

CHECKLIST FOR FIXED MOUNT TOWER CRANE USERS

This checklist provides an overview of the basic requirements which would help to ensure that a tower crane is safe for use. Tower crane users should work with suppliers / owners to meet these minimum requirements and address any concerns before the use of these lifting equipment.

The items in this checklist are non-exhaustive and users are encouraged to make modification and customization to suit to your work processes and conditions at the workplace.

A. EQUIPMENT APPROVED FOR USE		SUGGESTED EVIDENCE	Yes	No
1	Tower crane is of type-approved by MOM. (registered with effect from 1 April 2004)	<input type="checkbox"/> Type-approval document		
2	Tower crane is registered with MOM.	<input type="checkbox"/> LM Certificate or equivalent		
B. RISK ASSESSMENT		SUGGESTED EVIDENCE	Yes	No
3	Risk assessment conducted for the various work processes (e.g. installation, alteration, use, maintenance and dismantling)	<input type="checkbox"/> Completed risk assessment form for the various work processes		
4	Risk assessment team comprised of representatives from the occupier, equipment supplier, equipment operator etc.	<input type="checkbox"/> Risk assessment form indicating the composition of risk assessment team		
5	Safe work procedures are developed and implemented before work is being carried out.	<input type="checkbox"/> Safe work procedures implementation plan <input type="checkbox"/> Inspection to verify implementation of safe work procedures		
6	Safe work procedures are effectively communicated to all relevant parties (e.g. approved crane contractor, crane operator, lifting supervisor, signalman, rigger etc.)	<input type="checkbox"/> Records of briefing / training to relevant parties		
C. LAYOUT PLAN		SUGGESTED EVIDENCE	Yes	No
7	Layout plan is updated and clearly indicates the zones of influence of the tower crane.	<input type="checkbox"/> Layout plan complied with requirements outlined in <u>appendix 1</u>		

8	Layout plan is checked and endorsed by an Authorised Examiner (AE) for full compliance	<input type="checkbox"/> Authorised Examiner's stamp and signature to endorse the layout plan		
9	Operators, lifting supervisors, riggers and signalmen have seen and understood the zone of operation	<input type="checkbox"/> Layout plan with acknowledgement signature from various relevant persons (Operators, lifting supervisors, riggers and signalmen)		
10	Approval by other relevant authorities for the usage of tower crane	<input type="checkbox"/> Approval documents from CAAS, LTA, Mindef and SLA		
D. DESIGN AND CONSTRUCTION OF FOUNDATION / WALL TIE		SUGGESTED EVIDENCE	Yes	No
11	Tower crane's foundation and wall tie are designed and endorsed by a Professional Engineer (PE)	<input type="checkbox"/> Document of design drawing and calculations of foundation and wall tie with Professional Engineer's stamp and signature		
12	Construction of the tower crane's foundation and wall tie are supervised by a Professional Engineer	<input type="checkbox"/> Load data sheet and letter of undertaking from the PE that he would supervise the construction of the foundation / wall tie <input type="checkbox"/> Letter of undertaking from the PE that he had supervised the construction of the foundation / wall tie and that they are constructed in accordance to his design		
13	Tower crane's foundation is sufficiently barricaded to prevent against being knocked by moving objects	<input type="checkbox"/> Document of design drawing to include plan for barricade <input type="checkbox"/> Inspection to verify barricades are installed		
14	Tower crane's foundation is not submerged under water and is cleared of debris / rubbish	<input type="checkbox"/> Inspection to verify requirements are met		
E. PRE-INSTALLATION		SUGGESTED EVIDENCE	Yes	No
15	All load bearing parts and safety devices are checked by an Authorised Examiner before installation to ensure that they are of good construction, sound material, free from patent defects and of adequate design	<input type="checkbox"/> Inspection Checklist completed and signed by Authorised Examiner (<u>Appendix 2</u>) <input type="checkbox"/> Non destructive tests (NDT) report (if applicable)		

