

**ENVIRONMENTAL, HEALTH AND SAFETY MANAGEMENT SYSTEM**

**Doc No:**

**JPPL-EHS-19-03-SWP-02**

**Revision No:**

**04**

**Effective Date:**

**15 September 2020**

**Title: OMC Lifting Operations & Equipment**

<b>Revision No.</b>	<b>Description of Change</b>	<b>Clause No.</b>
02	Change of document numbering Change of company logo Change of EHS to EHS Insertion of content page	NA
03	Change of document numbering	
04	Review of document format	
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## **1 PURPOSE**

- 1.1 To provide guideline for lifting operation.

## **2 SCOPE**

- 2.1 To minimize potential lifting operation hazards.

## **3 RESPONSIBILITIES**

### 3.1 JPPL's Licence Mobile Crane Companies must:

- a) Pre-registered the crane with WSH by submitting valid Lifting Machine Certificate and insurances.
- b) Submit Mechanical Equipment (Temporary/Permanent) Entry Notification Form and its supporting documents to WSH before entry to JPPL Premises.
- c) Ensure that Pre-operation check has been carried out.

### 3.2 Workplace, Safety & Health (WSH) will;

- a) Verify the Mechanical Equipment (Temporary/Permanent) Entry Notification Form and its supporting documents at Permit Counter at Pass Office.

### 3.2 Security Personnel the Incident Command Centre to:

- a) Verify the Crane Entry Pass and Mechanical Equipment (Temporary/Permanent) Entry Notification Form for its validity during entry.

### 3.3 Site Operational Personnel for the Lifting Operation:

- a) Ensure all applicable crane spreaders are used for cranes' outriggers at the lifting site that fall within OMC lifting operations guidelines.
- b) Liaise and work closely with appointed lifting supervisor related to the lifting operations.

### 3.4 Company performing lifting operation shall appoint a competent lifting supervisor to supervise the lifting operations at all times.

### 3.5 Appointed Lifting Supervisor for each lifting site:

- a) Duly discharge their responsibilities in order for the safe lifting operation associated with the mobile cranes under all conditions.

- b) Ensure all lifting operations carried out with appropriate personnel e.g. trained signalmen, riggers and etc.
- c) Liaise and work closely with site operational personnel related to the lifting operations.
- d) Revise lifting plans, risk assessment and safe work procedures with site operational personnel.
- e) Communicate the lifting plan, risk assessment and safe work procedures to all the personnel involved.

### 3.6 JPPL WSH Staff:

- a) Conduct random checks on lifting sites to ensure all lifting operations fall within JPPL lifting operations guidelines.
- b) Acknowledge on the submission of document after site verification.

### 3.7 JPPL Engineering Property Maintenance (EPM) Engineers:

- a) Review periodically or upon special request, the JPPL lifting operations guidelines for mobile cranes usage at wharf decks/hard standing areas.

## **4 PROCEDURES**

### 4.1 General

- a) The Contractor shall not conduct lifting operations during lightning alerts or high winds. Checks on wind speed should be verified before the lift is conducted.
- b) The Contractor shall conduct a JSA briefing for all lifting operations prior to any lifting operation occurs.
- c) For all lifting operations Lifting Checklist must be completed and be available at the lifting location and must be submitted with the relevant work permit application. \
- d) The Contractor Supervisor, Rigger and Signalmen must be identified when executing their responsibilities on site. The following table below is the colour code required.
- e) All loads shall have tag lines attached in order to control the load, however, tag lines shall not be used to control swing or push and pull loads.
- f) Adequate communication between the Crane Operator and the Signalmen shall be maintained at all times during the lift. Where clear hand signal communication cannot be maintained, then radios shall be

used. A copy of the hand signals shall be maintained by the operators controls for ready reference.

- g) Pre-lift Talks shall be conducted prior to each lift, which will the specific details of the load, crane set-up and pick and drop points. Additional hazards and precautions shall be detailed.
- h) Barriers and the appropriate signage shall be erected around the lifting zone to warn of lifting activities. No person shall enter the barricaded areas unless authorized to do so by the lifting supervisor. No person, unless directly involved, shall enter the barricaded area during a lift.

