OMAN WASTEWATER SERVICES COMPANY S.A.O.C

الشركة العمانية لخدمات الصرف الصحي ش.م.ع.م

OMAN WASTEWATER SERVICES CO.S.A.O.C.

SECTION 05

LIFTING EQUIPMENT

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5. Lifting Equipment

5.1 General Requirements

All lifting equipment and operations shall comply with local statutory/regulatory requirements.

All shall be designed, procured, installed, commissioned and handed over such that the Employer's obligations under the statutory legislation are covered at all times.

A schedule of lifting equipment shall be submitted during the design phase.

The Safe Working Load shall be marked clearly and indelibly on each lifting item together with the unique identification number.

Lifting Equipment shall be installed for any of the following conditions:

- Where equipment above 25kg may need to be removed for operational maintenance.
- Where the frequency for removal for maintenance is one or more times per annum.
- Where the item of plant is considered to be critical.

All relevant documentation shall be included within the O&M Manual along with a copy of the Test Certificate.

5.2 Test Certification

There shall be one test certificate per item of lifting equipment.

The test certificate shall carry the following information in addition to that required under statutory legislation:

- Site name (as advised)
- Serial number (where appropriate)
- Details of proof load tests (including any measurements taken for deflection) and the examination conducted on the item certifying its fitness for safe use.
- (Where applicable) Length of lifting beams, span of cranes, radius of davit/swing jib, etc.

In cases where an item is unsuitable for proof load testing, such as textile slings, then the Contractor shall issue a certificate of conformity.

5.3 Fitness for Purpose

All equipment is to be of adequate strength, sound material, good construction and suitable for the duty which it is to perform, taking consideration of:

- Total maximum weight of the load to be lifted.
- The nature of the load to be lifted, and its principal dimensions which affect the lifting operation. In particular, headroom, height of lift, transport when suspended, manipulation of suspended load, centre of gravity, methods of attachment and external obstructions likely to be encountered.
- Adverse environmental conditions, including extremes of temperature, humidity, chemical attack and/or corrosive atmospheres.
- Frequency of use and average loadings to enable duty ratings to be established.
- Ergonomic Design, account to be taken of operating positions, working heights, reaching distances etc so as not to place undue strain on the user.

Maintenance platform with means of access shall be provided for the purpose of inspection and maintenance of those parts requiring frequent attention. Where this is impracticable, means shall be provided to attach temporary access. Access provision shall be subject to approval.

5.4 Site Testing

Before use, all new equipment shall be tested on site by the Contractor, who shall issue the original Proof load Test Certificate/Certificate of Conformity to the Employer.

The Employer is to be notified within a reasonable time before the intended date of testing of an item of lifting equipment, to enable it to conduct its own inspection.

5.5 Overhead Travelling Cranes

Where overhead travelling cranes are specified, the installation shall be to the following minimum standard:

The cranes shall be designed in accordance with BS2573. Runway beams shall comply with the requirements of BS 2853. Cranes with electrically powered motions shall comply with BS466: Class 2 Medium duty operations unless otherwise specified. The term ‘crane’ shall be deemed to include gantry rails, access maintenance platform, power collection, end stops and all other items required for a complete installation.

Operation shall be from ground floor level. Hand chains shall loop 600mm above operating floor level, and shall not require a force greater than 25kg to operate at maximum load. Electrical control shall be by pendant push-button.

Electrically and mechanically interlocked to prevent inadvertent operation of opposing controls. Wired pendants shall be supported independently of the electric cable. The control voltage shall be low/safe. Inching facilities on all motions shall be provided where accurate positioning of equipment is required.

An emergency stop shall be included on the pendant.

Cranes shall be fitted with limit switches and mechanical end stops to prevent excess travel, over hoisting and over lowering. Electrical motions shall have limit switches on all motions. All motors shall be of quick reversing type with electro-mechanical brakes suitably sized for operation under the design conditions.

Festoon cables shall be used for all motions unless the down-shop distance is greater than 20m or usage is high, when a set of four shrouded conductors shall be used. In that case, the power collection equipment shall have renewable contact pieces. Should the operating environment be particularly aggressive, festoon cables for power collection shall be used. Two pad lockable crane supply isolators shall be fitted, one on the crane mounted control panel and the second at ground level to isolate the supply to the conductor rails. A "supply on" light shall be fitted on both isolators.

5.6 Overhead Runway Beams

Straight and curved overhead runway beams shall be designed in accordance with BS 2853.

The maximum deflection of the runway beams shall not exceed 1/500 of the span under the test load. All beams shall have an even and level running surface particularly on the inside running flanges where travelling trolleys are to be used. End stops shall be provided.

5.7 Lifting Blocks, Trolleys, Hooks, Ropes, Eyebolts, Shackles, Fall Arrest Systems.

All lifting blocks, trolleys, hooks, ropes, eyebolts and shackles shall comply with the latest relevant International Standard. This includes all eyebolts supplied with plant, e.g., motors and pumps.

All hooks (suspension and load) shall be fitted with safety catches. All hooks on cranes and lifting blocks shall be fitted with swivel bearings. The hook block shall incorporate fully guarded sheaves.

Lifting blocks can be either chain or wire rope units. All blocks shall be fitted with sufficient chain or rope to allow the lifting hook to reach ground-operating level. All chains and ropes shall have the 'loose' end securely fixed to the lifting block. Chain units shall have a reliable braking and locking

arrangement on the hoisting mechanism. A chain box shall be fitted to hold the excess chain. An over hoist device shall be fitted to all electric hoists.

Electric hoist equipment shall be installed for lifting applications with the following conditions:

- For plant & equipment above 1000 kg, with a lift height in excess of 3m.
- Where the operation of manual lifting equipment or chain blocks for a single lift cannot be undertaken in 20 minutes.

An electric traverse shall also be provided for electric hoist equipment having a traverse distance in excess of 6m.

5.8 Lifting Davits and Sockets

The frame shall be galvanised steel or lightweight aluminium fabrication designed to lift the specified Safe Working Load. Where possible, davits shall be portable.

Where a winch is to be fitted, the operating handle shall be at a convenient height for the operator, i.e. 1.1m above datum level, and the effort to turn it with full load suspended shall not exceed 25kg force, if required the winch shall be geared to suit. A ratchet device shall be fitted and where the load exceeds 25kgs, the winch shall be fitted with a braking device to prevent free falling of the load when lowering.

A galvanised steel davit socket shall be provided with the davit where specified. This shall be designed and fabricated such that the top face of the socket shall be flush with the final finished surface level and covered with a secured galvanised steel cover plate. Lugs shall be incorporated to prevent rotation of the socket in the concrete. The davit socket shall incorporate a drain hole to an adjacent chamber where possible.

For Lightweight davits, no single part of the davit construction shall be greater than 25 kg in weight unless the davit is designed to be a permanent structure. In such case the davit is not intended for use as a portable davit.