Occupational Safety and Health Division
18 Havelock Road
Singapore 059764
Tel : 64385122
www.mom.gov.sg
mom_oshd@mom.gov.sg

MINISTRY OF MANPOWER

NOTIFICATION FOR USE OF TOWER CRANE IN WORKPLACE

This form may take you 20 minutes to complete.
You will need the following information to fill in the form:

- Particulars of occupier of workplace
- Particulars of tower crane used
- Particulars of Approved Crane Contractor

NOTIFICATION FORM FOR USE OF TOWER CRANE IN WORKPLACE

To: Ministry of Manpower
Occupational Safety and Health Division
Havelock Road, #03-02
Singapore 059764

Notes to all applicants:

1. This Notification must be **duly completed** and bear all the required signatories.
2. If any of the response to Part C – Part H is "No", it has not satisfied the stipulated requirements for the installation and use of tower crane.
3. For sites having more than 3 tower cranes, an additional Notification is to be made.
4. All documents shall be retained by the occupier and to produce them when requested by OSHD

S/No	Item	TC1	TC2	TC3
A) PARTICULARS OF OCCUPIERS				
1.	Factory Permit No			
2.	Name of factory occupier			
3.	Address where tower crane is to be installed			
4.	Postal Code	Singapore ( )		
5.	Expected date of installation			
6.	Expected date of dismantling			
B) PARTICULARS OF TOWER CRANES				
7.	Model of tower crane(s)			
8.	Jib Type (Saddle / Luffing)			
9.	LM Certificate No.			
10.	Tower crane's Serial No.			
11.	Type Approval No.			
12.	Maximum Design Safe Working Load (DSWL)			
13.	Year of Manufacture			
C) PROPOSED CONFIGURATION OF TOWER CRANE				
14.	Jib length			
15.	Final Height-Under-Hook (HUH)			
16.	Availability of an efficient braking or locking mechanism installed directly onto the luffing drum to prevent the free-falling of luffing jib– for luffing jib tower crane? (Y/N/Not applicable)			
17.	Is the final height of the tower crane within the approved AMSL by the authorities? (Y/N)			
D) THIRD PARTY INSPECTION REPORT (NDT BY SAC-SINGLAS ACCREDITED TESTING AGENCY)				
18.	Availability of NDT report for tower cranes used locally for 8 or more years? (Y/N/Not applicable)			
19.	Availability of NDT report for used tower cranes that are 5 or more years old brought in from overseas? (Y/N/Not applicable)			

E) FOUNDATION				
20.	Has the tower crane foundation been designed and endorsed by a PE? (Y/N)			
21.	Is there PE's Letter of Undertaking for the structural design of the foundation? (Y/N)			
22.	Is there PE's Letter of Undertaking for the supervision of the construction of the foundation? (Y/N)			
F) WALL TIE [for tower crane(s) that exceed the free standing height of 40m]				
23.	Is the wall tie designed by a PE? (Y/N)			
24.	Is there a side elevation of the tower crane/s endorsed by the PE who designed the wall ties indicating clearly the HUH and position of each wall tie? (Y/N)			
G) LAYOUT PLANS				
25.	Does the layout plan have all the necessary information as stipulated under paragraph 5 of the guidelines? (Y/N)			
26.	Is the layout plan endorsed by an authorised examiner? (Y/N)			
H) RISK ASSESSMENT				
27.	Has risk assessment been conducted to eliminate or reduce the hazards identified for the installation, use, maintenance, alteration and dismantling of the tower crane? (Y/N)			
28.	Has safe work procedures been developed and implemented for the installation, use, maintenance, alteration and dismantling of the tower crane? (Y/N)			
I) PERSONNEL				
29.	Name of Approved Crane Contractor installing the tower crane			
30.	Name of Approved Crane Erector(s)			
31.	Name of Tower crane Operator(s)			
32.	Name of Lifting Supervisor(s)			

DECLARATION:

I have read, understood and fully aware of the requirements and my responsibilities as stated in the Guidelines. I also undertake that all the information stated herein is true and correct.