16	Only original load bearing members from the manufacturer are to be used for the installation	<input type="checkbox"/> Letter of undertaking from supplier / owner stating that original load bearing members are used		
F. INSTALLATION		SUGGESTED EVIDENCE	Yes	No
17	Notify MOM at least three days before the date of installation	<input type="checkbox"/> Notification form to MOM for use of tower crane in workplace		
18	Only Approved Crane Contractors (ACC) are to install, alter, dismantle and repair tower crane.	<input type="checkbox"/> Approval document as Approved Crane Contractor (ACC)		
19	Post installation inspection carried out by Authorised Examiner which include load tests, inspection of safety devices and limit switches	<input type="checkbox"/> Inspection checklist completed and signed by Authorised Examiner (Appendix 2)		
G. OPERATION OF CRANE		SUGGESTED EVIDENCE	Yes	No
20	Only trained and competent persons are to be involved in the lifting operation (i.e. crane operator, lifting supervisor, signalman and rigger)	<input type="checkbox"/> Crane operator registration card, training records and certificate <input type="checkbox"/> Lifting supervisor, signalman and rigger's training records and certificates		
21	Lifting plan is developed and made available to all persons involved in the lifting	<input type="checkbox"/> Written lifting plan and acknowledgement from persons involved in the lifting		
22	Manufacturer's operating manual and operation log book are made available to the crane operator	<input type="checkbox"/> Manufacturer's operating manual <input type="checkbox"/> Crane operator log book		
23	<p>Crane operator to conduct pre-operational checks at the start of the work shift. The checks should include but not limiting to the following areas:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Observing the verticality of the crane <input type="checkbox"/> Check all limit switches <ul style="list-style-type: none"> <input type="checkbox"/> Check all brakes <input type="checkbox"/> Check all warning devices <input type="checkbox"/> Ensure that the electrical cables in the mast are free from twisting (if the crane is without corrective rings) <input type="checkbox"/> Observe any other visual or audio abnormalities <p>Source: CP62: Code of practice for Safe Use of tower Cranes</p>	<input type="checkbox"/> Pre-operation inspection checklist based on manufacturer's instruction <input type="checkbox"/> Record of completed checklist by operators		

H. MAINTENANCE		SUGGESTED EVIDENCE	Yes	No
24	Tower crane has a regular maintenance programme that is based on manufacturer's instructions	<input type="checkbox"/> Written maintenance programme by supplier / maintenance service provider <input type="checkbox"/> Maintenance record and service report		
25	Maintenance is carried out by competent person	<input type="checkbox"/> Training record or relevant document of competency		
26	Tower crane is inspected by an Authorised Examiner at least once every 12 months	<input type="checkbox"/> Inspection report signed by authorized Examiner		

Comments:

Note:

- Professional Engineer (PE) refers to a person who has a valid registration with the Professional Engineers' Board, Singapore
- Authorised Examiner (AE) refers to a person who is approved from the Commissioner for Workplace Safety and Health to carry out examination or test as stipulated by the conditions of his approval.

