METHOD STATEMENT FOR THE ERECTION
OF A FM GRU CITY TOWER CRANE
FOR BETTERIDGE & MILSOM LTD

Appointed Person: Marc Braybrook 01449319/1
Date: 15th February 2017  
Revision No. One  
Proposed Erection Date: 13th March 2017  
Customer: Betteridge & Milsom Ltd  
Site Location: Ragstones, The Vines, Sevenoaks, Kent, TN13 3SY  
Site Contact: Andrew Walker  
	07725 747787  
Mantis Cranes Ltd Contact: Marc Braybrook  
	07834 526196  
Duration of Activity: Two Days with Inspection and testing  
Plant, Equipment, Material Required: Electricity Supply, Mobile Crane, Partial Road Closure.  
Reference Documents: See Manual  
Specification of Crane:  
	Crane brand: FM GRU  
	Crane model: 1035  
	Serial No: TBC  
	Tower Height: 26m  
	Jib Length: 20m  
	Max lifting capacity when erected: 2,500kgs  
	Capacity at Jib end when erected: 2,000kgs  
	Base Type: Fixing Angle  
Service Engineers X 4:  
	1 x Crane Supervisor  
	3 x Crane Erectors  
P.P.E:  
	Hard Hat  
	High Visibility Vest/Coat  
	Steel toe capped footwear  
	Gloves  
	Fall Protection Equipment  
	Safety Glasses  
Hazard Identification, Risk Assessment, Mobile crane Plan: Documents included  
Appointed Person who compiled and approved this Method Statement:  
	Name: Marc Braybrook  
	CPCS No: 01449319/1  
Crane Supervisor: Name: Marc Braybrook  

Note: It is the responsibility of Betteridge & Milsom Ltd to ensure that the site upon which the crane is to be erected is suitable for the mobile crane specified. Provision must be made for safe access to and egress from the site during the erection of the crane. The mobile crane location must be free of all obstructions and the Jib lay down area clear. Banksmen and traffic management for all the vehicles supplied to erect the crane shall be provided by Betteridge & Milsom Ltd.
EXCLUSION ZONE

Due to the nature of the work being carried out an exclusion zone will be identified around the crane position. This is to be done on site and all parties in agreement.

The area for loading and off loading components will also be classified as an exclusion zone during these operations. Also the areas beneath the counter jib and front jib will be restricted during the erection procedure.

The area below any crane jib used to erect the tower crane on site is also to be a controlled area to safeguard other site personnel

All exclusion zones will be established and controlled by Betteridge & Milsom Ltd following agreement with the Mantis Cranes Appointed Person/Crane Supervisor prior to works commencing on site.

General

This method statement applies to the erection of a FM GRU 1035 City Tower Crane. It is carried out in connection with the User’s Instruction Manual and the Crane Operator Induction procedure.

Induction and other Arrangements

Any site specific inductions must be pre-notified during any previous site visits to enable crane and haulage timings to be adjusted as necessary and the inductions should not exceed 30 minutes in duration

SAFETY

Engineers are supplied with necessary PPE for work on site. This includes hi-visibility clothing, hardhat and steel toe capped footwear, which must be worn at all times. Other PPE available includes but is not limited to fall protection equipment, ear defenders, safety glasses, gloves and wet weather gear that must be worn as required.

It is the responsibility of Betteridge & Milsom Ltd to ensure no unauthorised personnel are within the slewing area of the cranes (Mobile crane and Tower crane). This must be done with the use of physical barriers unless other controls are put in place. Where this is not implemented and Mantis Cranes staff feels that the situation is unsafe, the work will be stopped.

Also supplied are 4 back to back radios for communication between the Mantis Cranes Supervisor, Senior Service Engineer, Mobile Crane Operator and Slinger/Signaller. All Mantis Cranes Ltd Supervisors, erectors and slinger banksmen have been trained by Mantis Cranes Ltd and are deemed competent in the erection and dismantling of the cranes operated by the company.

Everyone is responsible for their own safety and that of others.
PROCEDURE

1. The service engineers will erect the crane as per Crane Instruction Manual.
2. Fall protection equipment will be worn as per Fall Protection Requirements for Working at Heights
3. All hand tools used at height where practicable will be tethered by approved tool coil lanyards and attached to either the individual using them or the steel structure of the tower crane.

Below is a general guide to the erection and testing of the crane.

Erection and Testing Procedure

Step 1. The mobile crane for the erection shall pull into site/road closure and park as directed by Mantis Cranes. The Appointed person/Crane supervisor must ensure that all required crane certificates are checked prior to commencement of erection of tower crane. They must then ensure that all necessary measures are put in place by Betteridge & Milsom Ltd to prohibit access from unauthorised persons where tower crane is to be assembled and erected. This will be a 20 metre minimum exclusion zone around the city tower crane being erected and all lifting activities.

Step 2. Service Engineers check that there is safe access available for articulated delivery vehicles.