		Applicant	Occupier's Representative	Authorised Examiner
Name	:			
Designation	:			
Tel / Fax / Email	:			
Date	:			
Signature	:			
Company's Stamp	:			

GUIDELINES FOR THE NOTIFICATION FOR USE OF TOWER CRANE IN WORKPLACE

CONTENT **Page**

1. INTRODUCTION

1.1 With effect from Oct 2006, occupiers of workplaces need not seek written approval from the Occupational Safety and Health Division (OSHD) for the installation of tower cranes in their workplaces. Occupiers will now need only to submit a Notification Form to OSHD at least three (3) days prior to the installation of the tower crane(s).

1.2 Anyone who intends to install and use tower crane in a workplace (e.g. factory, worksite or shipyard) shall complete the ***"Notification Form for Use of Tower Crane In Workplace"*** and submit this Notification Form to OSHD at least three (3) days before the proposed installation date.

1.3 The occupier shall ensure that the tower crane is inspected and tested by an Authorised Examiner (AE) and had received a valid report of examination issued by the AE, prior to operating the tower crane.

1.4 The occupier shall retain the documents as specified in **Appendix 1** and produced them for inspection when requested by OSHD.

2. TOWER CRANE TYPE

2.1 Only tower cranes that are manufactured in accordance to acceptable international standards and codes are allowed to be used in Singapore.

2.2 All new tower cranes shall be type-approved for use in Singapore. For more details on the type approval of tower cranes, please refer to the URL: http://www.mom.gov.sg/Documents/safety-health/factsheets-circulars/Type%20Approval%20of%20Tower%20Cranes.pdf

2.3 Applications for type approvals of all new tower cranes shall be made directly to OSHD.

3. USED TOWER CRANES (IMPORTED FOR FIRST USE) (see Appendix 2)

3.1. All used tower cranes brought in from overseas and to be registered for use for the first time, shall satisfy the following conditions:

- It must be a model type-approved for use in Singapore; and
- It must be accompanied by a recent (not more than 2 years) inspection certificate from the statutory inspection authority of the country where it was last used.

3.2. Used tower crane from overseas that is 5 or more years old (from the date of manufacture) shall be subjected to an inspection by a third-party inspection agency acceptable to the Commissioner for Workplace Safety and Health (hereafter known as Commissioner). The third-party inspection requirements can be found in **Appendix 3**.

3.3. Used tower cranes of the following will not be permitted for use in Singapore:

- Tower cranes from countries that do not have requirements on statutory inspection; or
- Tower cranes which are 15 or more years old (from the date of manufacture); or
- Tower cranes with inspection certificate from country of last use issued more than 2 years ago.

4. USED TOWER CRANES (WITH EXISTING LM CERTIFICATE)

4.1 Tower cranes already approved and registered for use in Singapore, i.e. those with an existing LM certificates, and which are 8 or more years old (from the date of manufacture) shall have to undergo a third-party inspection before each installation. (**see Appendix 3**)

4.2 Tower cranes which are 15 or more years old (from the date of manufacture) will not be allowed to use unless the occupier or owner obtained a letter from the manufacturer certifying that the tower crane can be safely used for a longer period. Tower cranes of 20 or more years old (from the date of manufacture) will not be allowed for use.

4.3 Non-Destructive Tests shall be carried out by a testing agency that is accredited to the SAC-Singlas for the particular scope of testing.

5. LAYOUT PLAN

5.1. The occupier shall retain the latest layout plans at the site office showing clearly the zones of influence of the tower crane(s) with respect to the workplace (site) in accordance to the ***Acceptance Criteria for the Layout of Tower Cranes*** outlined in **Appendix 4**.

