

# Crane/lifting operations supervisor

*Note: It is recommended that you read the Supporting Information page before you read this factsheet.*

## Planning and regulatory requirements *(Regulatory requirements)*

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- The requirement for a lifting operation to be appropriately supervised is prescribed within regulatory codes of practice such as LOLER 1998, with the role and duties of a LE (Lifting Equipment) crane/lifting operations supervisor indicated within other guidance such as BS 7121 which identifies the responsibilities, attributes and requirements.
- The regulatory guidance states that lifting operations must be appropriately supervised and that the given definition of 'appropriate' supervision is that it is proportionate to the risk of the operation.
- The appointed person (AP) or lift planner remains responsible for the execution and safety of the lifting operation but may delegate the supervision, although not the responsibility, to other persons who in effect become the lift supervisor.
- Where the duty is being delegated, the lift supervisor should be able to give clear instructions to the lifting team and direct and supervise the lifting operation, ensuring it is carried out according to the lift plan or method statement and ensuring that LE/cranes are operated directly or indirectly through the slinger when attaching and detaching loads.
- If the lift plan requires amendments either before or during a lifting operation, the lift supervisor must consult with the AP, who is the only person who can authorise changes to the plan.
- Although in general not a 'hands-on' role, the lift supervisor needs to have sufficient experience and the appropriate expertise and knowledge. As the factors within a lifting operation can vary considerably depending on sector, location and Lifting equipment/crane type, the lift supervisor needs to know their limitations. If they are inexperienced in certain aspects, they should seek appropriate guidance accordingly.
- Lifting operations regulations require that a signaller is needed if the lifting equipment operator cannot see the full path of the load. This is an additional role to that of a load handler or slinger.
- To minimise any incidents such as trapped limbs, the lift plan should indicate, and the lift supervisor ensure, that the slinger directs initial movements to the LE/crane operator whilst the load is being slung, before handing control over to the designated signaller. In certain circumstances, several signallers may be required to guide the load along the travel route if it is out of sight for one signaller.
- The majority of LE/cranes are fitted with a rated capacity indicator (RCI) which normally provides warnings to the operator and others nearby when the LE/crane both approaches and exceeds maximum rated capacity for the configuration.
- Some RCIs can be overridden but this is purely for diagnostic and testing purposes during the maintenance programme. The lift supervisor must ensure that RCIs are not overridden by anyone during lifting operations, otherwise over-lifting could occur, with the LE/crane at risk of overturning.

## Lifting equipment and accessories *(Equipment and accessories)*

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- Lifting accessories (gear) come in a variety of types including chain slings, wire rope slings and fibre-type webbing slings. There is also specialist equipment such as lifting beams. The type of load to be lifted will determine the type of accessory used, but each type of accessory has its limitations and the selection of the incorrect type has caused loads to detach or fall from the accessory when being lifted.

- For example, although very versatile, the links of a chain sling can be easily damaged if they are used to lift steel beams that have protruding edges. Another example is that a wire rope sling cannot be effectively bent around tight corners and may not grip loads sufficiently.
- Lifting accessories should be marked with the safe working load (SWL) but are also rated by the working load limit (WLL). In terms of definition, the WLL is the maximum load that the accessory can, by design, lift and this never changes. The SWL is the maximum load that the accessory can lift under particular service conditions, which can vary depending on application.
- The SWL of a pair of slings normally only applies (in general) up to an included angle of 90 degrees – if this angle is exceeded, the SWL can be greatly reduced. For example, if a two-legged chain sling is lifting a load of 10 tonnes with each leg vertical, the load in each leg is half of the total and, in this case, 5 tonnes.
- If the included leg angle is increased beyond 90 degrees, the load in each leg is increased to 10 tonnes. If the accessory was working near to its SWL, it would be overloaded.
- Where the included angle increases beyond 120 degrees then, in general, the accessory cannot be used and must be substituted for the correct type, such as a lifting beam.
- When a multi-legged chain sling is attached to a load, it needs to be ensured that the open end of each hook should be facing out or away from the load, which reduces the chance of a hook slipping out of the load's lifting eye.
- When attaching the master link of a multi-legged chain sling to the hook of a LE/crane, the lift supervisor needs to ensure that the master link is large enough to articulate freely when on the hook.
- If more than one set of slings are being connected to the hook of a LE/crane, a shackle of sufficient size and load capacity should be used to prevent damage to the hook and each set of slings.

### Lifting and controlling loads *(Working tasks)*

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- Where the AP has delegated the supervision task to the lift supervisor, one key role is to effectively brief all members of the lifting team prior to the lifting operation taking place.
- Both during, but particularly at the end of, the briefing, the lift supervisor should check that each member has understood what is required and provide ample opportunity for each member of the lifting team to ask questions. In some instances, team members may have noticed that something is incorrect or not taken into account.
- When lifting operations occur near other workers or pedestrians, lifting guidance states that wherever possible, the moving of a suspended load above other workers or pedestrians should firstly be avoided. Only where this is not possible can other measures such as netting around a load or additional securing or protection features then be considered.
- If a load has to be left suspended for a short period, the lift supervisor needs to ensure that the operator stays with the LE/crane.
- All proximity hazards and conditions on site need to be taken into account and the jib or boom of a LE/crane must be kept well clear of any overhead power lines. Guidance issued by the energy networks utilities indicates what minimum distances must be kept from overhead power lines and the higher the voltage in the power line, the greater the distance that must be kept. This is to reduce the danger of arcing if the jib or boom is close to but not actually touching the power line.
- Where specialist lifting accessories are being used, the plan should specify, and that the lift supervisor ensures that, the slingers have sufficient knowledge of the relevant attaching procedures. LE/cranes sometimes need to be positioned within confined areas where there may be restricted room, particularly with smaller LE/cranes or lifting-type plant such as 360 excavators.
- Where space around the machine is limited, the lift supervisor needs to check for any trapping points around the slew or travelling area of the machine and facilitate an exclusion zone to minimise these trapping points if the gap is less than 600mm.