The Senior Crane Engineer will gather together all personnel present on site that are involved with the Erection of the Tower Crane (Clients Site Personnel, Mobile Crane operator, Crane Erection Engineers & Others) for a briefing on how he intends to perform the Erection of the City Tower Crane. All Crane Erection Engineers will agree their communication signals through hand signals or through the use of back-to-back radios with the Mobile Crane operator to eliminate any misunderstandings on directions being given.

The delivery vehicles will be articulated and will have to enter site/road closure guided by banksmen provided by Betteridge & Milsom Ltd. Betteridge & Milsom Ltd must ensure that any reversing is under the guidance of a Banksman wearing suitable PPE.(supplied by Betteridge & Milsom) And the traffic regulated by Betteridge & Milsom Ltd staff to allow safe access to site. All traffic marshals to be provided by Betteridge & Milsom Ltd.

Step 3. Fixing Angle is checked for level before the erections commences. The delivery vehicles will arrive on site in the sequence specified by the Senior Crane Erection Engineer. The Delivery Drivers & Erection Engineers will remove all chains and straps which have the items secured to the trailers.
Step 4. The first delivery vehicles will be off loading the tower mast sections. The Service Engineers now begin to erect the tower sections of the City Tower Crane assisted by the Mobile Crane. Each section of the City Tower Crane will be lifted into position using the Mobile Crane and all bolts connected and secured.

Another articulated delivery vehicle will now arrive with the slew ring, jib sections of the City Tower Crane and Aerial Ballast weights.

Step 5. The slew ring is now attached to the top of the tower sections.

Step 6. The Electricity Power Supply cable of the City Tower Crane is now lowered to the ground where it is connected to the power supply via a power termination box. This task will be performed by a qualified electrician within the erection crew. The electricity supply is to enable rotation of the slew ring before fitting the jib sections. After all power cables have been connected to the City Crane motors and an Earthing Rod has been placed the power can then be turned on.

Step 7. The counter jib section is now fitted to the slew ring using the Mobile Crane; all pins are fitted and secured. Where necessary the handrails and guards are re-fitted to both the front jib and counter jib before lifting and as some of these may have been removed for transporting purposes.

Step 8. One block of aerial counter ballast weight (1,650kgs) is positioned into the cradle at the rear of the counter jib section using the mobile Crane.

Step 9. The remaining block of ballast weight and test weights (1 x 1,650kgs) are now set out on the ground for the sections of the front jib to be placed upon. This is to allow for the assembly of the front jib.

Step 10. The sections of the front jib are assembled within the assembly area on the ground on site prior to it being fitted to the City Tower Crane. The trolley of the crane is fitted to the front jib prior to lifting. This is done by the Crane Erection Engineers in conjunction with the Mobile Crane. The trolley rope & hoist rope is fed through the required pulleys and excess rope is secured prior to lifting of front jib into position.

Step 11. The front jib is now lifted into position and fitted to the slew ring; all pins are fitted and secured.

Step 12. The remainder aerial counter ballast weight is now positioned into the cradle at the rear of the counter jib section using the Mobile Crane.

Step 13. The Service Engineers proceed to connect the trolley and hoist ropes to the block and adjust tightness. The Mobile Crane is no longer required and can now be de-rigged as per the manufacturer’s instructions and leave site under the guidance of the Betteridge & Milsom Ltd banksmen.
Step 14. The Senior Service Engineer will test all movements of the crane using either the radio remote control or cable control ensuring that all functions are operating correctly. The Electrical Engineers will now proceed with the configuring of the Crane Limit Switches as per the manufacturers manual.

Step 15. Overload tests are now carried out using test weights. A 10% overload is applied to the crane and the safe working load limits are then re-set to the manufacturers specifications. The results of these tests will be recorded on appropriate forms conforming to LOLER Regs. All necessary forms will be passed onto Betteridge & Milsom Ltd. Mantis Cranes will keep on record a copy of these. Once the overload tests have been completed the City Tower Crane Safe Working Load parameters will be set using known test weights / weighing apparatus.

Step 16. When required the Betteridge & Milsom Ltd operator can now be inducted on the Proper Use of the City Tower Crane as per the Crane Operator Induction procedure. Betteridge & Milsom Ltd must complete the daily, weekly and monthly check list (which are all on one sheet), which are provided by Mantis Cranes. This involves a visual inspection of the crane and the testing of the safe load indicator.

