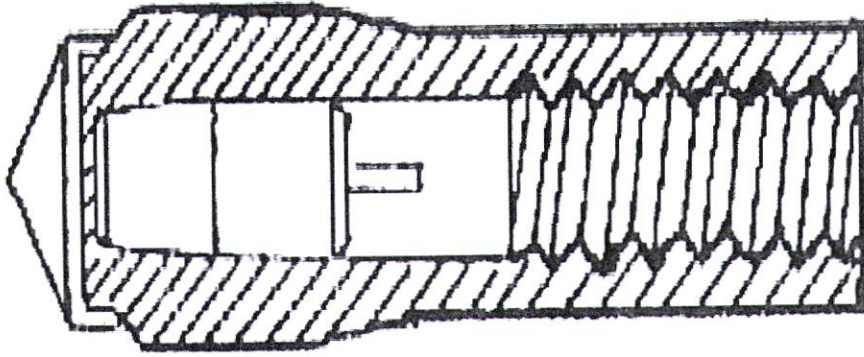
### 2. Wire or band tie

A typical wire or band tie anchor is shown in figure 4. The eye of the bolt has an internal diameter of approximately 30mm. A 6mm diameter wire lashings may be passed through the eye and around a scaffold tube with a minimum of three turns to form a tie. Steel banding of equivalent strength may also be used. The tube and fittings used should be arranged to prevent the scaffold moving inwards or outwards as this form of tie cannot take any compressive force.

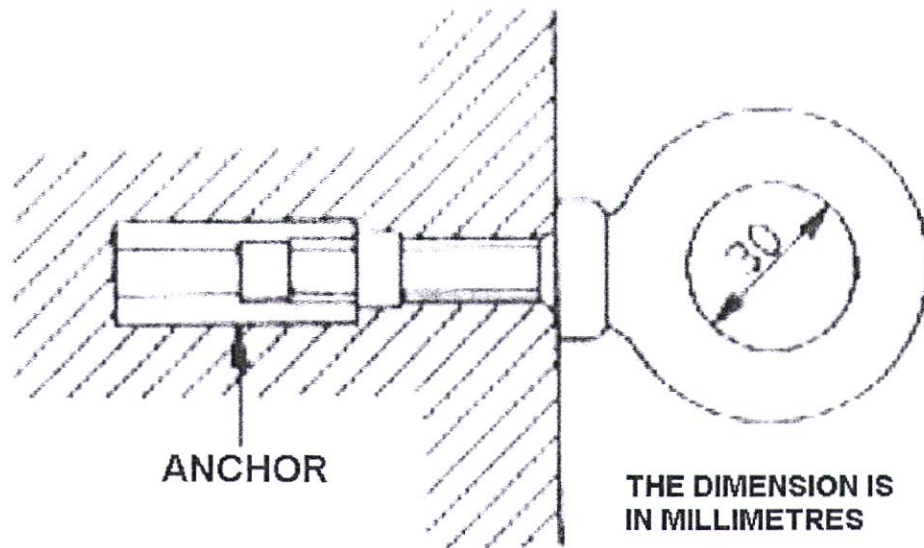




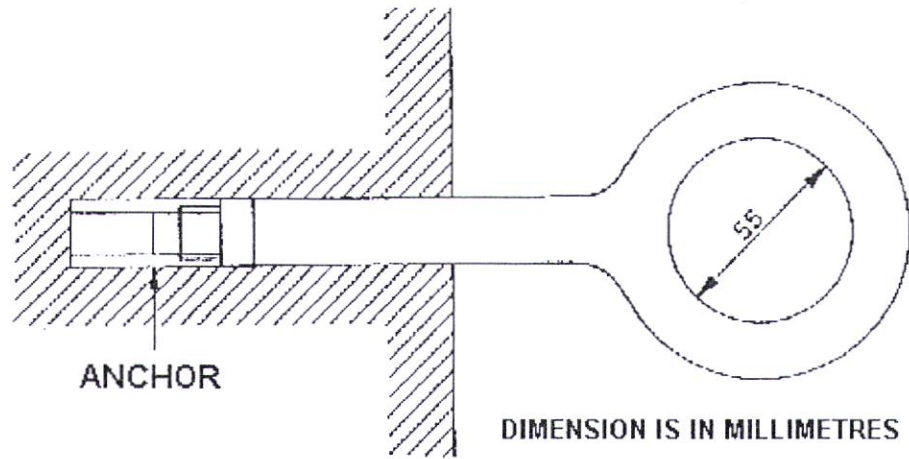
## DRILLED IN ANCHOR SLEEVE



A TYPICAL DRILLED IN ANCHOR SLEEVE IS SHOWN ABOVE. THE SLEEVE IS INSERTED INTO A PRE-DRILLED HOLE AND CAPTIVATED BY EXPANSION OF THE WEDGE AT THE BOTTOM OF THE HOLE. THIS TYPE OF SLEEVE HAS THE DISADVANTAGE THAT COSMETIC DAMAGE MAY OCCUR TO A WALL MATERIAL WHEN IT IS INSTALLED.



