GUIDE TO SAFE USE OF OVERHEAD CRANES, GANTRY CRANES, JIB CRANES AND HOISTS

CRANE SAFETY SYMPOSIUM
27 OCT 2016
Guide to Safe Use of Overhead Travelling Cranes, Gantry Cranes, Jib Cranes and Hoists
• THIS IS A GUIDE BOOK

– NOT A CODE OF PRACTICE

– NOT A STANDARD
PURPOSE

• CREATE AWARENESS OF THE HAZARDS IN LIFTING OPERATIONS

• PROVIDE BASIC KNOWLEDGE IN THE SAFE OPERATION
APPLICATION

• TO BE USED BY CRANE OPERATORS AND SUPERVISORS

• TO BE USED IN TOOLBOX MEETING

• AS A TRAINING GUIDE
CHARACTERISTIC OF THE GUIDE BOOK

• SIMPLICITY

• EASE TO COMPREHEND

• PICTORIAL

• SEQUENTIAL CHAPTERS
SEQUENTIAL CONTENT OF GUIDE BOOK

• COMMON ACCIDENTS
• WHO ARE THE KEY PERSONNEL
• CHECKS BEFORE USE
• RIGGING OF LOAD
• OPERATION SAFETY (DO’s & DON’T’s)
SEQUENTIAL CONTENT OF GUIDE BOOK (…cont’d)

• WHAT TO DO FOR MORE COMPLICATED LIFTING?
• ENVIRONMENTAL CONSIDERATIONS
• MAINTENANCE REQUIREMENTS
2. Common accidents

Overloading

Caught in between moving gantry crane and structure / objects / fixed obstruction

Hit by moving or swinging loads

Falling load due to insecure rigging

Caught in between load and lifting gear
3. Key Personnel

- OWNERS / OCCUPIERS
- LIFTING SUPERVISORS
- CRANE OPERATORS
4. Visual Checks (before operation)

- HAS A VALID TEST CERTIFICATE
## 4. Visual Checks

<table>
<thead>
<tr>
<th>Check the crane for:</th>
<th>![Image of crane]</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Oil leakage; and</td>
<td></td>
</tr>
<tr>
<td>• Any unusual vibration or sound.</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Check that hoist is in proper working condition, and all motion indicators on the pendant control correspond with control device marking.</th>
<th>![Image of hoist]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always familiarise yourself with the controls as pendant controls can differ from one another.</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Ensure all hoist limit switches, travel limit switches and indicating devices are in good working condition.</th>
<th>![Image of hoist limit switches]</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Crane may also be provided with any or a combination of the following types of indicators:</td>
<td></td>
</tr>
<tr>
<td>• Load indicator;</td>
<td></td>
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<tr>
<td>• Working space limiter;</td>
<td></td>
</tr>
<tr>
<td>• Anti-collision device; and</td>
<td></td>
</tr>
<tr>
<td>• Crane Motion indicator (Audible and visual).</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Check hook block to make sure it is in good working condition.</th>
<th>![Image of hook block]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check that the safety latch is able to spring back.</td>
<td></td>
</tr>
<tr>
<td>There should be no illegal modification to the hook.</td>
<td></td>
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</tbody>
</table>
4. Visual Checks ....
Load carrying members
• WIRE ROPE
4. Visual Checks ....
Load carrying members

- LOAD CHAIN
4. Visual Checks ....
Load carrying members

- WEB SLINGS
5. Rigging Methods
5. Rigging Methods
5. Rigging Methods

Worker’s Safety Handbook
for Rigger and Signalman
4. Roles and Responsibilities of a Rigger
Check lifting gears

5. Roles and Responsibilities of a Rigger
Ensure load lifted is safe and balanced

6. Roles and Responsibilities of a Rigger
Ensure loose loads are secured

7. Roles and Responsibilities of a Rigger
Report defective lifting gear to Lifting Supervisor

8. Roles and Responsibilities of a Rigger
Use paddings on the load edges

9. Good and Bad Rigging Practices
Correct use of choker hitches

10. Good and Bad Rigging Practices
Correct way to balance a shackle load

11. Good and Bad Rigging Practice
Correct hook-up methods

Note: Images and text on the pages appear to be related to safety and rigging practices in a construction or similar setting. The text and images are designed to educate and inform individuals on proper procedures and safety measures.
6. Operational Safety

Visually check the operating environment to make sure that there are no new hazards which might affect the safe use of the crane.

Do not make assumption. Ask if in doubt.

Do not operate the crane if not feeling well.