Step 17. Once this has been completed the Erection procedure of the Tower Crane is deemed complete.
The Specific Lifting plan for the Mobile Crane that is assembling the FM GRU 10-35 City Tower Crane

<table>
<thead>
<tr>
<th>PREPARED BY/ APPOINTED PERSON</th>
<th>Marc Braybrook</th>
</tr>
</thead>
<tbody>
<tr>
<td>AP Registration Number:</td>
<td>01449319/1</td>
</tr>
<tr>
<td>Expiry Date:</td>
<td>July 2017</td>
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<tr>
<td>Contact Number:</td>
<td>07834 526196</td>
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<tr>
<td>Signed:</td>
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**LIFT SUPERVISOR**

<table>
<thead>
<tr>
<th>Name:</th>
<th>Marc Braybrook</th>
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<tr>
<td>Signed:</td>
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<tr>
<td>Expiry Date:</td>
<td>July 2017</td>
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**Betteridge & Milsom Ltd SITE MANAGER**

**Acceptance of Method Statement Signature**

<table>
<thead>
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<td>Date:</td>
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**REFERENCE DOCUMENTS ATTACHED**

- Itemised Detail of Each lift (Includes Weights and Radii)
- Detailed Equipment Register
- Location Drawing (Attached)
- Personnel Register

**LIFT CLASSIFICATION**

- Complex Lift

No part of this document may be copied or duplicated in any way, be published, or given to another party without the express permission of Marc Braybrook of Mantis Cranes Ltd
1.0 INTRODUCTION

1.1 The aim of this Lift Plan to define and describe the equipment and safe procedures which are to be employed to carry out lifting operations in accordance with the following:

<table>
<thead>
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<th>LEGISLATION</th>
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<tr>
<td>Health and Safety at Work Act 1974</td>
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</tr>
<tr>
<td>Lifting Operations and Lifting Equipment Regulations 1998</td>
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</tr>
<tr>
<td>Provision and Use of Work Equipment Regulations (PUWER) 1998</td>
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</tr>
<tr>
<td>Control of Substances Hazardous to Health Regulations 1994</td>
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<td>Manual Handling Operations Regulations 1992</td>
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<th>APPROVED CODES OF PRACTICE</th>
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<tr>
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<tr>
<td>BS7121 Safe Use of Cranes part 3</td>
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<td>BS7121 Safe Use of Cranes part 4</td>
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<tr>
<td>BS7121 Safe Use of Cranes part 5</td>
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</table>

THE APPOINTED PERSON

1.2 The Appointed Person who has prepared this Lift Plan carries full responsibility for the safe completion of all works carried out during the operation. It is the responsibility of The Appointed Person to ensure that the person delegated with authority is adequately briefed on the contents of this Lift Plan.

1.3 Prior to the commencement of the works The Lift Supervisor must ensure that any site personnel involved are adequately briefed on the contents of this Lift Plan. This briefing shall take the form of a ‘toolbox talk’. The Lift Supervisor must liaise with The Appointed Person should site circumstances require material change to the methods to be employed during the operation.
2.0 **THE SITE**

Betteridge & Milsom Ltd shall provide:

Safe access and traffic management for the mobile crane and the delivery vehicles supplied. It is the responsibility of the site to ensure that there is adequate hard standing provided to support the loadings of the mobile crane used for the Tower Crane activity. Betteridge & Milsom Ltd are to make suitable preparation so that the ground that the mobile crane and transport will travel or on which it will work is substantial enough to support the forces imposed on it by the wheels or the jacks of the plant. These forces are detailed in this method statement and before the commencement of the works take place it must be confirmed that the above preparation has been carried out. This is in accordance with BS7121.

All necessary information relating to ground conditions. Confirmation of the location of any underground services or vaults / voids in the agreed transport/mobile crane position(s). This is in accordance with BS7121 (part 1). The signing of this method statement is an acceptance of the forces we detail to impose on the ground.

Betteridge & Milsom Ltd will continue to provide:

Partial Road Closure for the duration of the activity

Site parking for Mantis Cranes Ltd Engineers support Vehicles.

The Betteridge & Milsom Ltd site Risk Assessment document which identifies any hazards (environmental or other) that may be present within the works area.

All of the hazards presented if any are to be detailed and pointed out to the Mantis Cranes Site Team through the specific site induction.

I, THE UNDERSIGNED HAVE READ AND UNDERSTOOD THE ABOVE:

Print Name……………………….

Sign Name……………………….

Date…………………………

Mantis Cranes Supervisor:

Print………………………………………………

Sign………………………………………………
## 3.0 THE LIFT

### 3.1 DETAILS OF THE LIFT(S)

<table>
<thead>
<tr>
<th>Lift Schedule</th>
<th>No.</th>
<th>Item to be Lifted</th>
<th>Radius (m)</th>
<th>Mass (kg)</th>
<th>Lifting equip.</th>
<th>Mobile Crane Capacity at Radius</th>
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<tr>
<td></td>
<td>1</td>
<td>Tower Mast Section</td>
<td>26</td>
<td>980</td>
<td>4 leg Chain Sling 6m Long, 4.5 ton c/w shortening</td>
<td>At 26m Radius, Jib length</td>
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<td></td>
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<td></td>
<td></td>
<td>clutches</td>
<td>50m, Capacity 5.800kg</td>
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<td>2</td>
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<td>Slew Ring</td>
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<td>Counter Jib</td>
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<td>Ballast Weight</td>
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<td>Front Jib</td>
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4.0 THE EQUIPMENT

