Background

A sub-group of the M&EE Networking Group have looked at the arrangements for planning and executing lifting operations. The M&EE Networking Group recommend this COP as good practice for the industry.

M&EE COPs are produced for the benefit of any industry partner who wishes to follow the good practice on any railway infrastructure. Where an infrastructure manager has mandated their own comparable requirements, the more onerous requirements should be followed as a minimum for work on their managed infrastructure.

The M&EE Networking Group makes no warranties, express or implied, that compliance with this document is sufficient on its own to ensure safe systems of work or operation. Users are reminded of their own duties under health and safety legislation.

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Purpose

This Code of Practice details the minimum requirements for the planning and safe execution of lifting operations using Cranes.

Scope

This Code of Practice concerns all lifting operations involving lifting equipment such as rail cranes, twin jib cranes, road-rail excavator cranes, and vehicle mounted knuckle boom cranes such as lorry loader cranes. This Code of Practice also concerns vehicle mounted lifting arms/gantries, S&C panel lifting equipment and rail mounted gantries. Where road mobile cranes and road vehicles fitted with lorry loader cranes are in use, and where the operation has the possibility to encroach the area defined as “on or near the line” (as defined in the Rule Book), then this code of practice will apply, subject to the note below. This Code of Practice does not apply to MEWPS.

NOTE Where knuckle boom cranes are used to deliver or remove materials and equipment at locations not defined as ‘on or near the line’ simplified arrangements may be appropriate, see blank specimen at Appendix A and BS 7121 Part 4

NOTE For Tandem lifting with 2 excavator cranes see M&EE COP 0008.
Definitions

Competent person
A person appointed and certified to carry out specific duties and having sufficient practical and theoretical knowledge to enable the discharge of those duties safely to a set standard.

Crane controller
The competent person who sets up a safe system for controlling the lifting operation on site including the use of lifting equipment and pre-work checking of accessories.
Also responsible for completing the MC CC check sheet (COP0016). This person should also be conversant with the content of COP0002, and be compliant with the relevant Infrastructure Manager’s competence requirements.

Lifting accessories
Lifting beams, chains etc. that attach the lifting equipment hook with the load to enable the load to be lifted.

Lifting equipment
"Work equipment that can lift or lower a load" (LOLER Section 2). This applies equally to manually operated or powered equipment, but NOT Jacking equipment.

Lifting operation
"Means any operation concerned with lifting or lowering a load" (LOLER Section 8(2)).
Note: Load in this context includes persons in lifting cage attachments.

Lift planner
A Competent Person responsible for planning the lifting operation including calculating weights and symmetry of loads, the provision of adequate supervision and selecting the correct lifting equipment and accessories.

On or near the line
When on or within 3 metres of the nearest rail.

Rated capacity indicator (RCI)
A device that is set up to give visible and / or audible warning when a crane is nearing the limit of its capacity.

Safe working load (SWL)
The maximum load, which an item of lifting equipment may raise, lower or suspend under a particular duty and working radius conditions.

Slinger
Person responsible for attaching and detaching lifting accessories and responsible for identifying the use of lifting accessories in accordance with the specification of the Lift planner/Appointed person. The slinger may also relay signals to the operator. (The crane controller may undertake this duty).
1. **Competence**

1.1 **General**

1.1.1 All lifts should be planned by a competent person identified in LOLER ACOP Regulation 8 and further defined in BS7121 Part 1 (4.3) as the Appointed Person (Lifting Operations) hereafter known in this Code of Practice as ‘Lift Planner’.

1.1.2 Safe lifting operations depend upon the selection of suitable personnel who are competent to carry out the required duties. Records of training and experience assist in the selection of suitable personnel as crane controllers, crane operators and slingers.

1.1.3 All personnel appointed for a lifting operation should be:

   a) Competent to perform the tasks required of them.
   
   b) Adequately trained and successfully assessed for their role in lifting operations.
   
   c) Aware of their responsibilities and limitations during lifting operations.
   
   d) Able to present a record of appropriate training and assessment; e.g. SENTINEL card.
   
   e) Medically fit to the extent required by their role.

