



Tower Crane Manufacturers,
Suppliers, Owners and Interested Parties

TYPE APPROVAL OF TOWER CRANES

This document supercedes our earlier circular LE 5/02 of 12 Dec 2002. The type approval scheme for tower cranes is revised as follows:

For existing tower cranes registered with the Occupational Safety Department, MOM (ie. with LM certificates)

1. All existing tower cranes that have already been registered with the Occupational Safety Department (OSD) and used in Singapore, are **not required** to apply for type approval. With effect from 1st April 2004, these existing registered tower cranes shall have the following safety devices installed by the date stipulated as follows:

For tower crane already installed on site and will not be dismantled by the next statutory inspection.		
S/n	Installation of Safety Devices/Features	Compliance Date
1	a) Safe access (ladder with hoop guards) to the operator's cabin with rest-landings at every interval not exceeding 10 meters of vertical climb; or b) Adequate safety line(s) with fall-arresting device(s) for the attachment of safety lanyards shall be provided and maintained.	Prior to the next Statutory Inspection
2	A gangway with toe-guards at both sides shall be fitted along the jib(boom). A handrail or guard/safety line, to which a worker's safety harness can be attached, shall be fitted all along the length of the gangway. Such installation shall comply with ISO 11660-3:1999 Cranes – Access, guards and restraints – Part 3 Tower Cranes.	Prior to the next Statutory Inspection

For tower crane not yet installed on site; or for tower crane to be re-installed on site.		
S/n	Installation of Safety Devices/Features	Compliance Date
3	All safety devices/features as listed in Appendix 1 of the <i>Procedures for the type approval of tower cranes</i> .	Prior to the next installation of the crane.

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For imported tower cranes which are not registered with OSD (ie. without LM certificates)

2. With effect from 1st April 2004, all imported (new and used tower cranes yet to be registered for use in Singapore) tower cranes shall be type approved prior to use in Singapore. The procedures for the application of type approval are appended in this document.

Yours faithfully,



TAN GEOK LENG

for CHIEF INSPECTOR OF FACTORIES

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PROCEDURES FOR THE TYPE APPROVAL OF TOWER CRANES

(supercedes LE 5/02 of 12 Dec 2002)

1. INTRODUCTION

- 1.1. This procedure shall apply only to **all** models / types / brands of tower cranes imported on or after 1st April 2004 to be used in Singapore. This shall also include used tower cranes imported from overseas which have not yet been registered and issued with a LM certificate.
- 1.2. Only type approved tower cranes can be registered and issued with LM certificate with the Occupational Safety Department for used in Singapore.

2. OBJECTIVE

- 2.1. The objective for type approval of tower crane is to ensure that the tower crane brought into use in Singapore meet the mandatory and regulatory requirements for safe operation.

3. IMPLEMENTATION

- 3.1 The implementation of the type approval scheme for tower cranes will be from 1st April 2004.

4. PROCEDURES

- 4.1. The **suppliers (manufacturers or agents) or owners** shall make an application for the type approval of their tower crane using the prescribed application form and procedures describe in this document.
- 4.2. The applicant will need to submit one application for each model of the tower crane for type approval.
- 4.3. Upon the successful application for type approval, the department will issue a Type Approval Document for that model of tower crane.

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5. CRITERIA FOR THE TYPE APPROVAL OF TOWER CRANE

5.1. In order for the tower crane to be type approved by the department, the application must satisfy the Department in the aspects of designs, functions and safety.

a. Design Codes and Standards

- i. The tower crane shall be designed according to international codes and standards acceptable to the Chief Inspector of Factories. The following codes and standards are currently acceptable for use:
 - SS, ISO, EN, BSI, FEM, ANSI, DIN, ASME
- ii. Other National Codes may be used subject to the prior approval of the Chief Inspector of Factories

b. Verification of Design and Fabrication

- i. The verification involves a design review and a testing by an approved party as outlined below. The verification can be conducted either overseas or locally.