TYPICAL WIRE OR BAND TIE ANCHORAGE



TYPICAL RING BOLT TIE

## **SAFE PRACTICE DURING USE OF TOWER**

The Construction (Health, Safety & Welfare) Regulation 1996 state that where a person is to carry out work at any place from which they are liable to fall a distance of 2 m or more, guardrail. Toe boards or similar means of protection should also be installed, to prevent materials falling from the platform.

A double guardrail is required and in accordance with BS1139 PART 3 1994 (HD1004) the top guardrail height should be 1 m +or- 50mm above the platform. The maximum gap between the toe board or platform board and the mid guardrail is 470mm (18.5 inches)

If extra height is required on a mobile tower, steps, boxes, ladders or platforms placed on guardrail frame rungs should not be used.

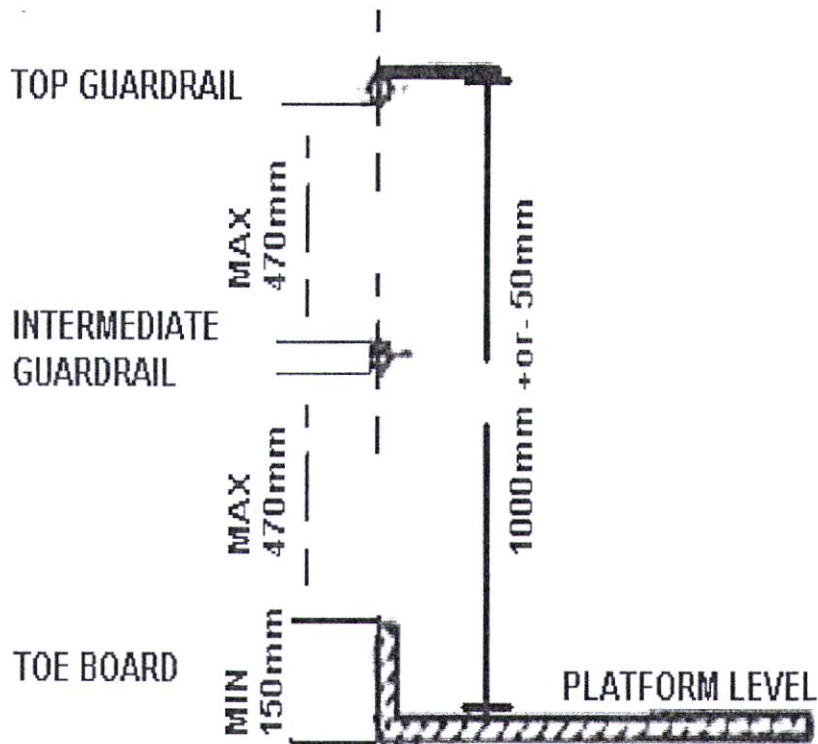
The only safe approach is to use additional tower equipment.

Take precautions in industrial areas, housing estates and public places such as fencing the base of the tower to prevent children and vandals from climbing the tower and vehicles colliding with the tower.

In certain locations a pavement licence may be required from the local authority.

Standard steel scaffold couplers are not suitable for use, with alloy towers, as the tube diameter, of the tower, is usually greater than that of steel tube. Usually a 50mm. (2") special alloy fitting is used which is compatible with both alloy towers and scaffold tube

# GUARD RAIL HEIGHT KEY DIMENSIONS



## GUARD RAILS AND TOEBOARDS

## PLATFORMS

The European Standard HD1004 allows a maximum vertical climb of 4m or 4.5m to the first working lift before a rest platform is required complete with guardrails.

The Construction Health Safety & Welfare Regulations 1996 allows a maximum distance of 9m between rest platforms

If materials are to be stored on the rest platform, a full toe board set must also be installed.

Where a tower is incomplete, or faulty, a warning notice must be attached e.g.