1.2 **Crane Controller**

1.2.1 The crane controller should be:

   a) Authorized to carry out the duties.
   
   b) Fully conversant with the duties of all personnel involved in the lifting operation.
   
   c) Able to give clear, unambiguous instructions to all other members of the team.
   
   d) Able to assess danger to the lifting operation from changed circumstances on site, and to call a halt to the operation if the risk becomes unacceptable, so that the lift planner can be referred to for further instructions if necessary.
   
   e) Fully conversant with the duties of the slinger, and trained in the techniques of communications and hand signals, detailed in BS7121.
1.3 **Crane operator**

1.3.1 The crane operator should be:

a) Medically fit, with particular regard to eyesight, hearing and reflexes.

b) Physically able to operate the crane safely.

c) Able to judge distances, heights and clearances.

d) Adequately trained for the type of crane being driven and have sufficient knowledge of the crane, its operating instructions and its safety devices.

e) Fully conversant with the duties of the slinger, and trained in the techniques of communications and hand signals, detailed in BS7121.

f) Trained in the use of the fire extinguishing/firefighting equipment on the crane (where provided).

g) Trained in the use of any means provided for escape in case of emergency.

h) Authorized to operate the crane.

1.4 **Slinger**

1.4.1 The slinger-signaller should be:

a) Medically fit, with particular regard to eyesight, hearing, reflexes and agility.

b) Physically able to handle lifting accessories and equipment.

c) Able to establish weights, balance loads and judge distances, heights and clearances.

d) Trained in the techniques of slinging.

e) Capable of selecting accessories that have been identified in the lift plan, assessing their condition and suitability prior to use and ensuring that they are within thorough examination period.

f) Trained in the techniques of communications and hand signals.

g) Capable of using and giving precise and clear verbal instructions where radio equipment is used.

h) Capable of relaying hand signals for the safe movement of the crane and load.

i) Authorized to carry out slinging duties.
1.5 **Lift Planners**

1.5.1 The Lift Planner should be:

a) Medically fit, with particular regard to eyesight, hearing, reflexes and agility.

b) Able to select the correct lifting equipment for the lift.

c) Able to establish weights, balance loads and judge distances, heights and clearances.

d) Trained in the techniques of slinging.

e) Capable of selecting accessories for the lift.

f) Good numeracy, literacy and relevant IT skills.

1.5.2 Typical examples of competence for lifting are

- CPCS/NPORS (Other) Appointed person (non-rail mounted lifting).
- Sentinel Lift Planner (rail mounted lifting).
- Other specific competence defined by the infrastructure manager.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Equivalent competence / terminology used in;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LOLER</td>
</tr>
<tr>
<td>Produces and authorises lift plan</td>
<td>Competent Person</td>
</tr>
<tr>
<td>Amends and authorises lift plan on site</td>
<td>Competent Person</td>
</tr>
<tr>
<td>Safe control of lifting operations</td>
<td>‘Appropriately Supervised’</td>
</tr>
<tr>
<td>Attaches/removes an accessory for lifting</td>
<td>Load Handler</td>
</tr>
<tr>
<td>Relays crane controller commands</td>
<td>No equivalent term specified</td>
</tr>
</tbody>
</table>
| Provides guidance for the movement of vehicles off track when manoeuvring | No equivalent term specified | Banksman | Banksman

**Table 1 – Industry terminology associated with lifting operations.**
2. Planning

2.1 Planning Process

Appropriate to the site, the following should be prepared.

2.1.1 A site visit by a person with the relevant skills and knowledge, e.g. lift planner, should be undertaken before the planning of any lifting operation. The aim is to check site conditions to aid the preparation of a lifting plan and identification of suitable lifting equipment, accessories and site specific hazards. The site visit should form part of the risk assessment needed to evaluate the risks involved and the nature and extent of any measures required to mitigate those risks, for the safe system of work (a typical site survey checklist is shown as Appendix B).