		Design Review	Functional Testing
Purpose of verification		To verify that the design conforms to the relevant design codes, standards and regulatory requirements.	To verify that the equipment had been fabricated in accordance to the design specification and can perform its function as designed in a safe manner when used. ^(Note 1)
Party to conduct the verification overseas		Approved Overseas Third Party Inspection Agency or the manufacturer ^(Note 2)	
Certification Required	Approved Overseas Third Party Inspection Agency	Certificate of Compliance (Design Review & Functional Testing) – Annex 1 & 2 Certificate of Compliance (Safety Devices/Features) – Annex 3	
	Manufacturer	Declaration of Conformity ^(Note 2) Certificate of Compliance (Safety Devices/Features) – Annex 3	
Party to conduct the verification locally		Approved Local Third Party Inspection Agency	
		Professional Engineer (PE) of the relevant discipline ^(Note 3)	Approved Person (AP)
Certification Required		Certificate of Compliance (Design Review) Certificate of Compliance (Functional Testing) Certificate of Compliance (Safety Devices/Features)	

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Note 1:

The model of the tower crane shall be tested in a suitable testing environment at the premises of the manufacturer works or a laboratory set up to the equipment.

Note 2:

Self-certification by manufacturer in the form of a Declaration of Conformity may be accepted if the crane is manufactured in accordance to the necessary standards/requirements of a recognized governing body, such as the EEC Council Directives and its mandatory requirements.

Note 3:

- a. This applies in the case where type approval is sought for a tower crane without any documentation to establish the origin of the lifting equipment.
- b. The owner of the tower crane engages a Singapore registered Professional Engineer (P.E.) of the relevant engineering discipline to carry out a review of the equipment's design. The P.E. shall use the latest and applicable version of the Singapore Standards, in his review.
- c. Where the applicable Singapore Standards is not available, any of the following national codes may be used:
 - ISO, EN, BSI, FEM, ANSI, DIN, ASME
- d. Other National codes may be used subjected to the prior approval of the Chief Inspector.

c. Quality Assurance by the Manufacturer

- i. The manufacturer of the equipment must satisfy the department that the equipment that they produced consistently meets the specifications of the crane that was type approved for used in Singapore.
- ii. The manufacturer must put in place an accredited Quality Assurance System that is reviewed or audited periodically. A certificate of accreditation of the Quality Assurance System shall be submitted to the department.

d. Compliance to Legal Requirements

- i. Every tower crane shall meet the legal and procedural requirements, including but not limited to the provision of the safety devices/features as listed in Appendix 1.

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6. SUBMISSION REQUIREMENTS

- 6.1. For the purpose of applying for type approval of tower crane, the applicant shall submit the following documents to the Occupational Safety Department:

Documents to be submitted:	
a	A completed Application Form.
b	Certificates of Compliance (Design Review & Functional Testing).
c	Certificate of Compliance (Safety Devices/Features) – safety devices/features as spelt out in Appendix 1.
d	Certificate of accreditation of the Manufacturer's Quality Assurance System.
e	List of Components. (see Appendix 2)
f	Operational history and Inspection Report issued by the country of last use – applicable for used tower crane.
Documents to be retained and will remain available on the owner's premises for any inspection purposes:	
g	Inspection Checklist (see Appendix 3)
h	Crane Log. (see Appendix 4)
i	Operations and Maintenance Handbook.

- 6.2. The department may consider the acceptance of the manufacturer's issued Declaration of Conformity for cranes manufactured in the EU in accordance to the regulatory requirements and the ECC directives, in place of the Certificate of Compliance (Design Review and Functional Testing) issued by an approved third party inspection agency.
- 6.3. Upon receipt of the completed application package, an inspector from the Occupational Safety Department will carry out a survey on the tower crane. The purpose is to assess the adequacy of the safety fittings and the safety provisions necessary to manage the risks involved in the use of the tower crane and to ensure compliance with the legal requirements.
- 6.4. At the end of the assessment, if the Ministry is satisfied that the tower crane has been properly designed, tested and has met the legal requirements, a type approval document would be issued to the applicant together with a Type Approval Number. This Type Approval number shall be marked on the tower crane.