5.2. The layout plan shall be drawn to scale and shall contain the following information:

- Model of the tower crane(s) *(consistent with the notation used in the Notification).*
- LM Number for each tower crane.
- The respective height-under-hook (HUH) of each tower crane.
- The tower crane(s) zone of operation and collapse;
- Location of the loading and unloading area;
- Adjacent areas up to 100 metres outside the factory boundary, indicating the buildings, structures, MRT tracks and etc. which fall within these areas;
- Areas that are affected should the tower crane collapse. In the event of a collapse, the maximum reach of the collapsed tower crane should be **at least 6 metres away** from the outermost edge of any MRT track, viaduct or station; or such clearance, which was granted by the LTA;
- A side elevation of the tower crane(s) indicating clearly the HUH and position of each wall tie that will be installed as per design by the Professional Engineer;

5.3. The occupier shall ensure that the layout plan is checked and endorsed by an AE for full compliance to the requirements stated in paragraph 5.2 and Appendix 4.

5.4. By endorsing on the layout plan, the AE is deemed to have certified that the layout plan has met the acceptance criteria stipulated in Appendix 4 and the requirements stated in paragraph 5.2. **Disciplinary action will be taken against the AE if it is found that the AE had endorsed the layout plan contrary to the requirements.**

5.5. The AE shall also at the time of testing and examination of the tower crane(s), check and certify that the layout of the tower crane(s) at the site complies with that drawn on the layout plans.

5.6. The occupier shall ensure that the registered crane operator, appointed lifting supervisor, riggers and signalmen have seen the approved zone of operation, by having them to sign on the layout plan as acknowledgment.

6. DESIGN AND CONSTRUCTION OF FOUNDATION / WALL TIE

6.1. The tower crane's foundation and wall tie (if applicable) shall be designed and supervised during its construction by a Professional Engineer (PE) of the relevant discipline. The PE must consider the following when designing the foundation:

- The final height and configuration of the tower crane;
- All applicable forces - wind loading, vertical and horizontal forces, moments and torques associated during the in-service and out-of-service conditions and to **select the more conservative forces** for use in the design.

6.2. Suitable wall ties (designed by a PE) shall be installed if the tower crane exceeds a free standing height of 40 metres. The wall tie design shall include a side elevation of the tower crane(s) endorsed by the PE who designed the wall ties indicating clearly the HUH and position of each wall tie.

6.3. The occupier shall obtain a copy of the design drawing and calculations endorsed by the PE and a load data sheet together with a letter of undertaking stating that the PE would be supervising the construction of the foundation/wall ties.

6.4. After completing the construction of the foundation/wall ties, the PE shall issue a certificate to confirm that he had supervised the construction and the foundation/wall ties were constructed to conform to his design.

6.5. The AE is to verify that the free standing height of the tower crane does not exceed 40m with and without the installation of the wall ties. The AE is also to verify that the wall ties are constructed as per the design of the PE.

6.6. The occupier shall retain the above documentation and make available for inspection when requested by OSHD.

Note: A Professional Engineer (PE) refers to a person who has a valid registration with the Professional Engineers' Board, Singapore

7. INSTALLATION

7.1. Siting

a) The tower crane must be installed at the position as indicated in the layout plan. All installations of tower crane must be in accordance with the instructions contained in the manual issued by the manufacturer.

b) The installation, alteration, dismantling and repair of the tower crane shall only be carried out by an approved crane contractor.

7.2. Pre-installation checks

a) All load bearing parts and safety devices of the tower crane must be checked by an AE before the Installation. They must be of good construction, sound material, free of patent defects and of adequate strength.

b) If possible, use new bolts/pins or other connecting fasteners for the bottom 3 mast sections. The supplier or owner must ensure that only original load bearing members from the manufacturer are used for the Installation. A letter of undertaking shall be submitted at application.

c) Bolts/pins or other connecting fasteners of 8 or more years old shall not be used.

7.3. **Installation**

a) All mast sections shall be erected only to a height necessary for immediate needs and extended in height only when construction has progressed. Mast sections shall be tied to the building at intervals as may be specified by the manufacturer. It shall be plumbed and securely tied to ensure stability and rigidity.

b) **Suitable wall ties (designed by PE) shall be installed if the tower crane exceeds a free standing height of 40 metres. Occupier or owner must seek the Commissioner's approval if he wants to erect the tower crane exceeding a free-standing height of 40 metres**.

