

Contractor Requirements Tower Crane erection, alteration & dismantle

Purpose

To provide contractors with a clear understanding of the St William/ St James requirements when supplying a tower crane

Main Requirements

Item	Requirements
Design of foundations	<ul style="list-style-type: none"> • Ensure a Foundation Design Specification Report is prepared by a competent Structural Engineer listing the design criteria, calculations and design outcome of the foundation method selected. The specific 'Out of Service' parameters must be considered within the foundation design. An independent design check of the crane foundation must be carried out by an engineer outside of the design provider, to verify that the foundation fully meets the European Standards in FEM 1005-C25 – EN14439. <ul style="list-style-type: none"> ○ Monitor and verify the tower crane base construction in line with the design and associated ITP (Inspection and test plan). Reinforcement and foundation anchors have been installed in accordance with the design details. ○ Concrete has been compacted in accordance with the design specification. ○ Concrete has reached the design strength before the tower crane erection commences, with test records held on file to substantiate this. • Note: Testing, inspection and witnessing needs to be conducted in accordance with the approved design, ITP and temporary works procedures at specified points during the installation process.
Structural Components and Non Destructive Testing (NDT)	<ul style="list-style-type: none"> • Ensure on all cranes over ten years old all jib sections of each crane (all tower cranes) must have undergone 'Non Destructive Testing' (NDT), e.g. magnetic particle inspection, to a minimum of 10% of the main structural joint welds, no more than three months by a UKAS accredited body prior to first erection on a Berkeley site. • A 100% visual inspection of all crane welds by a competent person (certified testing organisation) must also be carried out prior to bringing the crane to site. Written evidence must be provided to show this has taken place. In addition main structural and mechanical components should be CE marked and certificates produced to confirm this. • A pre-delivery inspection report must be produced by the crane supplier and signed off before erection on site confirming the requirements have been complied with. • After twelve months of the crane being in service a further 100% visual inspection must be carried out, on accessible parts, along with a load moment overload test (or equivalent) based on the Cranes duty chart. (Equivalent to test prior to taking into use).
Access ladders	<ul style="list-style-type: none"> • Ensure access ladders which are intended to be used without personal protective equipment against falls from a height have rest platforms at least every 6m and where there is a risk of falling greater than 5m, be equipped with a hoop guard or an alternative means of protection.
Wind Measurement	<ul style="list-style-type: none"> • Ensure an anemometer is fitted to the crane at its highest fixed point and is verified that wind is accessible to the measuring point from 360 degrees of horizontal access. The wind monitoring system must include the following additional equipment which must be tested and verified as correctly functioning prior to the crane being put into use: <ul style="list-style-type: none"> ○ A visual warning system, which can be disabled when the crane is taken 'out of service', using a two stage amber and red light system fitted to the crane in a prominent position, to warn when maximum wind speed is approaching and when it is reached. ○ A repeater monitor located in the Principal Contractors / designated office, displaying the wind speed in real time. ○ A real time data logger located in the Principal Contractors / designated office with a minimum 24 hour recording capability.
Aircraft Warning Beacons	<ul style="list-style-type: none"> • Ensure the Civil Aviation Authority (CAA) is consulted regarding the aviation warning lighting requirements of the crane based on its specific geographical location. Crane must be lit in compliance with CAA guidance. • "Guidance to crane operations on aviation lighting and notification". Further guidance is provided in the CPA-ICIG guidance document TIN 039. • All lights must be lit at night (defined as half hour after sunset and half hour before sunrise) and during inclement weather as determined by Appointed Person / Site Manager.