2.1.1.1 Where the lifting operation is contracted out, the employing organization needs to inform the appointed person of hazards identified by the overall site risk assessments.
2.1.2 All lifting operations must be planned and should be documented. The following aspects should be considered:

a) The load, its characteristics and the method of lifting, particularly when loads are lifted out of water, e.g. flow, suction, loss of buoyancy, position of centre of gravity.

b) Lifting operations where practical should not be planned over 90% of the duty rating of the crane unless approved by a senior engineering manager or Professional head.

c) Suitability of the access/egress to site for the lifting equipment.

d) Calculations and assessment of each type of lift with reference being made to the applicable duty charts of the lifting equipment for the planned lift. Particular reference being made to M&EE COP0008 for tandem lifts using RRV excavator cranes if the on-line lift planning tool does not have a tandem lift derating function.

e) The planning process should take into account that 3 piece boom excavator planning material will reflect maximum and minimum safe working loads including hydraulic limitations. During the planning process the lift planner can plan to use the maximum duty provided that there are no site structures that would restrict the machine boom configuration e.g. working in a tunnel and/or working radius is not limited. The maximum duty (where provided) is often when the main boom is forward in the range of 40 - 60 degrees: Photo on the right.

Key:

= Centre of the turntable
= 4m radius
= 1.5m height

Photo 1 RRV Boom Configuration

NOTE Photo 1 show machines at same height and radius but the rated capacity of each machine will be different.
f) The correct type of lifting equipment should be selected, taking into account the limitations on the acceptance certification (where applicable). Other considerations include whether, the lifting is by standard construction plant, lorry loader crane, and whether outriggers need to be used: see item q).

g) Care should be taken when selecting accessories being used where adjacent lines, DC conductor rails, or OLE are present as some accessories can move the load into a restricted area.

h) Lifting accessories should only be used as specified by the manufacturer, as failure to use correctly can result in damage to machine/accessory and personal injury. Without care, the use of excavators as cranes can alter the orientation of accessories such that loads are not lifted as per the intended design.

i) Where loads are required to rotate during the lifting operation, hooks designed to swivel under load should be specified.

j) Where lifting accessories are planned to be sacrificial/single use, e.g. slings, a process must be put in place to ensure that either the accessory is removed from site and quarantined/destroyed, or if to be left in the track bed, that they do not present a worksite/infrastructure hazard, e.g. tripping. This is usually accomplished by cutting off as much of the sling before burial in the ballast.

k) For de-rating of lifting accessories see Table 2 summary of mode factors. The maximum load to be lifted is the load factor x the SWL marked on the lifting accessory.

<table>
<thead>
<tr>
<th>MODE FACTORS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum load to be lifted = mode factor x SWL marked on the sling</td>
</tr>
<tr>
<td>Key: NP = non preferred, NA = not applicable</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Material</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single leg in line</td>
<td>Single leg choker</td>
<td>Single leg basket</td>
<td>Single leg back hooked</td>
<td>Single leg halved</td>
<td>Endless in line</td>
<td>Endless Choker</td>
<td>Endless Basket 0-90°</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chain</td>
<td>1</td>
<td>0.8</td>
<td>1.4</td>
<td>1</td>
<td>NP</td>
<td>NP</td>
<td>1</td>
<td>NP</td>
<td></td>
</tr>
<tr>
<td>Wire rope</td>
<td>1</td>
<td>0.8</td>
<td>1.4</td>
<td>1</td>
<td>NP</td>
<td>NP</td>
<td>1</td>
<td>1.4</td>
<td></td>
</tr>
<tr>
<td>Webbing</td>
<td>1</td>
<td>0.8</td>
<td>1.4</td>
<td>NA</td>
<td>NP</td>
<td>1</td>
<td>0.8</td>
<td>1.4</td>
<td></td>
</tr>
<tr>
<td>Fibre rope</td>
<td>1</td>
<td>0.8</td>
<td>1.4</td>
<td>1</td>
<td>1.6</td>
<td>1</td>
<td>0.8</td>
<td>1.4</td>
<td></td>
</tr>
<tr>
<td>Round sling</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>1</td>
<td>0.8</td>
<td>1.4</td>
</tr>
</tbody>
</table>

Table 2 - Summary of mode factors
Table reproduced with the kind permission of LEEA
l) Calculations for the Centre of gravity (not required for uniformly distributed loads) or individual loading if tandem lifting.