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7. PROCEDURES FOR OWNERS SEEKING TYPE APPROVAL FOR THEIR EQUIPMENT

7.1. The owner of the same model of tower crane shall first check with the supplier whether Type Approval had been granted for the equipment. If the supplier had already obtained a type approval for that model of tower crane, the owner may not need to type approve his tower crane of the same model if the following 3 documents are obtained from the supplier (i.e. the manufacturer or its authorised representative):

Letter of Compliance (Type Approval);
Letter of Compliance (Safety Devices/Features);
A copy of the Type Approval document; and
Inspection Checklist.

7.2. A Letter of Compliance (Type Approval) is a confirmation that the owner's equipment has been designed, built, tested and will be used in accordance with the specifications that had been type approved by the Department. This Certificate shall indicate clearly that the lifting equipment involved (bearing a particular identification/serial number) meets the specifications as per Type Approval Document issued by the Department.

7.3. A Letter of Compliance (Safety Devices/Features) is a confirmation that the owner's equipment has been equipped with all the necessary safety devices/features as spelt out in Appendix 1.

7.4. Only the supplier may issue the Letter of Compliance (Type Approval) and the Letter of Compliance (Safety Devices/Features) to other owners of the equipment.

7.5. The owner shall produce these documents to the approved person for his verification, prior to his registration of the tower crane.

7.6. If for some reasons, the supplier is unable to issue the Letters to the owner, the owner may apply directly to the department for the Type Approval based on the procedure outlined in paragraph 6.1.

7.7. A flowchart on the application procedure is outlined in Appendix 5.

8. CONDITIONS FOR THE TYPE APPROVAL OF TOWER CRANE

8.1. General Conditions

a. Only tower crane that meets the criteria will be considered for type approval. Where safety provisions on the tower crane are found lacking, the manufacturer, its authorised representative or the owner shall take all measures to ensure that the necessary safety fittings and safety provisions are installed before type approval will be granted.

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- b. Although the design calculations need not be submitted to the department as part of the application, it shall be documented and be made readily available for review whenever requested by the department. All applicants for type approval are required to keep a copy of the design calculations in a local office.
- c. Notwithstanding the type approval granted to the lifting equipment, all lifting equipment brought into use in Singapore are required to comply with all legal or procedural requirements issued by the Occupational Safety Department.
- d. The Chief Inspector reserves the right to impose additional safety requirements to a model of lifting equipment that was granted type approval. Such requirements shall be made known to the holder of the type approval, and / or owners of such equipment and it shall be complied with.
- e. Anyone who intends to bring in the same model of lifting equipment that had been type approved for use in Singapore will have to ensure that the equipment complies with the specifications that were being typed approved. He may approach the supplier to obtain the relevant Letters for his use of the equipment. (see paragraph 7)
- f. Alternatively, he may choose to follow the procedures in paragraph 6.1 to apply for the type approval.

8.2. Revocation of Type Approval

- a. The type approval granted to a model of a tower crane will be revoked if:
 - i. The applicant fails to implement, or meet the requirements imposed by the Chief Inspector of Factories for any lifting equipment to which the type approval applies;
 - ii. The applicant modifies the design of the lifting equipment, for which the type approval applies, without notifying and getting the approval of the Chief Inspector of Factories; and
 - iii. The applicant has made a false declaration, or has provided false or materially incorrect information, or has withheld information in his application for type approval.
- b. Any lifting equipment that was found to have breached the conditions or specifications issued or imposed for that Type Approval, will have its Report of Examination issued by an Approved Person (if any) withdrawn. The equipment will then be taken out of service until it has complied with the necessary requirements.