7.4. **Modifications**

a) Tower crane must be re-inspected by an AE if there is any modification to the load bearing members of the tower crane including changes to the length/height of the boom/tower and addition/removal of tiebacks.

b) The re-inspection shall include a load test. A new LM certificate must be issued for the test.

c) Such modification shall only be carried out by an approved crane contractor upon approval from the manufacturer and certified by an AE.

8. RISK ASSESSMENT

8.1 Risk assessment of the various types of work processes (such as installation, alteration, use, maintenance and dismantling of tower crane) shall be conducted to evaluate the risks to the safety and health of employees to which they are exposed while they are at work. Where the risks are significant, appropriate measures must be developed, implemented and maintained to eliminate or reduce the risks.

8.2 The occupier of the workplace is responsible to ensure the risk assessment is conducted by a team comprising representatives from the occupier, the equipment supplier, the equipment operator and etc. The occupier shall also ensure that safe work procedures are developed and implemented before carrying out such work. The safe work procedures shall include the safety precautions to be taken in the course of work and during an emergency; and the provision and use of personal protective equipment.

8.3 The occupier is to ensure that the safe work procedures are effectively communicated to all relevant parties such as the approved crane contractor, crane operator, lifting supervisor, signalman, rigger and etc.

8.4 For more information on the conduct of risk assessment, please refer to the following URL: http://www.mom.gov.sg/workplace-safety-health/safety-health-management-systems/Pages/risk-management.aspx

9. STRUCTURAL REPAIR OF TOWER CRANE

9.1. Any one who intends to carry out any structural repair of a tower crane, which may affect its safe use, must notify the Commissioner at least 3 days prior to its commencement.

9.2. Such repair must be carried out by an approved crane contractor, in accordance to the manufacturer's instructions.

-End-

APPENDIX 1 - DOCUMENTS TO BE RETAINED BY THE OCCUPIER

The occupier shall retain, but not limited to, the following documents at the site office:

a) A copy of the factory licence.

b) Tower crane(s) layout plan as endorsed by the Authorised Examiner.

c) Previous LM Certificate; or Manufacturer's certificate with the corresponding conformity certificate; or certificate issued by the overseas statutory inspection authority.

d) A copy of the Type Approval Document with the corresponding letter of conformity (*for tower cranes without LM certificate with effect from 1st April 2004*).

e) Third-party inspection report (if applicable).

f) Design drawings and calculations of the foundation and wall tie design (if applicable) certified by the Professional Engineer.

g) Letter of undertaking from the Professional Engineer who will supervise the construction of the foundation of his design.

h) Letter of undertaking from the Professional Engineer who had supervised the construction of the foundation in accordance to his design.

i) Letter of undertaking from the supplier that only original load bearing members from the manufacturer are used for the installation.

j) Approval letters from the relevant regulatory authorities, e.g. Civil Aviation Authority of Singapore, Ministry of Defence, Land Transport Authority, Singapore Land Authority.

APPENDIX 2 - REQUIREMENTS FOR TOWER CRANES

The following table shows the requirements for the categories of tower cranes that are acceptable to be used in Singapore:

Tower crane Type	Requirements
New tower crane	Manufacturer's certificate with the corresponding conformity certificate[1]
Used tower crane already in use locally	Less than 8 years old - Previous LM Certificate
	8 or more years old - Previous LM Certificate and third-party inspection[2]
Used tower crane brought in from overseas	Less than 5 years old - Inspection certificate from the country of last use[3] and issued not more than 2 years ago
	5 or more years old but less than 10 years old - Inspection certificate from country of last use[3] and issued not more than 2 years ago; and third-party inspection[2]
	Inspection certificate from country of last use[3] issued more than 2 years ago – Not allowed to be used.
	10 or more years old[4] - Not allowed to be used.