	<u>Safety Vest with Reflective Strips</u>	<u>Wording Printed on the vest</u>	<u>Safety helmet color</u>
Lifting Supervisor	GREEN with reflective strips	LIFTING SUPERVISOR	YELLOW helmet with 2 RED band
Rigger	GREEN with reflective strips	RIGGER	RED helmet
Signalman	GREEN with reflective strips	SIGNALMAN	RED helmet with 2 BLUE band

#### 4.2 Critical Lifts / Tandem Lifts

- a) All critical and tandem lifts shall follow the requirements set out in OMC.
- b) The Contractor will prepare and approve a Critical / Tandem Lift Plan before the lift takes place.
- c) Mobilization of mobile crane and transportation with counterweight:
  - Adhere to LTA rules & regulations.
  - To provide Auxiliary Police escort if necessary
  - To carry out pre-site survey before mobilizing the mobile crane into the site.
  - Provision of banksman to guide the mobile crane into the site.
- d) Position of mobile crane for ( XX ton) and (XX ton) mobile crane and assembly of counterweight
  - To check and survey ground condition and positioning location (inclusive of underground services).
  - Provision of approved lifting permit / lifting plan and laying of steel mat. ( As per site requirement)
  - Provision of banksman to guide the maneuver of vehicle.
  - To consult site personnel if in doubts
  - Barricade of working zone and warning signage
  - To submit all necessary certificates such as LG, LM etc before commences

- To attached base plate for outriggers before jacking up of mobile crane
- Crane operator should not extend boom section during crane set up
- Only appointed crane attendant to carry out the job and must give clear proper signal to the crane operator
- Crane attendant to put on body harness and hook up 100% tie off when working at height of more than 3m above ground
- Ensure mobile crane are service regularly and in good working conditions
- To conduct a check using crane checklist

e) Hooking and securing of lifting gear

- Ensure proper PPE such as hand gloves
- Lifting supervisor brief on tool box meeting and check on PPE

f) Lifting Operation

- Ensure a lifting plan is done
- To comply with the on-site Permit to work system such as Lifting Permit
- Lifting crew to know the load weight and inform crane operator
- Comply to crane load chart SWL
- Ensure taglines are available and wear proper hand gloves
- Signaller to ensure all rigger hands are off the load before giving further signals to the crane operator
- Ensure all rigging are properly carry out by competent rigger
- 2.6.8 Provision of proper PPE such as hand gloves, safety helmet, safety boots
- 2.6.9 Ensure LG and LA are tested and within valid test dates before usage
- Visual inspection of lifting gears to be conducted before start of any lifting operation
- Appoint of one signaller only to communicate with crane operator
- Using of hand signal or walkie-talkie (Setting of frequency for lifting operation should be separated from others)

g) Lowering of Load

- Ensure competency of signaller for the lifting operation and equipped with proper communication devices.
- Use a single channel for a single lifting operation.
- All personnel not involved in the operation to be cleared away from the area.
- No body part to be in-way-of any nips or gaps during the lowering of load onto the foundation.
- Adequate tag lines to be used for controlling the load.

- Lifting gears to be removed after the load has been fully lower onto the ground by the lifting supervisor.
  - Unhooking and unsecuring of lifting gears.
  - Proper PPE such as hand gloves, goggles, helmet, safety belt/harness, safety boots etc.
- h) Reposition of ( XX ton) for tandem lifting
- To check and survey ground condition and positioning location (inclusive of underground services)
  - Provision of approved lifting permit / lifting plan and laying of steel mat. ( As per site requirement)
  - Barricade of working zone and warning signage
  - To submit all necessary certificates such as LG, LM etc before work commences
  - To attached base plate for outriggers before jacking up of mobile crane
  - Crane operator should not extend boom section during crane set up
- i) Tandem lifting until levelled above the ground
- Ensure a lifting plan is done
  - Apply for lifting permit and comply to the recovery safe work procedures
  - Ensure competent lifting team members and determined load before lifting.
  - Lifting supervisor to brief the recovery team before works commence
  - Ensure taglines are available and wear proper hand gloves
  - Lifting supervisor to ensure the correct rigging point
  - Ensure that only qualified signalman is allowed to give a standard clear signal to the crane operators
  - Using walkie talkie as communication system
- j) Assemble / Disassemble of fly jib (if required)
- Usage of proper access such as approved type A-frame ladder
  - To provide assistant to assist in the fly jib extension activity
  - Equipped with proper PPE such as hand gloves, safety helmet with chin strap, safety boots & body harness
  - Crane operator to wait for crane attendant signal before moving any parts of the crane
  - To provide a tag line to control the movement of the fly jib
  - To comply with the manufacturer's operation manual on assembling of fly jib
- k) Demobilization of mobile crane and transportation with counterweights