m) Suitability and integrity of the load.

n) Consideration of control measures to avoid or reduce the risk from hazards such as obstructions, structures, DC Conductor rails and overhead line equipment, electrical supply lines, and other services during access, egress, travelling and during lifting operations.

o) Particular reference should be made to the physical restrictions on site such as tunnel walls and other structures that may be struck by the tail swing of any lifting equipment including attachments that could move the load into a restricted area, and adjacent lines open to traffic.

p) Consideration should be given to the use of tag lines to control the movement of the load (See 2.1.3)

q) Consideration of ground condition, existence of cabling, troughing, structures including bridge/parapet strengths, ground bearing capability, location of culverts/drainage etc. and ability to level the lifting equipment. (This information should be obtained through the site survey).

The lift planner should request the maximum outrigger/stabilizer point loading supplied by the plant owner, and should then work out the mat size based on the ground bearing pressures.

Regular checks should be made to ensure ground stability is maintained throughout.

The actual ground bearing figures for other areas should be supplied by the PC

<table>
<thead>
<tr>
<th>Example of pad size calculation based on track formation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max outrigger/stabilizer point loading = 15t (provided by the plant supplier)</td>
</tr>
<tr>
<td>Ground bearing pressure = 53t/m2</td>
</tr>
<tr>
<td>Area = point loading ÷ Ground bearing pressure = 15 ÷ 53 = 0.283m²</td>
</tr>
<tr>
<td>Mat size = √0.283 = 0.532m x 0.532m for a square mat therefore use the next biggest sized mat</td>
</tr>
</tbody>
</table>

Table 3 - Example of pad size calculation

NOTE 53t/m2 Ground bearing pressure can be achieved with well compacted ballast approx. 300mm deep
r) Consideration of the need to move the lifting equipment during the lifting operation (lift and carry) including the change of site conditions during movement e.g. cant, cut rails, formation condition, sleeper spacing and condition, rail fastenings etc.

NOTE Rail mounted lifting equipment is sometimes used on cut rails within worksites. The planning should take account of the need for alignment of rail ends, and mitigation against the tipping of short section of rails or abnormal rail dip between sleepers. Sometimes it is necessary to put in temporary fishplates/clamps to secure the rail ends.

s) Consideration of contingency arrangements required in the event of failure of equipment.

t) Consideration of the need to produce a description and drawing of each lift (the detail of the drawing will depend on the complexity of the lifting operation), showing the sequence of lifting / lowering operation and features of the worksite.

u) Consideration of other personnel who may be present on site and how they will be prevented from entering danger zones.

v) Decide the communication protocol for the worksite.

NOTE For Network Rail managed infrastructure this should be digital duplex communications.

w) Where allowed ensuring that, where persons are being lifted in compliant lifting cages, the recommendations of BS7121 -1 are followed.

x) Impact of wind speed on lifting operations (See 2.1.4).

y) Permissions may have to be sought where the collapse radius of the crane might have impact on surroundings.

2.1.3 Tag lines should be used:

a) If there is a possibility that the load could come into contact with any other object during the lifting operation.

b) To prevent loads from spinning due to wind.

c) To orientate or align the load for landing.

d) The safe system of work should identify how many tag lines are to be used and how they are to be attached to the load.

e) Care should be taken that tag lines do not become fouled during use.

WARNING: Persons holding tag lines should not wrap a line around any part of their body or attach a tag line to any structure. The tag lines should not be knotted or looped.
2.1.4 Consideration should be given to the impact wind pressure may have on the load to be lifted e.g. loads with large surface areas (presented side on to the wind) could have a significant effect on the stability of the crane and potential to foul adjacent lines open to traffic.

NOTE Wind pressure varies as the square of the wind speed, if the wind speed doubles, the wind pressure increases by a factor of four.