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8.3. Revision of the Type Approval

- a. The Type Approval shall be valid until there is a change in the approved specifications of the lifting equipment. The circumstances that warrants a fresh application or a revision in the existing type approval is tabulated below:

Type Approval	Parameters		
	Design & Components	Configuration	Revision of Design Codes and Standards
A new application is required when:	Addition / Alteration of structural components or design that result in a change in the Design safe working load of the lifting equipment	Increase in the maximum jib length	New equipment models built to the revised codes and standards
A revision to the existing Type Approval is required when:	Addition / Alteration of structural components or design that has no effect on the Design safe working load of the lifting equipment	Change in the marking scheme adopted	Existing (type approved) equipment models built to the revised codes and standards

9. FEES PAYABLE

- 9.1. A cheque made payable to the "Chief Inspector of Factories" shall all be made at the point of application.

Type Approval	Fees
New application	S\$350.00
Revision of existing Type Approval	S\$115.00

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10. INSPECTION BY APPROVED PERSON

- a. The supplier or the owner will appoint an Approved Person to inspect, test and approve the lifting equipment before using the lifting equipment. The Approved Person shall check and ensure that the lifting equipment had been type approved before carrying out his inspection.
- b. The Approved Person shall not inspect the lifting equipment if he finds that a type approval has not been granted to the lifting equipment, but will refer the supplier or the owner to apply for type approval with the Chief Inspector of Factories.
- c. The supplier or the owner shall make available, and the Approved Person shall request the following documents during his inspection:
 - i. The Type Approval Documents;
 - ii. The Certificate/Declaration of Conformity (Design Review & Functional Testing) – Annex 1 & 2;
 - iii. The Certificate of Compliance (Safety Devices/Features) – Annex 3;
 - iv. Inspection Checklist; and
 - v. Operational history and Inspection Report issued by the country of last use – applicable for used tower crane.
- d. The Approved Person will use the inspection checklist to assist him to conduct his inspection and testing of the lifting equipment. The Approved Person shall also with the help of the above documents, confirm that the equipment has been built or erected to the approved design and configuration.
- e. Only when the Approved Person is satisfied that the lifting equipment is built or erected to the approved design and is safe for use, will he issue a report of examination.

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SAFETY DEVICES / FEATURES ON TOWER CRANES

1. The safety features/devices shall include, but not limited to the following:
 - a. trolley traveling limiter, hoisting limiter, lowering limiter, derricking limiter, slewing limiter, max. load limiter, load moment limiter;
 - b. jib angle indicators, if applicable;
 - c. effective braking system(s) that is fail-safe with the brake automatically applied whenever there is power failure, or when there is free-falling of the luffing jib or the hoisted load;
 - d. 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;
 - e. a radius and safe working load indicator that shows at all times the working radius and the corresponding safe working load and gives an audible alarm and visual warning signal when the radius or the working load is unsafe;
 - f. safe access (ladder with hoop guards) to the operator’s cabin with rest-landings at every interval not exceeding 10 meters of the climbing mast. For vertical climbing mast without rest-landings, adequate safety line(s) with fall-arresting device(s) for the attachment of safety lanyards shall be provided and maintained.;
 - g. gangway with toe-guards at both sides shall be fitted along the jib(boom). A handrail or guard/safety line, to which a worker’s safety harness can be attached, shall be fitted all along the length of the gangway. Such installation shall comply with ISO 11660-3:1999 Cranes – Access, guards and restraints – Part 3 Tower Cranes.
 - h. a device that will prevent automatic restarting of motors at the resumption of power during power interruption;
 - i. adequate aircraft warning lights and/or chequered white and red flags;

