Management of Lifting with Mobile Cranes

IOSH Eastern Branch
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Topics

- Construction Plant-hire Association
- LOLER and Planning Lifting Operations
- Contract Lifting and Crane Hire
- When it Goes Wrong – Some Typical Accidents
The Construction Plant-hire Association

- CPA - principal Trade Association for plant hire professionals in the UK
- Founded in 1941.
- Membership in excess of 1500 companies
- Represents over 90% of all UK Construction Plant Hire by turnover
CPA – Special Interest Groups

- Special Interest Groups:-
  - Mobile and Crawler Cranes (CIG)
  - Tower Cranes (TCIG)
  - Construction Hoists (CHIG)
  - Powered Access (PAIG)
  - Concrete Pumps (BCPG)
  - Road Sweepers (RSIG)
  - Shoring Technology (STIG)
CPA Best Practice Guides

Maintenance, Inspection and Thorough Examination of Mobile Cranes

Best Practice Guide

Safe Use of Lorry Loaders

CPA - ALLMI Best Practice Guide
Safe Use of Self Erecting Tower Cranes

CPA Best Practice Guide

Safe Use of Telehandlers In Construction

Strategic Forum for Construction
Plant Safety Group

CPA Best Practice Guides
CPA Publications

- 20 Best Practice Guides
- 4 Plant Operator Guides
- 10 Technical Guides
- 30 Technical Information Notes

Download Free of Charge from

http://www.cpa.uk.net/p/Safety-Leaflets
LOLER
and
The Planning of Lifting Operations
Requirements of LOLER for Planning of Lifting Operations

- Regulation 8 – Organisation of lifting operations

  (1) Every employer shall ensure that every lifting operation involving lifting equipment is:

  (a) properly planned by a competent person;

  (b) appropriately supervised; and

  (c) carried out in a safe manner.

  (2) In this regulation "lifting operation" means an operation concerned with the lifting or lowering of a load.
Properly Planned???
Properly Planned???
Short Rigged Outriggers
Where to go for Guidance on the Management of Lifting Operations?

- BS 7121 Code of Practice for the Safe Use of Cranes (9 Parts) - Commended in Guidance to LOLER
  - Part 4 – Lorry Loaders (2010)
  - Part 5 - Tower Cranes (2006)
BS7121 - Management of the Lifting Operation

■ Safe System of Work
  ► Planning of the Lifting Operation
  ► Control of the Lifting Operation
  ► Carried out safely

■ Appointed Person
  ► Manages the Lifting Operation
Safe System of Work

- Planning the Operation and Risk Assessment
- Preparation of Method Statements
- Selection of Suitable Cranes
- Site Preparation
- Trained and Competent Personnel
- Supervision
- Documentation and Communication
- Other people
Control of the Lifting Operation

BS7121 Part 3 Clause 4.2

“The employing organization should contract an appointed person prior to each specific lifting operation. The appointed person should ensure that the safe system of work is implemented.

The appointed person should have sufficient training and experience to carry out all duties competently

NOTE: Provision of an appointed person does not lessen the legal responsibility of the employing organization for ensuring safety. The appointed person may have other duties and is not necessarily a direct employee of the employing organization.”
Selection of Appointed Persons

- Appropriate expertise and experience for the lift
- Notification in writing
- Sufficient authority
- Able to delegate duties and tasks but not responsibilities
- Different Appointed Persons for different complexity of lift
- Regular review of performance of Appointed Persons
Supervision

Appointed Person

Crane Coordinator

Lifting Team One
- Crane Supervisor
  - Crane Operator
  - Slinger/Signaller

Lifting Team Two
- Crane Supervisor
  - Crane Operator
  - Slinger/Signaller
Planning the Lifting Operation

- Planning by the Appointed Person
- Load characteristics & Lifting Method
- Selection of Appropriate Crane(s)
- Selection of Lifting Accessories
- Position of Crane before, during and after
- Site of Operation – access, hazards, space & ground
- Erection and dismantle
- Environmental conditions
Method Statement

■ Outcome of Planning Process
■ Should include
  ► Schedule of responsibilities
  ► Full details of cranes – model, rating, configuration
  ► Details of ancillary equipment
  ► Details of lifting accessories
  ► Name of appointed person
  ► Name of crane supervisor
  ► Complete plan including site preparation and sequence of operations
  ► Steps to eliminate danger to bystanders
Categories of Lift

■ Basic Lift
  ► Load of known weight
  ► No hazards or obstructions

■ Intermediate (Standard) Lift
  ► Hazards in the working or access areas
  ► No multiple lifts

■ Complex Lift
  ► Complex load
  ► Multiple lift
  ► Load enhancement attachments
  ► Hazardous environment
## Categories of Lift

<table>
<thead>
<tr>
<th>Environmental Complexity (E)</th>
<th>Load Complexity (L)</th>
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<th>2</th>
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Duties of Appointed Person

■ Basic Lift

► Establish weight of load
► Selection of crane
► Location, access and ground conditions
► Production of Method Statement
► Thorough examination, inspect and check for crane and lifting accessories
► Briefing all involved in the lift on the contents of the Method Statement
► Ensure that a crane supervisor is designated to direct personnel and ensure Method Statement is followed
Duties of Appointed Person