**DANGER – INCOMPLETE SCAFFOLD – DO NOT USE**

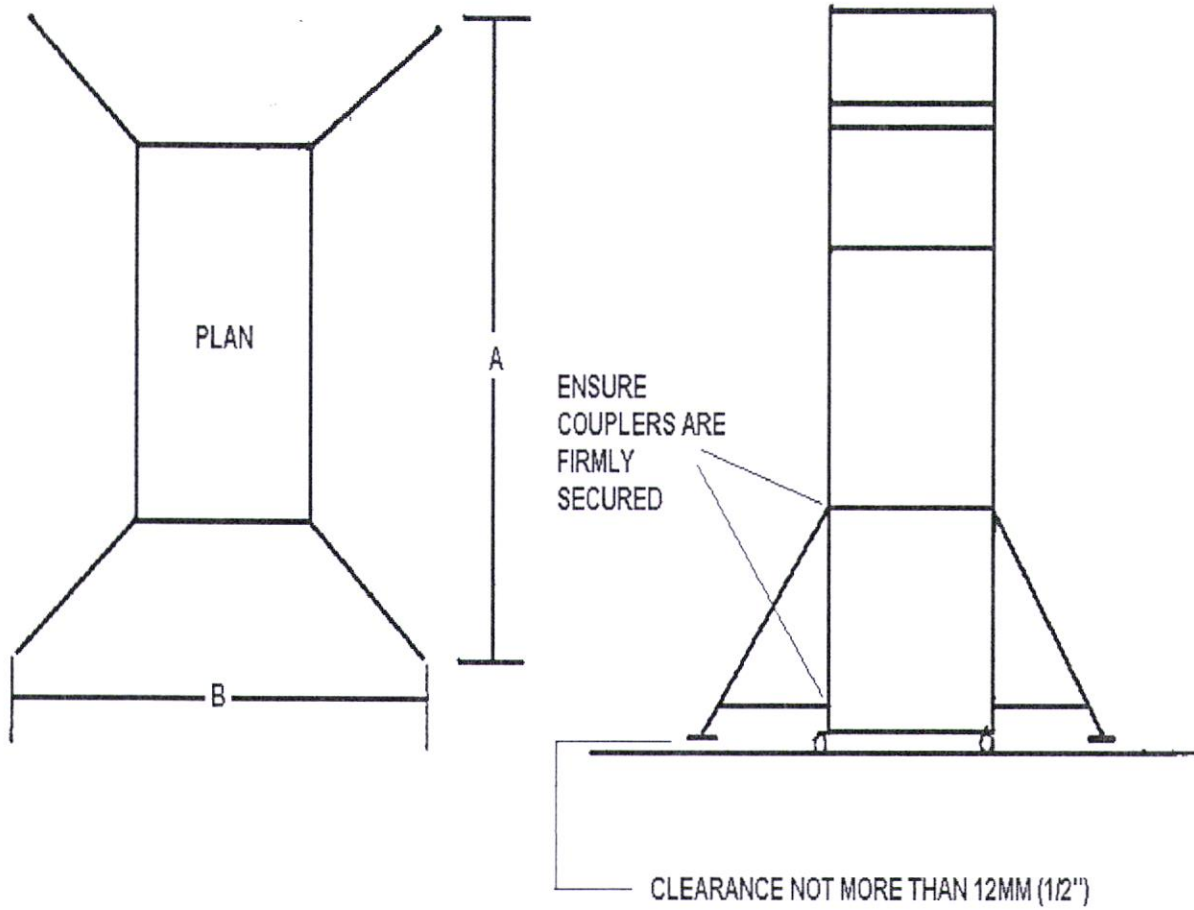
Or

**DAMAGED – NOT TO BE USED**

## MOVING TOWERS

- People and materials must be off the tower before it is moved.
- The tower may need to be reduced in height before moving. If the tower is tied in the ties must be removed progressively until the tower becomes free standing.
- Castors should only ever be unlocked when a tower is being moved. Once in the new position the brakes should be re-applied immediately.
- If stabilisers are fitted, to the towers, raise the stabiliser foot no more than 12mm. (1/2") as shown in the diagram. Reposition the stabilisers or outriggers, after moving the tower, ensuring they are in contact with the ground and tighten any clamps on the stabilisers or outriggers.
- After moving a tower re-check the alignment in the vertical, and both horizontal planes.
- If the tower was tied in, before moving, then it may need the ties replacing. If it was not tied in before it may well now need to be
- Only move a tower by manual effort by pushing, at the base, from behind. Never use mechanical means e.g. towed by fork lift or dumper truck. Never reposition a tower by lifting with a crane.
- Be aware of overhead electricity cables when moving or assembling towers.