Crane Type: TBC
Capacity: 
Counterweight: 
Main Boom Length: 
Boom Required: 
Fixed Fly Jib Length: 
Luffing Fly Jib Length: 
Hook Block: (S.W.L)

Permissible Design Wind Speed For Above Configuration: 10mps/36kph/22.5mph

RADIUS AND WEIGHT

Maximum Radius Of Lift: TBC
Maximum Weight Of Lift: 
Maximum Weight Of Hook Block: 
Maximum Weight Of Lifting Tackle: 
Weight Of Fly Jib Stowed: 

Required Lift Is - TBC

5.0 OUTRIGGER LOADS

Maximum outrigger point load: TBC
Grillage Spread: 
Actual Distributed Load: 
Rescue Procedure for a Fallen Operative

Each member of the Mantis Cranes Tower Crane team has been fully trained in the procedure detailed below

The idea of the GOTCHA™ is to provide a rescue kit that will enable a rescuer to:
- Attach a casualty who is suspended by a fall arrest lanyard.
- Force the casualty in order to release their current attachment.
- Raise or lower the casualty to a point of safety.

The above capabilities are all achievable without the need for the rescuer to access the casualty. In order to carry out this the rescuer must be able to access the point at which the casualty anchored their lanyard. The control feature of the rescue kit locks automatically if released.

The GOTCHA™ will be used in two different modes depending upon whether the anchor point is at the rescuers foot level or above (ideally 1.6m above to have any material effect), as this has important effects.

If the anchor is at foot level then the system will not be able to raise the casualty sufficiently to bring them back to their start point. The casualty must be raised in order to release their lanyard then lowered to safety. Also the rescuer is required to use their strength when raising the casualty, so the mechanical advantage is greater (4:1).

If the anchor is 1.6m above foot level, preferably at head height it will be possible to raise the casualty to their start point. For this the rescuer is able to use their weight to assist in the operation and therefore the mechanical advantage is lower (2:1).

SPANSET UK Limited
Telford Way, Middlewich, Cheshire, CW10 9HX, UK.
Phone: 44 (0)1605 73 7434 Fax: 44 (0)1605 737264
HIGH ANCHOR
Blue Pulley to Anchor Sling

Anchor more than 1.5m above foot level.

1. Access casualty's anchorage point.
2. Attach the anchor sling to a suitable anchor point above the casualty.
3. The rescuer's weight is used to assist in the operation. The double pulley is clipped to the anchor sling.
4. Adjust pole to the required length.
5. Attach the red clip to the end of the pole, and clip the single pulley into the webbing.
6. Adjust ropes in-between the pulleys to the same length as the pole.
7. Set the red clip to open.
8. Using the pole, attach the red clip to the casualty's harness attachment.
9. Remove the pole from the red clip.
10. Attach the GRIGRI to the rescuer's harness.
11. Pull the slack rope through the GRIGRI to tension the system.
12. The rescuer now sits down, thus raising the casualty.
13. With one hand, the rescuer holds the rope above the GRIGRI, close to the attachment sling. With the other hand they take in the slack rope as they stand up.
14. Once the casualty's weight has been transferred to the GOTCHA™, then their lanyard can be disconnected.
15. The casualty can now be raised to a point of safety, or lowered as follows.
16. To lower the casualty the rescuer must take hold of the rope that exits the GRIGRI, and this is used to control the descent.
17. With the other hand releases the black handle on the GRIGRI until the rope can be fed at a controllable speed. This thus lowers the casualty. (Please see note)

NOTE: In order to carry out a rescue the rescuer requires a harness with a front point of attachment for locating the GRIGRI. If the anchor point for the GOTCHA™ is such that the casualty must be lowered, then the rope length in the kit must be four times the distance from the anchorage to the point of safety.
LOW ANCHOR
Green Pulley to Anchor Sling

Anchorage at foot level.

1. Access casualty's anchorage point.
2. Attach the anchor sling to a suitable anchor point above the casualty.
3. The rescuer will use their legs to help pull in the rope. The single pulley is clipped to the anchor sling.
4. Adjust pole to the required length.
5. Attach the red clip to the end of the pole, and clip the double pulley into the webbing.
6. Adjust ropes in between the pulleys to the same length as the pole.
7. Set the red clip to open.
8. Using the pole, attach the red clip to the casualty's harness attachment.
9. Remove the pole from the red clip.
10. Attach the GRIGRI to the rescuer's harness.
11. Pull the slack rope through the GRIGRI to tension the system, and squat down.
12. The rescuer now stands up, thus raising the casualty.
13. With one hand, the rescuer holds the rope below the GRIGRI, close to the attachment sling. With the other hand they take in the slack rope as they squat down.
14. Once the casualty's weight has been transferred to the GOTCHA™ then their lanyard can be disconnected.
15. The casualty can now be lowered as follows.
16. To lower the casualty the rescuer must take hold of the rope that exits the GRIGRI, and this is used to control the descent.
17. With the other hand release the black handle on the GRIGRI until the rope can be fed at a controllable speed. This thus lowers the casualty. (Please see note)

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HAZARD IDENTIFICATION AND RISK ASSESSMENTS

HOUSEKEEPING / WORKPLACE TIDINESS

Hazard
- Slips, Trips and Falls
- Falling Materials / Collapse of stored material.
- Unsafe access and egress
- Fire

Risk
Medium

Controls in Place
- All personnel to be informed in induction of risks associated with poor housekeeping. Each employee is then responsible for “tidying as they go”.
- All materials which are stored at a height will be secured properly as to prevent from falling and prevent any materials falling. Materials will not be thrown, tipped or dropped from height.
- All rubbish is to be placed in designated waste bins.