- To comply with manufacturer specification
  - Crane operator should not rush the job and do it the safe way
  - Barricade of work area and prevent any unauthorized entry
  - Crane operator to ensure nobody is near to the outriggers before retracting it
  - Only appointed crane attendant to carry out the job and must give clear proper signal to the crane operator
  - Crane attendant to put on body harness and hook up 100% tie off when working at height of more than 3m above ground
  - Adhere to LTA rules and regulations
  - To provide Auxiliary Police escort if necessary
- l) Access & egress from crane cabin
- To use access ladder that is mounted on the crane
  - Check of the ladder every day before use
  - Exercise precaution when access is wet or muddy.
  - Apply the 3 points of contact rule when descending or ascending from the access
- m) Perform nightworks during operation
- Provide sufficient lighting by respective contractor when working at night.
- n) Working during inclement weather (Raining day/storm/ gusty wind)
- Update weather condition occasionally from supervisor
  - Immediately stop work when informed of CAT 1 and go to the nearest building shelter

#### 4.3 Lifting Equipment

- a) All lifting equipment, used by the Contractor must be tested and examined and have a valid certificate. Equipment must be properly marked with an identification number and safe working load and be colour coded by the Contractor in accordance with the OMC colour scheme.
- b) Copies of all test and examination certificates must be available on the Contractor site premises for inspection by OMC representative or visiting authority.
- c) A register of all lifting equipment used by the Contractor shall be kept by the Contractor onsite, and maintained by a nominated Contractor employee.
- d) The OMC WSH Manager's shall be notified by the Contractor of the name of the nominated employee, charged with ensuring lifting equipment is inspected, and the register maintained.



- e) The nominated Contractor employee shall receive all lifting gear on its arrival on site and ensure its proper storage in a rigging store, approved by the OMC.
- f) He shall further:-
  - 1.4.1 Ensure each item of lifting gear is accompanied by a valid certificate and keep all such certificates for examination by the OMC.
  - 1.4.2 Enter the details of all lifting equipment received on site into a register which shall have details of the lifting gear identification number and safe working load.
  - 1.4.3 Ensure that all items of lifting gear are properly colour coded as per the OMC requirements and that a board showing the current colour code is permanently displayed at the approved rigging store and other appropriate places.
  - 1.4.4 Keep a register of all issues of lifting gear and ensure that all items of lifting gear are returned for his inspection on a monthly basis and that such inspections are entered into the lifting gear register.
- g) The use of webbing (nylon) slings shall be closely controlled. The nominated Contractor employee shall issue webbing slings to a supervisor for one job only and they shall be returned on completion of the job for re-inspection by the nominated employee. The nominated employee shall keep a record of all such issues and returns.
- h) All lifting equipment shall be properly supported by a load bearing member of sufficient strength for the load to be imposed.
- i) Defective lifting equipment shall be withdrawn immediately from service and returned to the nominated Contractor employee, for removal from site.
- j) No item of lifting gear shall be used to support a load greater than the safe working load of the lifting gear.
- k) Protection from sharp edges shall be used where there is potential for cutting/slicing of slings e.g. steel edges.
- l) All lifting gear shall be examined, at monthly intervals and all such examinations shall be entered into the Contractor register. Colour codes on every independently examined item of lifting gear shall be changed based on the colour coding system as shown below.
- m) No item of lifting gear shall be used unless it has the current colour code for the operation.

MONTH	COLOUR
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JANUARY	<b>BLACK</b>
FEBRUARY	<b>BLUE</b>
MARCH	<b>GREEN</b>
APRIL	<b>YELLOW</b>
MAY	<b>WHITE</b>
JUNE	<b>GREY</b>
JULY	<b>BLACK</b>
AUGUST	<b>BLUE</b>
SEPTEMBER	<b>GREEN</b>
OCTOBER	<b>YELLOW</b>
NOVEMBER	<b>WHITE</b>
DECEMBER	<b>GREY</b>
REJECT / DANGER/ DO NOT USE	<b>RED</b>

- n) Lifting equipment and other lifting appliances belonging to OMC must not be used by the Contractor unless written permission has been given.
- o) No ropes of any manufacture may be used for support or restraining purposes, unless certified as appropriate for that use by the OMC Safety Manager.
- p) Temporary pipe supports used during erection, are to be of sufficient strength and durability for the loads imposed by the pipe-work system, i.e. approved wire rope lashing.