2.1.4.1 A risk assessment should be undertaken to determine if wind loading is going to be an issue. (For low height lifting with RRV excavators this is usually not an issue, for telescopic cranes that may be lifting higher the size of the load may be an issue) For wind loading calculation see BS 7121 -1:2016 Annex D

2.2 The Lift Plan

2.2.1 The documented plan should include where relevant the following:

a) Description, weights and method of lifting taking into account any possible adhesion between the load and structure or between the load and the ground. (This adhesion may be reduced by pre-jacking).

b) Where accurate calculation of the load is not possible and an estimation of the load by a competent engineer has been carried out then verification on site by a test lift should be specified in the lift plan.

c) Where the lifting equipment has multiple lifting points the plan should identify the actual lifting point(s) to be used.

d) Take into account hazards in the area of the planned lift and travel activity including but not limited to: cant, cut rails, formation condition, sleeper spacing and condition, rail fastenings etc. Tie bars may need to be deployed to prevent gauge spread where rail cranes operate on wooden sleepered track in poor condition.

e) Suitable control measures to prevent personnel access where a minimum of 600 mm clearance cannot be maintained between the lifting equipment and any structure or other obstruction.

f) The specification of lifting equipment (make and model and RCI type) and lifting accessories to be used, including beams, the weight of which must be taken into account when assessing the load on the lifting equipment. Where the lifting operation requires the use of specific lifting equipment or accessories it is recommended that the individual serial number of the lifting equipment and lifting accessories is recorded.

g) The radius and hook height for each lift within the relevant lifting equipment duty.
h) The location for the placement of the load, including any need for packing etc.

i) The maximum track cant for each lift, including changes during lift and carry.

NOTE: 150mm design cant can drift up to 174mm between track maintenance cycles.

j) The method of attachment and detachment of the load to the lifting equipment (e.g. working at height).

k) The position of the lifting equipment and the load(s) before, during and after the operation due to the effects of cant and gradient.

l) The environmental conditions that exist or may occur at the site of operation which may necessitate stopping the operation when conditions are unsuitable (e.g. wind speed).

m) All buried services (e.g. culverts, drains, cables) and other services (e.g. electricity, gas, water) which may affect the safe operation of the lifting equipment and appropriate measures of risk control.

n) The possession and electrical isolation requirements (DC 3rd Rail, OLE and REC) of running lines and sidings upon which the lifting equipment operates and adjacent running lines and sidings.

o) Interface arrangements with other parties in the same possession and train movements.

p) The control measures to be adopted when other lifting equipment is working independently but in close proximity on the same site including restrictions caused by other work and machines working in the same vicinity (e.g. the limits of travel and movement).

q) The limitations and control measures to be adopted when working on a bridge, arch, viaduct or ground supported by a retaining wall.

r) Train marshalling (including orientation of lifting equipment etc.).

s) Description of the communication protocol and where applicable the equipment to be used.

t) Clear allocation of tasks to specific personnel.

u) The potential for the load and/or lifting equipment to over-sail onto third party premises.

2.2.2 The documented lifting plan should also include the location, date of lift(s) and be signed by a competent lift planner.
2.2.3 Examples of lifting schedules and method statement for lorry loader cranes can be found in CPA – ALLMI Best Practice Guide “Safe use of Lorry Loaders”

3. **Executing Lifting Operations (Excluding MEWP)s**

3.1 The lifting operation should always be appropriately supervised. For Network Rail and London Underground this is carried out under the direction of a crane controller (CC) on site. This person should have a copy of the lifting plan with them, and be fully conversant with it. The CC must brief all staff involved in the lifting operation with the method of working. If a shift change occurs during the work, the CC being relieved should brief the new CC on any difficulties and progress of the lifting activities so far. The new CC should then take over the plan, brief the contents to all new staff, and confirm understanding.

3.2 Should circumstances on site mean that it is not possible to follow the original plan for whatever reason; a competent lift planner should agree any changes. The revised plan should then be communicated to all persons who need to know the revisions made and understanding must be confirmed.

3.3 The slinger is responsible for attaching and detaching the load to the lifting equipment and for using the lifting accessories in accordance with the lifting plan. The slinger should indicate to the Crane Controller, using the pre-agreed communication protocol (Duplex communications preferred), when it is safe to lift the load and they are in a safe position. If there is more than one slinger, only one of them should have this responsibility at any one time.