ARRIVAL AND DEPARTURE OF VEHICLES AND TRAILERS ON SITE

Hazard
- Speeding
- Reversing unsupervised
- Overloading or insecure loads
- Debris falling
- Contact with overhead power lines.
- Collision with other vehicles
- Collision with Site Personnel
- Manual Handling

Risk
Medium

Controls in Place
- Site surveyed prior to arrival. Site survey is to be passed on to crane erecting team before crane is loaded/off loaded onto vehicles.
- Road used to transport crane to/from site is also to be assessed; this includes low bridges, tunnels, traffic and weight restrictions.
- Non-associated site vehicles must not enter the area where crane operations are taking place.
• Service Engineers to ensure that no unauthorised personnel are within working area during the procedure.
• Traffic routes must be planned and controlled. Persons on foot should be excluded from areas of risk. A banksman is to be used during unavoidable reversing operations provided by the client.
• Passengers are not to be carried on any vehicle unless it is designed for this.
• All vehicles will be kept in a good state of repair according to the manufacturer’s recommendations. Drivers are expected to maintain mirrors, lights, indicators, etc in a good, clean condition.
• Drivers are expected to remove keys from vehicles every time they leave the cab. This is to prevent unauthorised use (including by members of the public).
• The road traffic act will be observed at all times.
• Chains, timbers & other awkward items are lifted by two operatives.
• All site personnel must wear high visibility clothing.

GENERAL WORKING AT HEIGHT

Hazard
• Over reaching while working at a height
• Work at heights while using hand tools
• Musculoskeletal disorders
• Back injury
• Carrying a load
• Dropping the load

Risk
Medium

Controls in Place
• Where practical work or as much work as possible is to be carried out at ground level.
• Tools must be carried in approved tool bags until operator is ready to work.
• Hands tools must be connected (tethered) to the individual using them at heights.
• If a load is heavy or awkward to carry it shall be lifted by telescopic handler or crane.
• No employees shall carry out work beneath another worker unless they are involved in the same task e.g. passing down of materials.
• All loads must be secured before working at heights.
WEARING OF FALL PROTECTION EQUIPMENT

Tasks
Wearing of Fall Restraint Equipment
Wearing of Fall Arrest Equipment

Hazards
- Wearing incorrect fall arrest or fall restraint equipment
- Incorrect wearing of fall arrest or fall restraint equipment
- Suspension trauma
- Wearing of damaged or defective equipment

Risk
High

Controls in Place
- Any employee that is required to wear fall arrest or fall restraint equipment must have it specifically purchased for him/her based on their usage (amount of time that harness is worn), type of work carried out.
- Employees must be trained in the types, use of, maintenance, inspections and disposal of fall protection equipment before being required to use it.
- Where an employee does fall and is suspended in their harness then immediate action must be taken to bring the employee back to a solid surface. Where there is a risk that an employee may be suspended for a period of time then this consideration must be used in the purchasing of appropriate equipment.
- In the event of an operative falling from the tower crane, attempts are immediately to be made to return the operative to the crane. If this is not an option, e.g. casualty is unconscious or injured, then the casualty is to be lowered to the ground as per Tower Crane rescue training. Prior to walking the front jib or after attachment of the slew ring of the crane, the Gotcha rescue kit is to be brought to the top of the crane.
- The harness worn by tower crane personnel is a full body harness, which is designed to provide comfort to the wearer and reduce the likelihood of the quick onset of suspension trauma in the event of a fall.
- All fall protection equipment will be certified on at least a six monthly basis from date of issue. All harnesses and other fall protection equipment which consist of webbing material (e.g. harness) will have a maximum life expectancy of Ten years (Petzl) after issue date or ten years from date of manufacture.
ON SITE MAINTENANCE

Tasks
Servicing cranes
Changing ropes – trolley, hoist
Changing or Repairing Motors
Makes repairs to crane electrics
Adjusting or repairing brakes

Hazard
• Injury or damage caused as a result of lack of training or experience
• Struck by site machinery
• Fall from height
• Dermatitis / ill health from exposure to oils, grease, lubricants, diesel.
• Entrapment between ropes and pulleys
• Injury from lifting equipment or materials
• Slips from crane out riggers
• Falling Objects
• Poor Housekeeping
• Personal injury from maintenance work being carried out