[1] Tower cranes are to be manufactured in accordance to acceptable internationally standards and Codes

[2] Third-party inspections are to be done by either an AE or any of the third-party inspection agencies; or by a party prescribed by the Commissioner

[3] Inspection certificate must be issued by the statutory inspection authority from the country of last use (eg : HSE certificate for tower cranes from United Kingdom)

[4] From date of manufacture

APPENDIX 3 - THIRD-PARTY INSPECTION REQUIREMENTS

1. If there is a need for a third-party inspection, it should be conducted by an acceptable third-party inspection agency, or any AE authorised to act as a third-party by the Commissioner.

2. All Non-Destructive Tests shall only be carried out by a testing agency, which is accredited to the **SAC-Singlas** for the particular scope of testing.

3. The inspector shall inspect all parts of the tower crane. A comprehensive survey report shall include the following defects: -
   a) Corrosion
   b) Cracks (especially at weldments)
   c) Dents and bends at members
   d) Signs of fatigue
   e) Other defects

4. If the defects can affect the safe operation of the tower crane, the AE inspecting the tower crane shall not approve the tower crane for use.

5. The inspector shall carry out magnetic particles inspection (MPI) to check for surface or sub-surface flaws at weldments at critical parts of the tower crane, such as at the mast sections, slewing ring, tie-rod brackets, etc. If necessary, MPI should be conducted at all other weldments if the inspector, after the visual inspection, finds it necessary. Radiography of the weldments may also be used.

6. Random ultrasonic thickness measurements should be conducted at various points to confirm that significant thinning of structural components has not occurred.

7. The inspector shall after completion of his inspection and tests, prepare a report on his inspection, stating the observations made and the suitability of the tower crane for use. He shall append to his report, the results of the MPI and ultrasonic thickness gauging made on the tower crane.

Note: Inspector refers to an inspector from a third-party inspection agency or an authorised examiner.

APPENDIX 4 - ACCEPTANCE CRITERIA FOR THE LAYOUT OF TOWER CRANES

The table below shows the acceptance criteria for tower cranes to be used:

Issues	Criteria
Zone of Influence (includes both jib and counterjib)	**<u>For Saddle Jib (Hammer-head) Tower Crane</u>** The ***Zone of Operation*** is within the factory boundary. **unless:** • Slewing limit switches are installed (and indicated on the plan) to prevent the jib from slewing beyond the factory boundary; i.e. the tower crane shall not slew 360 degrees.
	<u>For Luffing Jib Tower Crane</u> 1. To conduct Risk Assessment with control measures on the proposed use of luffing jib tower crane. The control measures shall be reviewed and endorsed by an AE. 2. To implement and maintain records for the safe use of luffing jib tower crane. 3. The ***Zone of Collapse*** is within the factory boundary. **unless:** • The collapsed zone lies within uninhabited areas or non-public access areas; • The tower crane is sited such that it is within or surrounded by the building/s under construction; i.e. the zone of collapse is mitigated by the building structure. **Written acknowledgement and agreement** from the owner of the adjacent properties that their property lies within the zone of collapsed shall be obtained. 4. The luffing jib tower crane when not in operation shall be so parked within the zone of collapsed as proposed in the layout plan.
Crane to crane interference	For factory with more than one tower crane, **crane-to-crane interference must be prevented by suitable devices**, such as slew or trolley limit switches or anti-collision device. The zone of influence of the counter-weight jib must not interfere with the zone of influence of another tower crane. The minimum horizontal buffer distance between the jibs / counter-jibs of both tower cranes shall not be less than 3 metres.
Height Separation	Where the zone of influence of two or more tower cranes interferes with one another within a site, there must be a height separation of at least **3 metres** vertically between the jib of a tower crane to the highest point of the other tower crane or structure within the zone of influence.

Note : The zone of collapse refers to the affected area in a worst case scenario should a tower crane collapse completely, i.e. both mast and jib.