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LIST OF COMPONENTS

1. This list may be used by an inspector to verify the components installed on the tower crane and the configuration(s) in which the tower crane may be installed.
2. The list shall include the identification/part/serial number of all components used for the crane for all possible combination of tower masts, jibs and all other components that are or will be used in Singapore. The components shall include but not limited to the following:
 - a. Undercarriage (including fixing angles)
 - b. Tower Mast Section
 - c. Climbing Equipment
 - d. Slewing Platform or Turntable
 - e. Tower head (Cathead)
 - f. Counterjib (including stay rods)
 - g. Main Jib (including stay rods)
 - h. Winches / motor
 - i. Braking mechanism
 - j. Rope / Trolley Pulleys
 - k. Specifications of Wire Ropes
 - l. Accessories that affect the mechanical and structural integrity of the crane during operation
3. The component list shall also include drawings corresponding to the components listed above.
4. Applicant shall submit the component list in write-once media (eg. CD-R)

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INSPECTION CHECKLIST

1. The inspection checklist shall have the following minimum information:
 - a. The brand, model, capacity and configuration of the lifting equipment;
 - b. A diagram of the lifting equipment;
 - c. A list (with part / identification no.) of all the components corresponding to the diagram in paragraph 1b that need to be inspected at each statutory inspection;
 - d. If necessary, a list of the other items that need to be inspected at other intervals, indicating the inspection intervals;
 - e. The test parameters and approval limits;
 - f. The dates of tests, inspections, issue of report, and the next inspection date; and
 - g. A "Remarks" section where the Approved Person can record any observations from his inspection of the lifting equipment. He is also to append remarks on any repairs or modifications made since the lifting equipment was first approved for use.

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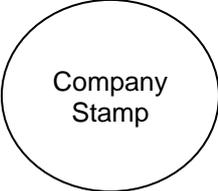
CRANE LOG

1. There shall be a crane log maintained for each unit of the tower crane throughout its service life. The information contained in the crane log should include at least the following:
 - a. The particulars (such as brand, model, serial no.) of the crane;
 - b. The ownership of the crane;
 - c. Records of the usage pattern (duration and type/weight of loadings) of the crane;
 - d. Records of any malfunction during operation of the crane;
 - e. Records of servicing/maintenance/repair done on the crane;
 - f. Records of inspections performed on the crane;

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**SAMPLE FORMAT FOR
CERTIFICATE OF COMPLIANCE (DESIGN REVIEW)**

The following information shall be included in the Certificate.

<i>Certificate of Compliance (Design Review)</i>	
The undersigned hereby declares that the following equipment:	
Category	: Tower Crane (Luffing / Hammerhead)
Manufacturer	: _____
Model	: _____
Serial No.	: _____
Year of Manufacture	: _____
Max. Design Safe Working Load	: _____
Max. Boom/Jib Length	: _____
Complies with all the design requirements as per following standards/codes listed:	
<i>List all the design standards/codes here</i>	
Issued on	: _____
Signature	: _____
Name of Officer	: _____
Designation of Officer	: _____
Organisation	: _____
	

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**SAMPLE FORMAT FOR
CERTIFICATE OF COMPLIANCE (FUNCTIONAL TESTING)**

The following information shall be included in the Certificate.

Certificate of Compliance (Functional Testing)

The undersigned hereby declares that the following equipment:

Category : Tower Crane (Luffing / Hammerhead)

Manufacturer : _____

Model : _____

Serial No. : _____

Year of Manufacture : _____

Max. Design Safe Working Load : _____

Max. Boom/Jib Length : _____

Functions in accordance and comply with the design specifications as per following standards/codes listed:

List all the design standards/codes here

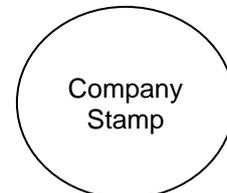
Issued on : _____

Signature : _____

Name of Officer : _____

Designation of Officer : _____

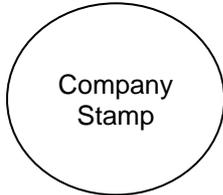
Organisation : _____



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**SAMPLE FORMAT FOR
CERTIFICATE OF COMPLIANCE (SAFETY DEVICES/FEATURES)**

The following information shall be included in the Certificate.