- Intermediate Lift (Basic plus)
  - Evaluation of hazards
  - Increased risk from lifting from height
  - Liaison with persons or authorities to overcome hazards
  - Consider effect of the lifting operation on surrounding property or persons.
Duties of Appointed Person

- Complex Lift (Intermediate plus)
  - Establish weight of load
  - Adequacy of lifting points
  - Proportion of weight for multiple lifts ($\pm 2\%$)
  - Crane capacity margin
  - Planning to avoid jib clashes
  - Detailed ground assessment
  - Hoist rope load and inclination monitoring
  - Assessment of hazardous environment
Siting of Cranes

- Crane Standing and Support Conditions
- Presence and Proximity of Other Hazards
- Effect of Wind In-service and Out-of-service
- Suitability of Access/Egress
Crane Standing and Support

- Appointed person should ensure that the ground or foundation can sustain the loads imposed by the crane.
- Loads from the crane from manufacturer or other authority
- In service and out-of-service
- Spreading of load to reduce ground pressure
**SLEEPER MAT FOR MOBILE CRANE OUTRIGGER**

**DATA:**

- **Cane:** 30 tonne capacity truck-mounted mobile.
  - Size of outrigger pads: 400 x 400 mm.
- **Maximum outrigger load:** take 33 tonnes (i.e. approx 330 KN).
- **Ground:** dense to very dense sandy gravel.

**REQUIRED SIZE OF MAT:**

- Using factor of safety = 2, and $\phi = 40^\circ$
  - Area of mat required = $0.9 \text{ m}^2$

For granular soil, this area can be square or rectangular; try 3 no. sleepers wide x 1200 mm long
  - i.e. 750 mm x 1200 mm
  - i.e. Area = $0.75 \times 1.2 = 0.9 \text{ m}^2$

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1. The maximum load has been taken from the table of typical cranes on page 47 of this guide. In practice, it is better to obtain the outrigger loads from the crane manufacturer, via the hirer, for the actual crane and jib configuration to be used.

2. The size of mat has been derived from the graph on page 49 of this guide, reproduced opposite.
Proximity Hazards

- Underground Services
- Overhead Lines and Cables (GS 6)
- Airfields
- Railways
- Highways
- Live Plant
- Principle Contractor’s duty under CDM
Wind
Access/Egress
Safe System of Work

- Risk Assessment
- Planning the Operation
- Preparation of Method Statements
- Selection and Use of Suitable Cranes
- Site Preparation
- Trained and Competent Personnel
- Supervision
- Documentation and Communication
- Other people
Crane Hire and Contract Lifting
Crane Hired by the Customer

■ The customer must:
  ► Carry out all work in accordance with BS7121
  ► Supply the “appointed person”
  ► Plan the lift and operate a safe system of work
  ► Ensure that the crane hired is of a suitable type and capacity
  ► Check the credentials of the crane hire company and certification supplied.

■ The crane rental company (owner) has a duty to:
  ► Provided a crane that is properly maintained, inspected and thoroughly examined
  ► Provide a competent driver
Contract Lift
(Carried out by the Crane Owner)

The customer should specify:-

► That all work is to be undertaken in accordance with BS7121
► That the crane company is to supply the “appointed person”
► What information and/or services will be provided to the crane company by the customer

The crane company is responsible for:-

► Supplying the “appointed person ”
► Planning the lift, and operation of a safe system of work (via method statement/risk assessment)
► Organisation, and supervision of the lifting operation
Insurance Considerations

■ Crane Hire – The Customer is responsible for:-
  ► Loss or damage to the crane
  ► Loss of hire charges while crane is out of action
  ► Damage to goods on the hook
  ► Public Liability (loss or damage to property/ injury to persons)

■ Contract Lift – The Crane Owner is liable for:-
  ► Loss/damage to the crane, loss of hire charges, damage to property/Injury to persons when caused solely by the crane company’s negligence in the performance of the contract
Responsibility for Ground Conditions

■ Crane Hire

► The crane owner is responsible for providing the customer with maximum outrigger loadings

► The customer is responsible for the siting of the crane and ensuring that the ground will be able to take the outrigger loads

■ Contract Lift

► The crane owner is responsible for the siting of the crane and will provide the customer with maximum outrigger loadings in order that the customer can assess the ground conditions and the need for any additional foundations

► If the crane owner does not believe that the customer has the necessary expertise to assess the ground conditions he must ensure that an appropriate specialist has been consulted
Basic Requirements for Safe Lifting

- Lifting operations planned by trained competent appointed person's)
- Risk assessment & lifting plan/ method statement prepared
- Responsibilities established: clarity as to whether contract lift or crane hire terms apply; It must not be a hybrid!
- Crane outrigger supports assessed, i.e. identify outrigger loadings and load-bearing capacity of the ground
- Slinging arrangements planned and slinging undertaken by trained and competent persons
- Lifting operations supervised by trained persons and carried out in accordance with the lifting plan/method statement
- Machines and equipment adequately maintained
- Machines and equipment with up to date thorough examination reports
Basic Rule

If a customer does not have the necessary expertise to competently plan and supervise the lifting operation, he/she must not hire a crane but should enter into a Contract Lift arrangement with the crane hire company.
When It Goes Wrong - Some Typical Accidents
Know the Weight of the Load
Short Rigged Outriggers
Short Rigged Outrigger
Overlifting
Everything!
Lack of Planning
Incorrect RCI Setting
How to Install a Hot Tub
Questions?