APPENDIX 2: CHECKLIST FOR INSPECTION & TESTING OF TOWER CRANE

Source: *Guidelines for the Notification for Use of Tower Crane in Workplace*

Factory No.	
Occupier	
Location	
Name of Approved Crane Contractor/Erector	

LM No.	Serial No.	Brand/Model	Year Manufactured

Pre-Installation Checks		Date / Time:															
S/No.	Item	Yes / No	Remarks														
1	The tower crane was of the type submitted to the Occupational Safety and Health Division. (OSHD).																
2	All bolts/pins or connecting fasteners used are in accordance to manufacturer's design and readily identifiable.																
3	All mast sections have identification markings.																
4	a) All mast sections are free from defects and corrosion that may affect their structural integrity. b) Non-destructive testing not required to establish this.																
5	Random samples of all bolts/pins or connecting fasteners used are non-destructively tested for any defects.*																
	<table border="1"> <thead> <tr> <th>Number of bolts/pins used (excluded those used at the bottom 3 mast sections)</th> <th>Sample size required</th> </tr> </thead> <tbody> <tr> <td>9 to 15</td> <td>5</td> </tr> <tr> <td>26 to 40</td> <td>10</td> </tr> <tr> <td>41 to 65</td> <td>15</td> </tr> <tr> <td>66 to 110</td> <td>20</td> </tr> <tr> <td>111 to 180</td> <td>25</td> </tr> <tr> <td>181 to 300</td> <td>30</td> </tr> </tbody> </table>	Number of bolts/pins used (excluded those used at the bottom 3 mast sections)	Sample size required	9 to 15	5	26 to 40	10	41 to 65	15	66 to 110	20	111 to 180	25	181 to 300	30		
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6	a) Random samples of all slew ringbolts used are tested for any defects. These bolts should be taken from positions on the slew ring that are mutually 90 degrees apart and identified in some manner that is indicative of their original position.* b) Non-destructive test is conducted on the welding of the slew ring attachment to the slew ring mount.																
7	The machine deck is free from any corrosion or defect that may affect its structural integrity.																
8	The operator's cabin is free from any defects that may affect its serviceable use.																

Pre-Installation Checks		Date / Time:	
S/No.	Item	Yes / No	Remarks
9	A safety bar is fitted across the operator's cabin window where there is likelihood of the operator falling through it.		
10	An approved fire extinguisher is provided in the operator cabin.		
11	An emergency stop button, which will terminate the operation of the crane engine, is installed in the operator cabin and correctly identified.		
12	All controls are checked for correct identification.		
13	The hydraulic system is free from any oil leaks.		
14	All the brake and clutch mechanisms have been stripped and serviced.		
15	An emergency load lowering device is fitted.		
16	All rope anchorages are serviced.		
17	All counter-weight attachments, trolley, trolley wheels etc., are serviced and free from defects.		
18	The cat-head including the tie-rods are free from any defects that may affect its serviceable use.		
19	All jib sections are free from defects and corrosion that may affect their structural integrity.		
20	All main cords on each jib section are thickness tested to detect internal corrosion. .		
21	All sheaves and bearings are free from any defects that may affect their serviceable use.		
22	The hook, hook block, overhauling weight and associated attachments are free from wear and damage.		
23	The climbing frame and equipment is free from any defects that may affect their serviceable use.		
24	The foundation has been designed; and certified by a Professional Engineer of the relevant discipline and constructed accordingly.		

Installation Checks		Date / Time:	
S/No.	Item	Yes / No	Remarks
25	The tower crane is sited as indicated in the layout plans endorsed by the Occupational Safety and Health Division.		
26	The installation is in accordance with the configuration and manufacturer's instructions.		
27	The bolts/pins or other connecting fasteners used for the bottom 3 mast sections are new ones.		
28	The tower crane is plumbed to check that it is vertical.		

29	All the pins/bolts or fasteners used for the assembly are fitted with safety pins or locking pins.		
30	Bolts are tightened to the correct torque.		
31	Tie rods to the boom and jibs are securely fastened.		
32	Tie-backs are fastened as per designed.		
33	Fixed access ladders are provided for access to all serviceable parts of the tower crane.		

Other Tests / Checks		Date / Time:	
S/No.	Item	Yes / No	Remarks
34	The tower crane is load tested at both its maximum and minimum working radii with sufficient load.		
35	Limit switches are tested : a) overhoist limit switch b) overload limit switch c) trolley limit switch d) slewing limit device		
36	A load-radius indicator with warning signal is installed and in good working condition.		
37	All safety devices and brakes are checked.		
38	Wind anemometer is installed and in good working condition.		
39	Anti-collision devices are tested to stop the tower crane's operation such that the crane-to-crane interference must be maintained at not less than 3 metres.		

Other Remarks:

Name & Signature of authorised examiner: _____

Date : _____