- The plan should specify actions to be taken if there are changes to environmental aspects, such as extreme weather which can affect the lifting operation in terms of load control, visibility and ground support. Exposure of the lifting team to poor or extreme weather being another issue to be addressed.
- If a complex lift is taking place where two LE/cranes are lifting a single load, a procedure that ensures good co-ordination between each LE/crane operator during the lift should be determined within the lift plan and executed by the lift supervisor.
- As part of their work role, members of the lifting team such as the slinger/signaller may provide assistance with, or lift materials directly from a delivery vehicle. Before any load restraining or securing gear is released, the lift supervisor must check that the load will not shift or move before any load-restraining or securing gear is released. Severe injuries have occurred when loads have shifted unexpectedly after securing gear is released.

### **Lifting equipment stability** *(Stability)*

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- Instability and overturns of LE/cranes still occur for a variety of reasons, including changes in operating conditions, unknown or unconsidered factors (such as ground support), insufficient factors of safety, deviation from the lifting plan or errors in calculations.
- To avoid overloading of the LE/crane, the weight of a load must be identified or calculated before it is lifted as incorrectly guessing the weight and finding that the load is too heavy for the configuration (radius and height) is likely to result in instability.
- Proper siting and support of the LE/crane should minimise many of the instability issues. The lift plan should determine the ground-loading pressure to be exerted by the LE/crane in all configurations and loads, that the weight of all known loads determined and calculated correctly, and that the ground can safely support the required pressure.
- Apart from determining the gross weight of the LE/crane and they ground loads being imposed, the plan should further account for dynamic forces applied by the LE/crane through the ground and an appropriate factor of safety determined accordingly.
- All LE/cranes are designed to lift a load vertically and the rated capacity of a LE/crane only applies to a freely suspended load, and does not apply at all times or for all situations. For example, if a load is still attached to a structure, vehicle etc. or embedded in the ground, the increased resistance when being lifted can overload the LE/crane.
- Wind speeds should be regularly monitored so that LE/cranes are only in use when winds are below the maximum authorised speed stipulated by the LE/crane manufacturer. Gusts of wind may also need to be taken into account, even if overall wind speeds are below the set limit.
- Loads with a large surface area can, in high winds, move and/or swing, making the hoist rope go out of line vertically, which could cause the LE/crane to go out of radius.
- When travelling on a site, a mobile-type crane may need to travel or manoeuvre on temporary roadways or haul roads. In some cases, this can involve large distances and driving up or down long and steep inclines. In most cases, these types of temporary roads do not have kerbs.
- Driving too close to the edge of a temporary or minor roadway can and has caused the sides of the roadway to collapse and LE/cranes have been known to overturn when driving too close, with severe injuries received by the driver.
- The lift supervisor, where relevant, needs to ensure that the driver of the LE/crane is aware of any potential issue and must seek further guidance if necessary on alternative routes or methods.

## Sample questions

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The following questions are based on the text within this factsheet and indicate how the questions and answers are structured. Based on the factsheet, there is only one correct answer. The correct answer to each question is indicated at the end of this factsheet.

**Q1. According to the regulations for lifting operations, when must a signaller be specified for a lifting operation?**



At all times



When the LE/crane operator can't see the full path of the load



When the gross weight of the load exceeds 1 tonne



When specialist lifting accessories are being used

**Q2. Why is it poor practice to use a pedestrian operated tower LE/crane to lift objects, such as pipework, that are embedded in the ground?**



The trolley could snag on the jib



The hook cannot be centralised over the load



Motion limiters need to be overridden



An overload situation can easily occur

## Study checklist

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This checklist aims to act as a study aid to ensure that the reader has identified and understood the relevant parts of this factsheet.

### Do you know?

1. What is considered an essential attribute of a lift supervisor.
2. Who can make any amendments to a lift plan.
3. Why the slinger needs to provide the initial signals to the lifting equipment/crane operator when lifting a load.
4. What the function is of the LE/crane's RCI.
5. Why the correct lifting accessory must be selected for the load.
6. What could be a limitation of using a wire rope sling.
7. What the difference is between SWL and WLL.
8. What the result is where a sling is used beyond an included angle of 90 degrees.
9. What should happen if the included angle of a sling exceeds 120 degrees.
10. What the procedure should be if a load has to be lifted above other workers in the area.
11. Why the open end of a chain sling hooks need to be facing outward when being attached to a load.
12. Why the master link of a multi-leg chain sling needs to be large enough when being coupled to the hook of the LE/crane.
13. What the lift supervisor must ensure when briefing the lifting team prior to the lifting operation.
14. Why minimum distances are specified when working near to overhead power lines.
15. What the hazards may be when a lifting operation is taking place in a confined area or area of restricted space.
16. What the factors are that could cause LE/cranes to become unstable.
17. Why wind speeds should be constantly monitored and the procedures if wind speeds go above set limits.
18. How temporary roads can affect the stability of mobile-type cranes.

**Answers to sample questions: Q1: B and Q2: D**