## MOVING TOWERS



REDUCE TO FREE STANDING HEIGHT AS SHOWN IN INSTRUCTION MANUAL (I.M.)

## MOVING TOWERS



## INSPECTION OF TOWERS

Before a mobile tower is taken into use, for the first time, it must be inspected by a competent person and a report completed. ( see example format )

Satisfy yourself that all components are in their correct position and that the tower is sited properly.

A further report is required :-

- after a period of every 7 days.
- whenever the tower has been substantially altered.
- where any other event may have affected its stability or strength ( e.g. Hit by a forklift )

**NB** - a report is not required where :-

- a person cannot fall more than 2m.
- where the tower is not going to remain in the same place for 7 days or more.

## **STORAGE & MAINTENANCE OF TOWER EQUIPMENT**

The life of alloy towers will be increased if proper care is taken during transportation and storage.

Before storage, components should be cleaned to remove corrosive or concrete substances.

During transportation, avoid loading heavy equipment on top of components. Space can be saved by placing braces, platform and stairways in available space within vertically stacked frames.

**P.A.S.M.A.**

**QUESTIONS**

1. What is the definition of a competent person given by the Construction ( Health, Safety and Welfare ) Regulations 1996?

.....

2. What vital document must you be in possession of when erecting a Mobile Aluminium tower?

.....

3. When you have established the Height, cross sectional area and MDL (SWL) capacity of the Mobile Aluminium Tower, how do you establish the components you require/

.....

4. How do you establish at what height a Mobile Aluminium Tower must be tied in?

.....

5. When should you inspect the components?

.....

6. Guardrails and toeboards are required on a working platform if a person can otherwise fall a certain height. What is that height?

.....

7. Why are guardrails and toeboards required/

.....

8. What exception to the above rule, with regard to toeboards, is there?

.....

9. When should a Mobile Aluminium Tower be tied in to a rigid structure?

.....

10. What are two important factors ( other than wind and ground conditions ) that affect the stability of a Mobile Aluminium Tower?

.....

11. At what stage would you fit stabilisers / outriggers?

.....

12. When moving a Mobile Aluminium Tower fitted with stabilisers, what height should the stabiliser feet be from the ground?

.....

13. When moving a Mobile Aluminium Tower, where should the physical effort be applied?

.....

14. What is the only way to climb a Mobile Aluminium Tower/

.....

15. Under BS 1139 what is the maximum height between platforms?

.....

16. What is a typical maximum designed load capacity ( SWL) of a Mobile Aluminium Tower?

.....

17. How many guardrails are required on each side of the working platform?

.....

18. What is the maximum unprotected gap permissible by the Construction ( Health, Safety & Welfare ) Regulations 1996 between any guardrails, toeboards, barrier or other similar means of protection?

.....

19. What is the height of the main guardrail, above the edge of the platform, as required by BS 1139?

.....

20. When moving or assembling a Mobile Aluminium Tower, what major overhead hazard should you be aware of?

.....

21. What two things should not be on a tower when it is being moved?

.....

22. When fitting a full hatch platform, to a Mobile Aluminium Tower, where should the hinge be sited?

.....

23. After fitting one frame on to another, what is the next thing you must do?

.....

24. What type of coupler must not be used on PASMA type Mobile Aluminium towers?

.....

25. What is the maximum wind condition suitable for working on a Mobile Aluminium tower?

.....

26. If you need to gain additional height to work, how should you achieve it?

.....

27. When is the only occasion that castors may be left in the unlocked position?

.....

28. Your employer has legal responsibilities relative to safety. Who else may be held legally responsible if an accident occurs?

.....

29. What is the overriding general principle you must abide by when about to assemble a Mobile Aluminium Tower?

.....

30. When should an inspection report be made on the Mobile Aluminium Tower, from which someone can fall 2 meters or more if it remains in the same place for a period of 7 days or longer?

- a) before being taken into use for the first time
- b) after any substantial addition, dismantling or other alteration.
- c) after any event likely to have affected its strength or stability
- d) at regular intervals not exceeding 7 days since the last inspection.
- e) all of the above.

.....