Risk
Medium

Controls in Place
• All Mantis Cranes employees who work on sites are deemed to be competent and adequately trained. All personnel are given training on each in house before being assigned to carry out work on site. Training also includes slinging/signaller and/or telescopic handler course where necessary
• All Mantis Cranes personnel (including office based staff) are to wear hi-visibility vest, coat or t-shirt, hardhat and steel toe capped footwear at all times on construction sites.
• Where service personnel are required to work in an area where they could fall a distance liable to cause personal injury then suitable protective measures must be put in place e.g. railings. Where this is not practical then other measures must be put in place e.g. using man basket, hoist or cage. Where there is still a risk of injury then employees must wear fall restraint equipment e.g. in man basket or fall arrest equipment e.g. when working at a height
• Gloves and other protective clothing (coats, overalls) are provided to service engineers who may come into contact with oils, grease, etc. and these must be worn where there is a risk of contact with any material, which may cause irritation.
• All service engineers are deemed to be competent before being assigned to carry out work on cranes. These personnel are to maintain adequate care and
attention when working with ropes to ensure that hands do not become trapped.  
- All personnel are trained in manual handling techniques. Where necessary all heavy or awkward lifts shall be carried out by mechanical means e.g. telescopic handler or crane. Where this is not practical a two person lift shall be used.  
- All excess material must be removed from crane before tower crane is put into service. This includes parts that are changed, oils/greases containers or maintenance equipment.  
- The working area required by Mantis Cranes engineers must be cleared and safe access/egress provided prior to entering site. Where there is a risk of injury due to poor site conditions then work must not proceed.  
- All Mantis Cranes Engineers are deemed to be competent in the work that they are assigned to carry out. All engineers are issued PPE that they require, i.e. gloves, eye protection, overalls, foot protection, head protection, fall protection equipment, before being sent on site. Appropriate and required PPE is to be worn as required while on any construction site.

USE OF MOBILE CRANE

Tasks
- Erection of Tower Cranes
- Loading Ballast on Tower Crane

Hazard
- Overloading due to failure to correctly estimate loads or due to incorrect use of crane.
- Inadequate maintenance of equipment or use of defective equipment.
- Unsafe slinging.
- Hit by swinging ballast weight
- Insecure loads.
- Handling of loads in high winds.
- Incorrect signals.
- Collision with Mantis Cranes Personnel

Risk
- High

Controls in Place
- Mobile crane must set up in position as per method statement and mobile crane location drawing. (Drawings by hard are adequate)
- Adequate space must be maintained for emergency services access at all times.
- Appointed Person must ensure that every crane provided for use has a current test certificate, and has been thoroughly examined within the preceding 12 months. This certificate will be kept with the machine.
Where any defect is noted or reported on any crane or item of lifting gear and the defect could affect the safe use of the equipment, it must be taken out of use until the defect is rectified or destroyed.

Crane driver must move mobile crane jib slowly to prevent swinging of ballast weights. Where ballast weights do swing all personnel must stay clear and do not attempt to physically stop ballast weights.

Only authorised (and where appropriate suitably certified) persons will be permitted to give signals and sling loads. The authorised persons must be over the age of 18 and have relevant training completed with evidence by way of certification.

Where weather conditions may affect the safety of lifting operations the Appointed Person, crane supervisor, Site Management or Safety Officer or the crane driver may stop operations until conditions improve.

The manufacturer’s maximum wind speed for safe working is displayed in each cab. Otherwise 10mps/36kph/22.5mph is the speed at which all operations will cease.

WORKING AT HEIGHT – TOWER CRANE

Hazard
- Climbing access ladders
- Climbing access ladders with uneven rung spacing
- Walking along the jib
- Serious head injury, broken bones
- Passing through slewing section
- Raising and lowering of tools and materials
- Entanglement or shearing in moving areas of equipment such as winches and running ropes.

Risk
High

Controls in Place
- Inspections of rungs to be made as first person is climbing tower. Care is taken at top of tower sections where spacing in rungs begins to differ.
- Access to crane is restricted to competent and experienced personnel only
- All people working on site to receive site induction and/or toolbox talk before commencing work. Those not involved in the tower crane activity will adhere to the exclusion zones implemented.
- All persons walking along the jib will use harness attached to secure anchor points and safety lines at all times. Harnesses used will have twin tailed lanyard attached and one of these will be attached at all times. This fall protection equipment fall arrest and suitable rescue equipment along with trained personnel must be available prior to walking out jib. Engineers are also supplied with work positioning lanyard.
- Personnel required to wear/use harnesses will receive instruction on their proper use and maintenance. Specifically – all must have received training on the use of fall protection equipment.
- Clients are required to ensure that work is planned so that safe access/egress and working places are provided for Mantis Cranes operatives to work at heights.
- Materials must not be tipped, dropped or thrown down from any height.
- Effective barriers must be fitted at lower levels to deter non-essential personnel in some areas. In exceptional cases where this is not practicable operatives are required to attach tools or small articles to lanyards so that they cannot fall.
- Approved tool bags to be used to carry essential tools while working at heights. Where practicable tools are to be lifted to top of tower crane using mobile crane.
- Only trained and competent personnel are assigned to carry out duties during assembly of cranes. This is strictly enforced where ropes are being connected and tensioned.