#### 4.4 Mobile Cranes

- a) Contractor Mobile Cranes shall be inspected in line with the OMC Procedures.
- b) All cranes, whether owned by the Contractor or hired, must carry relevant test certificates and thorough examination reports, together with the manufacturer's handbook. This documentation must be provided to OMC and made available before mobilisation of plant & equipment to site.
- c) Only persons who are competent and authorised by the Contractor shall be allowed to operate cranes. The Contractor must be able to prove, to the satisfaction of the OMC. The competence of their employees to operate such equipment prior to its use. Operators, Lifting Supervisors and Riggers will be certified by the Singapore Ministry of Manpower and records / register of assigned and authorised personnel shall be maintained by the Contractor.
- d) The Contractor involved in lifting operations with a crane (including a piling rig) or mobile crane shall appoint in writing a lifting supervisor, qualified riggers and signalman to oversee all lifting operations.

- e) Crane operators or other competent persons must carry out daily inspections and enter these in the Contractor crane register. Failure to maintain the register properly may lead to suspension of operations. This obligation is the responsibility of the crane hirer when he is supplying the crane and the operator. In addition, the Contractor will implement a regular inspection and maintenance programme to ensure that all components of the lifting device are in good condition.
- f) Travel routes for cranes and crane standing must be agreed through the OMC WSH Supervisor to avoid such things as overhead lines and other structures, underground services, excavations, made up ground, etc. Cranes must be escorted all times when travelling round the site. No crane shall move without an escorting banksman.
- g) The Contractor shall ensure that load spreader pads of sufficient size in thickness area and of suitable material, i.e. metal plates, timber, etc, are to be placed under each outrigger foot, before all crane lifting operations. Outriggers shall not be placed on cable trenches where appropriate ground inspection and ground pressures shall be checked before the crane is setup to ensure that soft grounds and voids are avoided.
- h) Crane duty charts (Load Radius Tables) must be displayed on or be available in the crane for easy reference, in English, and a language understood by the Contractor's operator. In addition, the Crane Manufacturer's Operating and Erection manuals must be available on site.
- i) Sections above shall also apply to HIABS, fork lift trucks, cherry pickers, and similar equipment and any type of mechanical man lifting equipment.

All cranes shall be fitted with working and where necessary calibrated:-

- 1.4.5 Reverse warning audible alarm.
- 1.4.6 Load Radius Indicator.
- 1.4.7 Automatic Safe Load Indicator.
- 1.4.8 Crane hooks with Safety Catches.
- 1.4.9 Limit Switches.

- j) The assembly, rigging and de-rigging of any crane components, including fly jibs, shall only be done under the supervision of a competent lifting supervisor. An approved lifting plan and JSA, together with the manufacturer's erection procedures must be in place covering rigging activities for the equipment.
- k) No crane shall travel with a suspended load, unless designed to do so by the crane manufacturer e.g. crawler crane.

- l) Outriggers, when installed, must always be used and fully extended, unless allowed by the crane manufacturer.
- m) Cranes will be to a suitable earth point.
- n) Fall protection shall be provided during for crane rigging assemblies through the use of retractable lifelines, safety harnesses/lanyards, minimizing movement in elevated areas by using ladders and in some cases personnel lifts.
- o) Walking of chords and lacings of crane booms without continuous fall protection such as horizontal lifelines is prohibited.
- p) When working on crane cabs / superstructure, retracting lifelines shall be attached by the first person up and be used by all persons working on the elevation. Other means of fall protection can be used so long as they provide mobility and continuous safety.
- q) Specific JSA addressing fall protection must be generated by the Contractor for all personnel involved with crane assembly/dismantling prior to beginning the work.

## **5 RECORDS**

- 4.1 PTW - Lifting Operations and Equipment

## **6 ATTACHMENTS**

- 5.1 NIL

## **7 REFERENCES**

- 6.1 All applicable legislation & other requirement