3.4 Where hooks are permanently welded to the lifting point e.g. dipper arm or quick hitch the orientation of lifting hooks should be considered as the angle of the hooks will change relative to the boom configuration. The Slinger should ensure the lifting hook is maintained at the correct orientation for lifting operations.

Photo 2 Quick Hitch with permanently welded lifting hook
3.5 Where suspended loads are required to rotate during the lifting operation, hooks on the lifting equipment designed to swivel under load should be used.

3.6 All lifting accessories should be checked prior to use for condition and suitability including that the thorough examination is in date.

3.7 Where using lifting equipment with hoist ropes, it is essential that the ropes are maintained in the plumb position for the duration of any lifting operation.

3.8 The control of the lifting operation should be such that the load is not suspended over areas occupied by persons.

3.9 Where two RRV excavator cranes are used for tandem lifting the same load, this should be conducted in accordance with M&EE COP0008.

NOTE: For tandem and multiple lifting operations using other lifting equipment see RIS-1700-PLT and NR/L2/RMVP/0200 module P503.

3.10 The RCI must be in lift mode for all lifting operations, static and lift and carry.

3.11 The rated capacity indicator (RCI) must not be overridden or ignored.

3.12 Should a RCI fail during work on site, then provided that all parameters are known and within limits, the lifting operation may continue in order to make the track/worksite safe, after which the lifting operations should then cease until the RCI is properly functioning. If extra control measures are required then these need to be documented on the lifting plan, and authorised by the Lift Planner. The crane operator, all members of the lifting team, and the site management are to be briefed on the situation and change of plan.

3.13 The RCI should not be used as a control mechanism in its own right.

3.14 Where there is the facility to lock the RCI mode, the CC should ensure that the duty is selected as described in the lift plan and locked out by the CC until such time as there is a requirement to alter the settings.

3.15 Load limiting devices, where fitted, should not be disabled during lifting operations.

3.16 The CC should ensure that adequate arrangements are in place for safe passage of trains on any adjacent lines in accordance with the infrastructure manager’s requirements (see M&EE COP0032). These arrangements may also include use of movement limiting devices. Further restrictions may be identified for OTP and OTM on the certificate of engineering acceptance.
3.17 If cranes with outriggers are to be used, the lift plan diagram should show their position and downward forces when extended including the extent of any temporary works necessary to spread their load and their proximity to any underground services. Outriggers are not to be supported directly on the rail or sleepers.

3.18 Where a road mobile, contract lift or knuckle boom crane lifting operation may encroach the area defined as “on or near the line”. A CC should be appointed to fulfil the rail interface requirements of this Code of Practice.

3.19 Where the lift plan identifies the need for additional measures to control the movement of the load e.g. tag lines then these should be used at all times.

3.20 Wind can affect the crane stability and also can affect staff on the ground trying to manoeuvre the load.

3.20.1 Where the lift plan has identified a maximum permitted wind speed for the lift to be carried out, then the wind speed should be monitored throughout the lifting operation to ensure it remains within the safe parameters as stated in the lift plan. The wind speed measured on site should be measured at the height intended to be lifted by the crane.

3.20.2 Anemometers should be fitted where the need for this is identified by the risk assessment. Where fitted, anemometers or other wind-speed measuring devices should have their indicators located in clear view of the crane operator and, if appropriate, the person controlling the lift.

3.21 Multiple lifting usually also involves multiple lowering. When lowering, a crane can transfer load to another crane involved in the operation. During lifting, a crane operator can monitor and control the amount of load the crane is taking during lowering, but the operator of the crane receiving the load has no direct control of the amount of load the crane is receiving.

3.21.1 This becomes more complex if more than two cranes are involved in the operation. The lift plan should therefore address the means of controlling the distribution of load during lowering. In particular, the rating of the cranes should allow for foreseeable variations of load share, taking account of the response time of the operators and cranes.