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	<ul style="list-style-type: none"> A daily monitoring regime must be in place to ensure compliance, and any unserviceable lamps should be replaced as soon as possible after failure and in any event within 24hrs.
Design of ancillary equipment	<ul style="list-style-type: none"> Ensure the design of the fixing arrangements for ancillary equipment light boxes (illuminated signs), signs, aircraft warning beacons, floodlights etc., shall be provided to a structural designer by the crane supplier for verification prior to installation, and evidence has been provided that it has been fixed to this design
Anti-collision (AC) systems	<ul style="list-style-type: none"> Ensure automatic AC systems are used where two or more cranes or parts thereof have the potential to come into contact. Strobe lights should be mounted on each crane fitted with an anti-collision system, configured and which will be illuminated when it has been disabled / overridden. Ensure the Principal Contractor issues written instructions to the crane operators and their supervisor / lifting co-ordinator stating that the anti-collision system (and / or exclusion zoning system) must not be disabled / overridden for any reason. If a request is made by any person to disable or override the system, the request must be recorded in writing, clearly stating the reasons for the request and the identity of the person who made the request. The system must be disabled or overridden for no longer duration than one day, with new written approvals being required for any extensions. Testing and calibration should be carried out prior to taking the crane into service, thereafter it will be repeated at three monthly intervals (in line with 'Thorough Examination') to ensure any system is operating within the set parameters. Ensure that all systems are set up, configured and tested with a representative load (not an empty hook) to allow for the deflection of the crane structure, i.e. the crane under load should not be able to operate beyond the intended parameters.
Rated Capacity Indicator (RCI)	<ul style="list-style-type: none"> All cranes must be fitted with a properly commissioned and calibrated RCI, which gives the operator real time visual display of the percentage of the pre-set safe working load being applied during any lift, plus audible warning when the load exceeds a pre-set percentage of the safe working load, (as agreed between supplier, Principal Contractor and other relevant stakeholders e.g. rail operators).
Slew ring bolt checks	<ul style="list-style-type: none"> Ensure all slew ring bolts are checked for the correct torque prior to first erection on site and are visually checked, where possible, thereafter. Confirmation of this is to be supplied to the Principal Contractor.
Bolted structural connections	<ul style="list-style-type: none"> Ensure during erection, all bolted structural connections must only be tightened using calibrated and fully certified torque equipment, and documentary sign off acquired to verify that this has been carried out. Bolts must not be tightened by flogging. Where possible all structural bolts must be marked by a suitable means to enable a weekly visual check to be carried out to ensure that movement (loosening) has not occurred. Weekly Visual Checks of the structural bolted connections (where accessible) by the crane operator must be incorporated into the Risk Assessment and Method Statement. The requirement for Weekly Visual Checks of the structural bolted connections by the crane operator shall be included within the lifting team briefings and lifting co-ordination meetings and records retained.
Duty Board	<ul style="list-style-type: none"> Ensure a durable, legible and accurate duty board is supplied with the crane.
Security & signage	<ul style="list-style-type: none"> Unauthorised access to tower cranes must be prevented through the provision of suitable protection to the base of the mast. This must follow the requirements of 'CPA TIN 009 Security of access to the crane base.'

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	<ul style="list-style-type: none"> The minimum requirements to be met are as follows: <ul style="list-style-type: none"> A minimum of a 2.4m hoarding with fan protection around the base of the crane. A minimum of a 2.4m hoarding with fan protection at every level the crane mast projects through. The above hoarding specification is to include a lockable access on each level the crane is to be accessed from (e.g. basements, podium levels or frame slabs). A lockable hatch on the ladder run An anti-climb device fitted to the outside of the crane mast at a height of 6.5m above the base of the crane, or 6.5m above the top level the crane projects through. Where masts are close to a building, anti-climb measures added to prevent climbing from the slab edge onto the crane mast; Signs must be in place at the base of the crane mast to warn that unauthorised personnel are not permitted to access the crane, in accordance with CPA TIN 012 Tower Crane Access Signage. Signs should also be placed at the top of the tower below the slew ring to warn of the hazards associated with passing through the slewing section when the crane is in use or in free slew, in accordance with CPA TIN 012 Tower Crane Access Signage. Ensure signs are placed at the top of the tower below the slew ring to warn of the hazards associated with passing through the slewing section.
Thorough Examination	<ul style="list-style-type: none"> Ensure that after erection, an Independent Tower Crane inspection company undertakes the first Thorough Examination and test, before the crane is taken into use. Ensure a Thorough Examination is carried out at three monthly intervals alternately between the crane provider and a Tower Crane Inspection Company for the time the crane is on site.
Electronic Inverter Drives	<ul style="list-style-type: none"> Ensure prior to first use of the crane, the crane provider confirms in writing whether any inverter drives have been replaced or repaired. Where an inverter drive has been replaced or repaired, written confirmation that the inverter drive control parameters have been correctly programmed must be provided.
On-site Machine History File	<ul style="list-style-type: none"> Ensure a machine history file is kept on site by the user to record all maintenance activities carried out on the crane whilst it is erected on that site.
Electrical bonding to earth	<ul style="list-style-type: none"> Ensure that adequate electrical earthing is achieved. The resistance path between the bottom of the tower and earth should be measured and should not exceed a value of 10. Ensure adequate lightning protection / earthing is provided in accordance with BS7121 Part 5 in addition to the level of protection referred to above
Fault Identification	<ul style="list-style-type: none"> Ensure that the Principal Contractor is aware of any crane fault by the Crane Operator presenting the Principal Contractor with a daily inspection report.