Do not operate the crane if it is locked out or tagged out (LOTO).

Do not overload crane or hoist.

Do not use the hoist rope/chain as a sling.
6. Operational Safety

- Do not lift a load from the side. Centre the crane directly over the load before hoisting to avoid swinging the load.

- Do not ride on the load or allow others to do so.

- Do not lift loads over people.

- Make sure the load is properly secured before lifting.

- Do not multi-task when operating the crane.

- Do not operate the crane in a rushed manner.
6. Operational Safety

- Communicate clearly between lifting team before and during lift.
  - Use Tag Lines or Push/Pull Sticks to help control the load.
  - Do not use crane to pull out a jammed or stucked object.

- Ensure adequate clearances between cranes and fixed objects.
  - A ≥ 750mm
  - B ≥ 600mm

- Do not leave suspended load overnight or unattended.
Complex Lifting Operations

• TANDEM LIFTING
  – PLAN WITH COMPETENT PERSON

• USE OF SPECIAL LIFTING ATTACHMENTS
  – USE THEM IN COMPLIANCE WITH MANUFACTURER’S INSTRUCTIONS
8. Environment Conditions

8.1 Rain
For all outdoor cranes / hoists, the equipment and all sensitive components should have been designed with the correct Ingress Protection (IP) enclosure and proper shelters.

8.2 Thunderstorms
• During thunderstorms, stop lifting operations immediately.

8.3 Strong Winds
• Cranes must never be used when wind speeds are beyond those recommended in the crane manufacturer’s instructions.
• In the event of strong winds, stop all lifting operation and secure the gantry crane with a wind restraint device.
Maintenance

• EMPLOYERS MUST ENSURE ALL LIFTING EQUIPMENT ARE IN GOOD WORKING CONDITION

• PUT IN PLACE A PREVENTIVE MAINTENANCE PROGRAMME
9. Documentation

- RISK ASSESSMENT
- SAFE WORK PROCEDURE
- LIFTING PLANS
10. References

- Workplace Safety and Health Act
- Workplace Safety and Health (General Provisions) Regulations
- Workplace Safety and Health (Risk Management) Regulations
- Workplace Safety and Health (Operation of Cranes) Regulations 2011
- Approved Code of Practice on Safe Lifting Operations in the Workplaces
- Approved Code of Practice SS497:2011 Code of Practice for Design, safe use and maintenance of gantry cranes, overhead travelling cranes and monorail hoists
- Approved Code of Practice SS595:2014 Steel wire ropes for hoisting – Part 3: Code of Practice for the care, inspection and maintenance of steel wire ropes for hoisting
- Guidebook for Lifting Supervisors
- Worker’s Safety Handbook for Rigger and Signalman
References

SINGAPORE STANDARD
Code of practice for design, safe use and maintenance of gantry cranes, overhead travelling cranes and monorail hoists

SS 497: 2011
(SC53.020)

SINGAPORE STANDARD
Code of practice for factory layout – Safety, health and welfare considerations

(Formerly CP 27)

SS 567: 2011
(SC51.048 SC51.130 SC51.140)
Annexes...Hand Signals

- Jib Up
- Jib Down
- Travel to me
- Travel from me
- Hoist
- Lower
- Slew Left
- Slew Right
- Extend Jib/Trolley Out
- Retract Jib/Trolley In
- Stop
- Emergency Stop

- Derricking Jib
  Signal with one hand. Other hand on head.
- Signal with both hands.
- Clench and unclench fingers to signal take the strain.
- Arm extended, pointing with finger in direction of swing of boom.
- Telescoping Jib/Horizontal Jib
  Signal with one hand. Other hand on head.
- Clench and unclench fingers to signal inch the load.
Annexes…Examples of Lifting Appliances (LA) and Lifting Gears (LG)

Lifting appliances: includes pulley blocks, gin wheels, chain blocks or set of chain blocks.

- **Pulley Block**
- **Chain Block**

Lifting gear: any chain, rope, chain sling, webbing sling, rope sling, ring, hook, shackle, swivel or eyebolt and any cage or work platform used for carrying persons while suspended from the load line of a crane.

- **Chain Sling**
- **Rope Sling**
- **Webbing Sling**
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Cathay Teo         SIA Engineering Company Ltd
Johnny Cheng       Singapore Aero Engine Services Pte Ltd
Charles Tan        Ministry of Manpower
Han Kin Sew        Workplace Safety and Health Council
GET IT

TOGETHER WE’LL MAKE LIFTING OPERATIONS SAFE

USE IT
THANK YOU