3.21.2 The means of communication between the crane controller/signaller and the crane operators should be such as to facilitate a reliable and timely exchange of information and instructions. Multiple radio communications should be used for this operation. Where technically possible, the use of additional load monitoring equipment should be considered, for example, providing the crane supervisor with remote load readouts for all the cranes.
## Appendix A  Generic Lifting Plan for Lorry Mounted Knuckle Boom Cranes Making Simple Lifts

<table>
<thead>
<tr>
<th>Vehicle Reg. No.</th>
<th>Job Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job Location</td>
<td>Date of lift</td>
</tr>
<tr>
<td>Driver (Name)</td>
<td></td>
</tr>
</tbody>
</table>

This plan only applies to simple lifts using the vehicle mounted knuckle boom crane and where the following site conditions have been verified by the vehicle driver. The driver will invoke the “Work Safe” procedure if unsure or not happy with the site arrangements.

(The driver is acting as lift planner and crane supervisor under LOLER as per his training.)

1. The driver has been trained and passed competent in the use of the KBC.
2. The driver has been briefed by the site manager/site representative of risks associated with the site.
3. Whilst operating the KBC the driver can see the load at all times.
4. No part of the lorry or the load being lifted will come within 3 metres of any railway line.
5. The lorry and its stabilisers are on reasonably level ground and the ground appears adequate for the intended operation.
6. The load, including lifting accessories, will not be greater than 85% of the duty of the crane at the radius of the lift.
7. Attachment of the crane to the load and lifting accessories to the load is either undertaken by the driver or has been verified by the driver as having been properly attached before undertaking the lift.
8. The load will not be moved over people or items belonging to third parties.
9. The site manager/representative has provided a person, when needed; to assist with controlling the swing/orientation and this person has been briefed by the driver.
10. The vehicle will only be moved with the KBC in its stowed position.

As driver of the vehicle and operator of the KBC I have checked the site and that the lifts planned fall within the scope of this generic lift plan.

Signed

Where any of the following apply then driver will not operate the KBC until the site manager/representative provides a lift plan and suitably competent crane supervisor, or Crane Controller if within 3 metres of a railway line, and the driver has been adequately briefed in the lifting plan to be used. The driver will invoke the “Work Safe” procedure if unsure or not happy with the site arrangements.

a. Whilst operating the KBC the load will at any time be out of sight of the driver.

b. Any part of the lorry or the load being lifted will come within 3 metres of any railway line.

c. The load, including lifting accessories, will require the crane to work at more than 85% of capacity at the radius of the lift.

d. Ground conditions are such that special arrangements have to be made to ensure stability.

e. The load requires to be moved over people or items belonging to third parties.

f. The load to be lifted requires special lifting attachments.

As driver of the vehicle and operator of the KBC I am not content that the site and lifts planned fall within the scope of this generic lift plan and have informed both the site manager and my manager.

Signed
### Appendix B  Generic Lifting Plan

<p>| | | | | | | | | | | | | |</p>
<table>
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<tr>
<td>(I &gt; G)</td>
<td>IS LIFT ALLOWED?</td>
<td>YES / NO</td>
<td>YES / NO</td>
<td>YES / NO</td>
<td>YES / NO</td>
<td>YES / NO</td>
<td>YES / NO</td>
<td>YES / NO</td>
<td>YES / NO</td>
<td>YES / NO</td>
<td>YES / NO</td>
<td>YES / NO</td>
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<tr>
<td>I = H x 0.85</td>
<td>85% of AVAILABLE DUTY (kgs.m)</td>
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<tr>
<td>H</td>
<td>AVAILABLE DUTY AT RADIUS (kgs.m)</td>
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<tr>
<td>G = E x F</td>
<td>INTENDED DUTY (kgs.m)</td>
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<tr>
<td>F</td>
<td>RADIUS OF LIFT (m)</td>
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<tr>
<td>E = C + D</td>
<td>TOTAL WEIGHT OF LIFT (kgs)</td>
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<tr>
<td>D</td>
<td>WEIGHT OF LIFTING ACCESSORIES (kgs)</td>
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<tr>
<td>C = A x B</td>
<td>WEIGHT OF ITEMS (kgs)</td>
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<tr>
<td>B</td>
<td>NUMBER OF ITEMS</td>
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<tr>
<td>A</td>
<td>SINGLE WEIGHT (kgs)</td>
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<tr>
<td>ITEM DESCRIPTION</td>
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</tbody>
</table>
### Appendix C  Lift Planning Site Survey Check

