

Slinger/signaller

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

Preparation and completing work *(Preparation)*

- The role of the slinger/signaller is to connect lifting accessories (gear) to the hook of lifting equipment (crane) and to provide instructions in the form of signals or verbal communication to the crane operator while guiding a travelling load from the lifting point to the landing point, or a part of the total distance required. Slinger/signallers may work with a variety of lifting equipment but, within the construction sector, mainly with tower or mobile-type cranes (including crawlers) which are equipped with a hook block suspended from hoist ropes and can slew through 360 degrees.
- The slinger/signaller is an integral and important part of any lifting team and should have the necessary authority to carry out their role. Therefore this factsheet aims to make slinger/signallers aware of issues that have arisen with cranes, such as the causes of instability and factors that normally come under the control of the crane operator.
- A lift plan for the particular lifting operation that is to be carried out needs to be, through legislation, devised by a lift planner/appointed person. Amongst the many factors that the lift plan needs to identify include all risks, the mitigating measures to be taken, the sequence of work, the number of personnel involved in the lifting operation and the weight of all loads to be lifted.
- It is also important for all those involved in the lifting operation, including the slinger/signaller, to be informed of the contents and required actions. They must take note of the contents of the lift plan during the briefing and what is required of them, as they may notice an error or that something is not correct or missing.
- The slinger/signaller should immediately relay any concerns about the lift plan to the lift supervisor or appointed person/lift planner if they are present. If the lift plan needs amending before or during the lifting operation, only the lift planner/appointed person is allowed to alter the lift plan.
- Proper pre-use checks are a requirement for the safe operation of any type of plant and equipment, which includes all lifting accessories that are to be used for each load. The slinger/signaller is expected to check all relevant accessories for damage before work begins.
- Failure to properly check accessories could mean that an incident or injuries occur because a faulty accessory can make each lift unsafe. The lift plan should specify the type and size of the lifting accessory to be used including the safe working load (SWL) of each accessory.
- As a member of a lifting team, the slinger/signaller sometimes assist the crane operator in setting up and operating their machine, and can act as an additional pair of eyes to ensure safe margins are not exceeded. For example, where numerous cranes are working close to each other, the slinger/signaller may assist a crane operator in ensuring that the jib or boom of their crane does not collide with other cranes both before and during work.

Types of lifting accessories *(Equipment and accessories)*

- 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 determines the type of accessory used, but each type of accessory has 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 and can be used to form a choke hitch on larger loads, 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. As stated before, the lift plan should specify the type of accessory that needs to be used for each load.
- Where a load is not uniform or is oddly shaped, to keep the load level could mean that one or more legs of a multi-legged chain sling may need to be shorter than the others. A proper shortening clutch must be used and the slinger/signaller needs to ensure that, for most types, the loaded end of the chain exits at the bottom of the clutch.

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- Lifting accessories are marked with the safe working load (SWL) but are also rated by the working load limit (WLL). The WLL is the maximum load that the accessory can lift and never changes, whilst the SWL can change depending on how it is used.
- As an example, the SWL of a pair of slings only applies (in general) up to an included angle of 90 degrees – if this angle is exceeded, the SWL is greatly reduced.

Working safely and with others *(Working safely)*

- As part of their role, the slinger/signaller may provide assistance with or lift materials directly from a delivery vehicle. Due to possible movement in transit, they 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 operations take place in a variety of places within the radius of a crane, including near or next to areas with public access. The area of lift and the area of load-placing must be segregated from pedestrians who are normally oblivious to the dangers, and should be planned as such before work starts by the appointed person.
- 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.
- Before, during and after work, the slinger/signaller will need to both take into account site conditions and identify hazards accordingly as part of the lifting team. For example, 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.
- Nearly all cranes have a limit on the maximum authorised wind speed they can work in, stipulated by the crane manufacturer, so the wind speed should be regularly monitored.
- Even though the wind speeds are below the set limit, loads with a large surface area, such as shuttering, can move or swing in high winds, causing the crane to go out of radius. The lifting team may also need to take into account gusts of wind, even if overall wind speeds are below the set limit.
- Instability of a crane can occur with any swing of a load that is not controlled and the slewing of a load that is too fast can cause a crane to go out of radius.
- Slewing with a load needs to be undertaken with caution as slewing too fast can cause the jib or boom to be subjected to additional side stress and could further cause the load to overshoot the landing place, possibly striking a structure or object.
- To minimise the chance of an overshoot, slinger/signallers should not delay in providing the correct signals or instructions, particularly where the crane operator cannot see the load or landing point.
- Naturally, the delivering of timely and correct signals and instructions is crucial to any safe lifting operation. Where radios are being used, radio protocol indicates that a slinger/signaller should repeat all instructions to a crane operator. This is to guard against the possibility of any radio interference that may have occurred during transmission of the first message.
- Although specified in the lifting plan, slinger/signallers need to have an understanding of the safe working load of each lifting accessory and know the effects of an accessory used beyond prescribed limits. 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 – in this case, 5 tonnes.
- If the (included) leg angles are increased beyond 90 degrees, the load in each leg is increased to 10 tonnes. If the accessory was previously working near to its SWL, it would be overloaded.