**CONNECTING POWER SUPPLY TO CRANE**

**Hazard**
- Electrocution from wet or damaged cable
- Head injury while climbing under base to connect power to the base

**Risk**
Medium

**Controls in Place**
- Warning signs on the electrical cabinet door.
- Safety hats worn at all times on site.
- All cables are insulated. Ensure power supply is switched off at the distribution board on the site.
- All employees are fully trained prior to carrying out any electrical work on machines or equipment.

**FALLING OBJECTS FROM CRANES**

**Hazard**
- Falling materials striking individuals working on site.
- Striking head off fixed object.
- Displacement of loose material

**Risk**
Medium
Controls in Place

- All areas on site are designated as hard hat areas. **No authorised person may work in vicinity of crane without a hard hat, hi-visibility vest and safety footwear.**
- A minimum exclusion zone around the cranes and below any area where lifting operations are carried out is required. These areas will be clearly marked out by tape/cones/signs by the main contractor on site to protect all personnel. **All persons are required to observe the exclusion.**
- Ensure all loads are secured before lifting
- All lifting equipment is certified
- All non-essential material is removed from crane sections before lifting begins. All accessible areas must be kept clean and free of loose materials.

ADVERSE WEATHER CONDITIONS

In the event of snow fall, high winds, extreme rain and sub zero conditions causing the Tower Cranes structure to become icy and unsafe to work with, climb or walk on, the project WILL be aborted by Mantis Cranes Staff in agreement with the Mantis Cranes Appointed Person for safety reasons. The project will be re-evaluated for a later date when site conditions have improved.

**THERE ARE NO EXCEPTIONS**
Appointed Persons details and Qualifications. Other team member’s qualifications will be available on the morning of the Tower Crane Erection...
### RISK ASSESSMENT

**Operation/Task:** Installation of Top Slew Tower Crane with Mobile Crane  
**Employees at Risk:** Site Personnel, Visitors, and Erection Team  
**Location/Company:** Betteridge & Milsom Ltd, Sevenoaks, TN13 3SY  
**Other Persons at Risk:** Contractors, General Public  
**Appointed Person:** Marc Braybrook  
**Key Responsible Person:** Appointed Person, Crane Co-ordinator, Supervisor, Erectors and Labourers

<table>
<thead>
<tr>
<th>Activity</th>
<th>Hazards/Risks</th>
<th>Pre Control Risk Rating</th>
<th>Control Measures</th>
<th>Post Control Risk Ratings</th>
</tr>
</thead>
</table>
| Crane Installation of Pedestrian operated tower crane Top Slew | Working at Height  
Falls from Height from employees and materials | 3 7 21 | Work to approved method statement.  
Fully certificated and tested PPE to be used at all times all erectors have been trained in safe use of all fall arrest equipment and systems.  
Trained First Aiders along with First Aid equipment are available  
Tool box talks; display of appropriate warning signs are in use  
It is not possible to eliminate the use of erectors so safe systems of work are required by providing and ensuring platforms are in place to prevent erectors and tools falling. Safe system of work is to be in place with the prevention of lone working.  
Permit to work required with specific training for all personnel involved in the issuing of the permit | 1 7 7 | HSG 65 Work at Height Regulations 2002  
Management of Health and Safety Regulations 1999 |
### Set-up of crane

| Ground Bearing Unsatisfactory | Crane Collapse | 3 | 7 | 21 |

The surface in which the crane is to operate will be prepared and checked to ensure stability by a Qualified Engineer. Regular daily checks will be made to ensure the stability of the crane by the operator.

### Lifting Operations

| Ballasting of crane | Collapse of structure | 3 | 7 | 21 |

Trained erectors currently use manufacturers instructions to ballast the crane. Ensure lifting procedures are adequately planned and carried out by trained and competent persons. Check attachments are used and certificated.

---

BS 7121 Safe use of cranes 2006 parts 1-5 CIRIA Special Publication 131 Crane Stability on Site.