<table>
<thead>
<tr>
<th>Site</th>
<th>Date</th>
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</thead>
<tbody>
<tr>
<td>Client</td>
<td></td>
</tr>
<tr>
<td>Site Contact</td>
<td>Contact No</td>
</tr>
<tr>
<td>Description of work</td>
<td></td>
</tr>
<tr>
<td>Mileage from:-</td>
<td>To:-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item to be considered</th>
<th>Internal Check</th>
<th>Comments/Measurement</th>
<th>If determined on site</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Curvature of line – radius</td>
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<tr>
<td>2) Maximum cant Track</td>
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<tr>
<td>3) Cant direction define working high to low or low to high side</td>
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<td>4) How will demarcation be provided if cant needs restricting to enable lifts within duty charts</td>
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<tr>
<td>5) Gradient, Fall of track and direction of fall</td>
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<tr>
<td>6) Location of any changes: straight/transition to circular curve</td>
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<tr>
<td>7) O.H.L on site – YES / NO</td>
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<tr>
<td>Isolation requirements – lines and extent</td>
<td></td>
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<tr>
<td>Wire Height (Lift planner should determine minimum wire height for all lifting operations where applicable)</td>
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<tr>
<td>Need to slue wires?</td>
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<tr>
<td>Adjacent lines arrangements: – Live/isolated</td>
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</tbody>
</table>
| 8) | Is third/fourth rail present  
     Isolation requirements,  
     lines and extent |
| 9) | Have details of underground or overhead Services been established with Statutory Bodies i.e.  
     Gas  
     Water  
     Electricity  
     Telecomm  
     Where overhead electricity or telecomm has been identified have wire heights been established and safe working height been agreed with the owner of service?  
     Goal posts required? |
| 10) | Have details of the following O/H or U/R Services been identified from client records?  
     Signalling cables  
     Telecomm cables  
     Power supplies  
     Supplies which may be on client land due way leave etc. as in statutory bodies above |
| 11) | Details of services visible on site  
     Any of the above (list)  
     Drainage pipes and catch pits |
| 12) | Detail of services identified by cable avoiding tool (cat) survey |
| 13) | Compaction of ground and suitability to support wheels & outriggers e.g. |
### New ballast

### Voids

### Wet spots

### Other

Have arrangements been made to undertake remedial works prior to lifting activities

#### 14) Is track condition suitable for crane working?

- Sleeper condition / loose sleepers
- Gauge (signs of gauge spread)
- Rail weight/Type
- Missing or broken clips loose fastenings
- Loose or dipped joints

Have remedial works been planned to be completed prior to lifting operations

Where more information is needed on Track condition then advice from a Track Engineer may be needed.

#### 15) Clearances and structures

- Six foots and ten foots (max & min)
- Overhead to bridges and tunnels
- Walls to parapets of bridges – clearances / loadings, platform structures / tail swing
- Under-bridges and other structures that could possibly be overloaded by the crane working
- Culverts (check down embankments and in the bushes)
Drainage – clearance to catch-pits, collapse of pipes due to load causing collapse of crane

Lateral loads to catch-pits, turning chambers etc.

Signal post / gantries

OLE masts / gantries

Temporary works / scaffolding that may have been erected (by others) in the working area

Lighting columns

Trees and vegetation

Fencing

Above ground Cable Runs

3rd party assets/premises

16) Access route to and from the infrastructure

17) Crossing services particularly cable routes

18) Traffic consideration:

Are any adjacent lines (including sidings, train depots) open to traffic YES / NO

If YES a system of work must be planned in accordance with the infrastructure managers requirements

19) Lines crane is travelling/working on

20) OTP Delivery & collection points

21) Survey of area when lifting in Road Mode

Infrastructure access gates/point
| Ground conditions, Level, Pot holes, |
| Surface type etc. |
| Route for lift & carry |
| People/plant segregation |
| Structures |
| OHL – power, phone etc. |
| Lighting |
| Other vehicles (public cars etc.) |

Pre-work site check undertaken by (Name/Crane Planner)

Is there anything likely to change on site between site check and physical work Y/N if yes please give details:

Notes