APPENDIX 4 - ACCEPTANCE CRITERIA FOR THE LAYOUT OF TOWER CRANES

1. **The occupier and AE shall ensure that:**

   a) The jib, counterjib and counterweights of the tower crane shall not over-sail or interfere with **any buildings, structures, bridges, public roads or areas within the railway protection zone (ie 40m from the outermost edge of the rapid transmit system structure)**, unless the owner/occupier of the tower crane has obtained the consent from the occupant of the building or relevant authorities (eg LTA), etc allowing the jib of the tower crane to over-sail the building or public roads.

   b) The written consent shall be accompanied by a proposal by the occupier stating down preventive measures to be taken if the jib is over-sailing the building or road (e.g. special hoarding or periodic road closure).

   c) The jib or counterjib of the tower crane shall not over-sail any **school, petrol station, community clubs, places of worship or any other public buildings** beyond the factory boundary. This is regardless whether permission had been obtained by the owner of the establishment.

2 Written approvals shall also be obtained from the Civil Aviation Authority of Singapore and Ministry of Defence for the Installation of the tower crane. This is to ensure that the tower crane, among other things, will not interfere with their activities.

3 The addresses of the relevant authorities are as follows:

   (a) Director-General of Civil Aviation
   Civil Aviation Authority of Singapore
   Singapore Changi Airport
   P.O. Box 1
   Singapore 918141

   (b) Manager
   Development & Building Control
   Land Transport Authority
   PSA Building
   460 Alexandra Road #19-00
   Singapore 119963

   (c) Head, Air Plans
   Air Plans Dept, HQ RSAF
   Mindef Building
   Gombak Drive
   Singapore 669638

APPENDIX 5 - INSPECTION OF TOWER CRANE BY AN AUTHORISED EXAMINER (AE)

1. An AE engaged to carry out the inspection of a tower crane shall ensure that:

   a) The tower crane is of the type indicated in the Notification submitted to OSHD.

   b) The tower crane was sited as indicated by the plan.

   c) The foundation had been designed and certified by the Professional Engineer (PE) of a relevant discipline and constructed accordingly.

   d) He checks the tower crane before the Installation to establish that all parts of tower crane used are of good construction, sound material, free of patent defects and of adequate strength.

   e) The installation was in accordance with the manufacturer's instructions; and

   f) He carried out an inspection of the tower crane after the Installation, including a load test. The load test shall be conducted at both its maximum and minimum working radii, with sufficient load to test its safe operation.

   g) The operation of the tower crane is in compliance with requirements under Appendix 4.

2. The AE shall retain a copy of the LE certificate issued by him together with the duly completed ***Checklist for inspection & testing of tower crane (see Appendix 6),*** and produced them to OSHD upon request.

3. The AE shall also ensure that an operation log-book is available and updated by the registered tower crane operator.

APPENDIX 6 - CHECKLIST FOR INSPECTION & TESTING OF TOWER CRANE

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

LM No.	Serial No.	Brand/Model	Year Manufactured

<table>
<tr><th colspan="3">Pre-Installation Checks</th><th colspan="2">Date / Time:</th></tr>
<tr><th>S/No.</th><th colspan="2">Item</th><th>Yes / No</th><th>Remarks</th></tr>
<tr><td>1</td><td colspan="2">The tower crane was of the type submitted to the Occupational Safety and Health Division. (OSHD).</td><td></td><td></td></tr>
<tr><td>2</td><td colspan="2">All bolts/pins or connecting fasteners used are in accordance to manufacturer’s design and readily identifiable.</td><td></td><td></td></tr>
<tr><td>3</td><td colspan="2">All mast sections have identification markings.</td><td></td><td></td></tr>
<tr><td>4</td><td colspan="2">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.</td><td></td><td></td></tr>
<tr><td>5</td><td colspan="2">Random samples of all bolts/pins or connecting fasteners used are non-destructively tested for any defects.*

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</td><td></td><td></td></tr>
<tr><td>6</td><td colspan="2">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.</td><td></td><td></td></tr>
<tr><td>7</td><td colspan="2">The machine deck is free from any corrosion or defect that may affect its structural integrity.</td><td></td><td></td></tr>
<tr><td>8</td><td colspan="2">The operator’s cabin is free from any defects that may affect its serviceable use.</td><td></td><td></td></tr>
</table>

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 : _____