Attaching and lifting loads *(Working tasks)*

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- As previously described, the SWL of a pair of slings is reduced considerably if it is used beyond 90 degrees as the load in each leg increases. Where the (included) angle increases beyond 120 degrees, then in general, the accessory must not be used and must be substituted for the correct type, such as a lifting beam, with any substitution approved only by the appointed person.
- Slinger/signallers should also be aware of the constitution of each load (its type or content) and how particular types of load should be slung. For example, where fabric bags (known as FIBCs) are being lifted, the lifting loops should be kept near to vertical by using a four-legged chain sling.
- When a multi-legged chain sling is attached to a load, 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 crane, the master link must be large enough to articulate freely when on the hook.
- If more than one set of slings are being connected to the hook of a crane, a shackle of sufficient size and load capacity should be used to prevent damage to the hook and each set of slings.
- Lifting gear can be damaged if it is used incorrectly or is not the correct type. If the eye of a webbing sling, for example, was too small for the hook of the crane, the stitching of the eye can be compromised, which would render the sling defective.
- A choke hitch is a common method of securing a load with a chain sling but the slinger/signaller needs to be aware that if a choke hitch is used, the SWL of the sling may need to be reduced by up to 20%.
- All cranes, including mobiles, are designed to lift a load vertically. This means that the slinger/signaller must guide the hook of the crane so it is placed directly above the centre of gravity for the load, not the centre of the load. Depending on the load, the measured centre of the load and the centre of gravity of the load (the point that it is in balance) is not always at the same place.
- 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.
- The rated lifting capacity of a LE/crane defines the total weight that can be lifted for the relevant configuration (e.g. the required radius), and is determined by the crane manufacturer.
- Slinger/signallers need to be aware that the total weight being lifted includes the not the just load but the weight of the lifting accessory and any packing or packaging, as
- One of the key responsibilities of the slinger/signaller is control of the load whilst it is being moved. If a hand or tag line is used, guidance suggests that the line is only connected to the load, and not the hook or accessory, and that it is of sufficient length so that the slinger/signaller is not directly beneath the load.

Sample questions

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. Why should radio instructions to the crane operator be repeated?



To guard against possible radio interference



Signal strength is stronger the longer the message



So that other cranes in the area are aware of the operation



To ensure that the crane driver is kept alert and focussed

Q2. What should be ensured when a tag or hand line is to be used?



That the line is attached to the slinger's body using a shackle when in high winds



That the line is only used on loads of more than 3 metres in length



That the line is only attached to the load



That the line has a breaking strain of at least 3 kilonewtons

Study checklist

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 role and responsibilities are of the slinger/signaler.
2. Who is responsible for planning the lift.
3. What are the factors that have to be taken into account when the lift is being planned.
4. Why the information in the lift plan needs to be known by all of the lifting team.
5. Why lifting accessories need to be checked before use.
6. In what ways the slinger/signaler can directly assist a crane driver.
7. Why it is important that the correct lifting accessory is selected for the load.
8. What the limitations are of a wire sling being used on certain types of loads.
9. How a shortening clutch should be used.
10. What is the difference between WLL and SWL.
11. What the dangers are of helping to remove loads from a transport vehicle delivering loads to a site.
12. How high wind speeds can affect lifting operations.
13. What the issues could be where a load is being slewed too fast.
14. What the correct methods are of transferring instructions by radio.
15. What happens to the SWL of a sling if used beyond a 90 degree angle.
16. By how much the SWL of a sling must be reduced when a choke hitch is being used.
17. Why the hook of the crane must be positioned above the load's centre of gravity.
18. What makes up the total weight of a load being lifted by the crane.

Answers to sample questions: Q1: A and Q2: C