## QUESTION

## ANSWER

- |  |   |
|--|---|
| 1. What is the definition of a competent person given by the Construction (Health, Safety & Welfare) Regulations 1996?   | The operator is required to possess such training, knowledge or experience as may be appropriate having regard to the nature of the activity, or to be supervised by such a person. |
| 2. What vital document must you be in possession of when erecting a Mobile Aluminium Tower?  | Instruction Manual  |
| 3. When you have established the height, cross sectional area and MDL (SWL) capacity of the Mobile Aluminium Tower, how do you establish the components you require? | By referring to the Instruction Manual  |
| 4. How do you establish at what height a Mobile Aluminium Tower must be tied in?   | By referring to the Instruction Manual.   |
| 5. When should you inspect the components?   | Before assembling the Mobile Aluminium Tower.   |
| 6. Guardrails and toeboards are required on a working platform if a person can otherwise fall a certain height, what is that height?                                 | 2 meters and above  |
| 7. Why are guardrails and toeboards required?  | To prevent persons or materials falling from the platform   |

## QUESTION

## ANSWER

- |   |   |
|---|---|
| 8. What exception to the above rule, with regard to toeboards, is there?  | If the platform is not a working platform and if nothing is stored on it then no toeboards are necessary. |
| 9. When should a Mobile Aluminium Tower be tied into a rigid structure?   | On every possible occasion.   |
| 10. What are two important factors (other than wind and ground conditions) that affect the stability of a Mobile Aluminium Tower? | The narrowest base dimension, the height or stabilisers.  |
| 11. At what stage would you fit the stabilisers/outriggers?   | As soon as sufficient height of Mobile Aluminum Tower has been built, usually 2 meters                    |
| 12. When moving a Mobile Aluminium Tower fitted with stabilisers, what height should the stabiliser feet be from the ground       | 12mm (1/2 inch)   |
| 13. When moving a Mobile Aluminium Tower, where should the physical effort be applied?  | By pushing at the base (physical effort only). No mechanical means to be used.                            |
| 14. What is the only way to climb a Mobile Aluminium Tower?   | Using the method provided inside the Mobile Aluminium Tower. You should never climb outside the tower.    |
| 15. Under BS1139 what is the maximum height between platforms?  | 4 meters  |



## QUESTION

## ANSWER

- |  |   |
|--|---|
| 16. What is a typical maximum designed load capacity (SWL) of a Mobile Aluminium Tower?  | 750 Kg U.D.L.                             |
| 17. How many guardrails are required on each side of the working platform?   | Two                                       |
| 18. What is the maximum unprotected gap permissible by the Construction (Health, Safety & Welfare) Regulations 1996 between any guardrails, toeboards, barrier or other similar means of protection? | 470 mm (18.5 inches).                     |
| 19. What is the height of a main guardrail above the edge of the platform as required by BS 1139?  | 1 meter plus or minus 50mm                |
| 20. When moving or assembling a Mobile Aluminium Tower, what major overhead hazard should you be aware of?   | Electricity Cables                        |
| 21. What two things should not be on a tower when it is being moved?   | Men and materials                         |
| 22. When fitting a full hatch platform to a Mobile Aluminium Tower, where should the hinge be sited?   | On the outboard side of the tower.        |
| 23. After fitting one frame onto another, what is the next thing you must do   | Ensure the locking mechanism has engaged. |

## QUESTION

## ANSWER

- |  |   |
|--|---|
| 24. What type of coupler must not be used on PASMA type Mobile Aluminium Towers.   | Conventional scaffold couplers i.e. 29/32inches (48.4mm) OD.  |
| 25. What is the maximum wind condition suitable for working on a Mobile Aluminium Tower?   | Beaufort Scale 4 i.e. 17.2 mph  |
| 26. If you need to gain additional height to work, how should you achieve it?  | Use additional equipment?   |
| 27. When is the only occasion that castors may be left in the unlocked condition?  | Whilst moving the Mobile Aluminium Tower.   |
| 28. Your employers has legal responsibilities relative to safety, who else may be held legally responsible if an accident occurs | You and your fellow employees.  |
| 29. What is the overriding general principal you must abide b y when about to assemble a Mobile Aluminium Tower                  | If you cannot do what is dictated by safety considerations when about to assemble a tower, do not do the job until you have sought advice from your employer. |

## QUESTION

## ANSWER

30. When should an inspection report be made on the Mobile Aluminium Tower, from which some one can fall 2 meter or more if it remains in the same place for a period of 7 days or longer
- a) Before being taken into use for the first time
  - b) After any substantial addition, dismantling or other alteration.
  - c) After any event likely to have affected its strength or stability.
  - d) At regular intervals not exceeding 7 days since the last inspection
  - e) All of the above
- Item (e). All of these.