<i>Certificate of Compliance (Safety Devices/Features)</i>	
The undersigned hereby declares that the following equipment:	
Category	: Tower Crane (Luffing / Hammerhead)
Manufacturer	: _____
Model	: _____
Serial No.	: _____
Year of Manufacture	: _____
Max. Design Safe Working Load	: _____
Max. Boom/Jib Length	: _____
Has all the safety devices/features installed as per following listed:	
<i>List all the safety devices/features installed on the equipment here</i>	
Issued on	: _____
Signature	: _____
Name of Officer	: _____
Designation of Officer	: _____
Organisation	: _____
	

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APPLICATION FORM FOR THE TYPE APPROVAL OF TOWER CRANE

A complete application for type approval includes the following:

Hard copy of

- a) A completed Application Form;
- b) Certificate of Compliance (Design Review & Functional Testing);
- c) Certificate of Compliance (Safety Devices/Features)
- d) Manufacturer's Certificate of Quality Assurance System;

In CD-R

- e) List of Components;
- f) Operational history/Inspection reports – if applicable

A cheque made payable to the "Chief Inspector of Factories"

All completed application are to be submitted to the:

Chief Inspector of Factories
Ministry of Manpower
18 Havelock Road, # 03-02
Singapore 059764

For Official Use:
Reference Number:
Date of Application:
Please tick:
<input type="checkbox"/> New Application
<input type="checkbox"/> Revision

SECTION A: PARTICULARS OF MANUFACTURER / COMPANY

Particulars of Company making the application		
Name of company:	Contact address:	Telephone Number :
Country:	Email:	Facsimile Number :
Particulars of Manufacturer		
Name of Manufacturer:	Contact address:	Telephone Number :
Country:	Email:	Facsimile Number :

SECTION B: PARTICULARS OF THE CRANE

Brand:	Model: Version / Revision: (If applicable)	Maximum Design Safe Working Load:
Maximum Jib Length:	Maximum Standing Height:	Maximum Design Free-Standing Height:
Serial Number:	Certification Body: Manufacturer / Third Party Inspection Agency * (* delete where not applicable)	
Year of Manufacture:	Design Codes/Standards used:	

SECTION C: SAFETY DEVICES

Type of Safety Devices / Brakes installed on the model of the crane
(please tick those that are applicable):

<p>Limit Switches</p> <p><input type="checkbox"/> Load radius indicator (mandatory)</p> <p><input type="checkbox"/> Automatic moment limiter</p> <p><input type="checkbox"/> Overload limit switch</p> <p><input type="checkbox"/> Over hoist limit switch</p> <p><input type="checkbox"/> Trolley limit switch</p> <p><input type="checkbox"/> Over derrick (luffing) limit switch</p> <p><input type="checkbox"/> Slewing limit switch</p> <p><input type="checkbox"/> Travel Limit Switch</p> <p>Safety-line with Fall Arresting Device</p> <p><input type="checkbox"/> On climbing mask.</p> <p><input type="checkbox"/> Along jib/boom</p> <p>Guardrails</p> <p><input type="checkbox"/> On climbing mask/rest landings</p> <p><input type="checkbox"/> On gangway</p>	<p>Braking Mechanism</p> <p>Type of primary hoist / luff drum brakes :</p> <p>_____</p> <p>_____</p> <p><input type="checkbox"/> Acts directly on primary hoist/luff drum</p> <p><input type="checkbox"/> Acts indirectly on primary hoist/luff drum</p> <p>Type of secondary hoist / luff drum brakes:</p> <p>_____</p> <p>_____</p> <p><input type="checkbox"/> Acts directly on secondary hoist/luff drum</p> <p><input type="checkbox"/> Acts indirectly on secondary hoist/luff drum</p> <p>Others (pls. specified: _____)</p> <p>_____)</p>
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SECTION D: DECLARATION

I declare that I have read the application procedures and the information stated above are true and correct to the best of my belief and knowledge.

Date **Name and Designation of Applicant** **Signature**