Lifting Operations and Lifting Equipment Regulations 1998 With associated (ACOPs)
<table>
<thead>
<tr>
<th>Crane Operations</th>
<th>Crane movements</th>
<th>3</th>
<th>7</th>
<th>21</th>
<th>The operator is under full supervision from the crane supervisor who both holds the relevant CPCS qualifications.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Crane Overturning</td>
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<td></td>
<td>Load bearing calculated by structural engineer and appropriate pads or sleepers used to prevent adverse pressure on the ground. This will be signed off before lifting commences.</td>
</tr>
<tr>
<td></td>
<td>Failure of lifting gear or equipment</td>
<td>3</td>
<td>7</td>
<td>21</td>
<td>Appropriate evidence of examinations in respect of lifting equipment and lifting accessories will be examined and copies retained on site.</td>
</tr>
<tr>
<td></td>
<td>Crane Overturning</td>
<td></td>
<td></td>
<td></td>
<td>A minimum clearance of 600 mm must be maintained between any slewing or travelling crane body and any obstruction. Lesser gaps must be fenced.</td>
</tr>
<tr>
<td></td>
<td>Failure of lifting gear or equipment</td>
<td></td>
<td></td>
<td></td>
<td>Warning Signs placed around perimeter fence warning of possible crush injuries. Gates closed to prevent access to lifting area</td>
</tr>
<tr>
<td></td>
<td>Serious injuries or possible death</td>
<td></td>
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<td>Unauthorised personnel in vicinity</td>
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<td></td>
<td>BS 7121 Safe use of cranes 2006 parts 1-5</td>
</tr>
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<td></td>
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<td></td>
<td>Thorough examination certificates for relevant equipment</td>
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<td></td>
<td>LOLER 1998 &amp; PUWER 1998</td>
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<td></td>
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<td>With associated (ACOPs)</td>
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<td></td>
<td></td>
<td></td>
<td>Occupiers Liability Acts 1957 &amp; 1984</td>
</tr>
<tr>
<td>Crane erection procedures</td>
<td>Wind effects</td>
<td>3</td>
<td>7</td>
<td>21</td>
<td>Check wind speed is in safe limits to Manufacturers Recommendations and cease operations when wind speed is excess of these limits (consult manual).</td>
</tr>
<tr>
<td></td>
<td>Crane overturning</td>
<td></td>
<td></td>
<td></td>
<td>Download up to date weather reports Monitor weather by periodically checking the anemometer</td>
</tr>
</tbody>
</table>
Set up of Crane | System Failure, Crane and system overturning | 3 | 7 | 21 | Only trained competent operators are permitted to use certificated equipment, full inspection of crane certificates & equipment before use. On site inspections of ground and weather conditions before set up. Operator to set crane up to manufacturers recommendations and to the configuration and height identified in the lift plan. *(OPERATOR MUST NOTIFY APPOINTED PERSON BEFORE DEVIATING FROM LIFT PLAN).*

Crane Operations | Various Loads of the crane and materials used in the erection process | 3 | 6 | 18 | Slingers and Signallers will be responsible for examining all lifting gear before use, ensuring stability and security of loads. (This will be inspected before loads are lifted by having a trial lift. Operatives engaged in slinging and signalling will be trained and hold certificates of training – CPCS copies available on request. Safe working loads (SWL) will be clearly indicated and never exceeded Unidentified loads to be measured by using a load cell if this is not possible the load will be estimated and 20% added as a Factor of Safety.

Slinging/ Signalling | Estimating Loads & Blind Lifting | 3 | 5 | 15 | Slingers will be required to know the weight of materials to be raised before commencing a lift. Individual slingers are currently used to control the activities If the crane operator can not see the load during the whole of the lifting operation, an additional slinger/banksman or radio communication will be used. Loads are not to be lifted outside the site boundary.

Operations to ensure the crane operates to the correct commands | Overhead cables Electricity cables Arcing or contact with over head | 3 | 5 | 15 | All overhead power cables will be clearly identified. Cranes will not operate within 9 metres and boom length of overhead power lines on wooden poles and 15m and length of boom

Betteridge & Milsom Ltd FM GRU Tower Crane Erection TN13 3SY
from the remote control cables or other obstructions. 3 5 15 on metal pylons unless a permit-to-work is issued and the electricity supplier notified before commencement.

<table>
<thead>
<tr>
<th>Probability Ratings</th>
<th>1= Highly Unlikely, 2=Unlikely, 3= Possible, 4= Probable, 5=Common, 6=Regular, 7= Continuous.</th>
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</thead>
<tbody>
<tr>
<td>Severity Ratings</td>
<td>1= Trivial, 2= Minor, 3=Under“3-Day” Injury, 4= Over the “3-Day Reportable Injury, 5= Major Injury, 6= Fatality (1 person), 7= Multiple Fatality (2+ persons)</td>
</tr>
</tbody>
</table>

The person signing this assessment must check the information above to ensure it is relevant to this operation on this site. Additional control measures deemed necessary must be included.

**ALL EMERGENCIES MUST FOLLOW THE CRANE COMPANY PROCEDURES AS IDENTIFIED IN THE INDUCTION.**

Target Post-Control Rating = 10. Some pre-control ratings may be less than 10 but further controls are still to be considered.
Tool Box Talk Sign Off Sheet

Assembly of FM GRU 1035 City Tower Crane

I have read and understood the above method statements for this project

<table>
<thead>
<tr>
<th>Customer Name: Betteridge &amp; Milsom Ltd</th>
<th>Site Address: The Vines, Sevenoaks, TN13 3SY</th>
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<tbody>
<tr>
<td>Name</td>
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Betteridge & Milsom Ltd  FM GRU Tower Crane Erection TN13 3SY