

Training Standard

Slinger/Signaller: Excavator (novice)

Learning outcomes

Including additional guidance to support training delivery and final assessment

The learner will be able to:

explain the hazards of working in the lifting industry, and their responsibilities as a slinger-signaller

Delivery to include:

- why the industry has many hazards and why safe working practices must be adopted and maintained
- why personal health and safety is not just physical injury and can include the effects of noise and vibration. All of which can lead to lost time, lost income, expense for the employer, fines, custodial sentences etc.
- legislation, regulations and industry good practice, including: Health & Safety at Work Act 1974, Lifting Operations and Lifting Equipment Regulations (LOLER) (including the L113 ACoP to LOLER), Provision and Use of Work Equipment Regulations (PUWER) (including the L22 ACoP to PUWER), Management of Health and Safety of Work (MHSW) Regulations, Construction (Design & Management) Regulations (CDM), BS 7121 Part 1, LEEA Code of Practice for the safe use of Lifting Equipment, HSG144, GS6 etc.
- the relevance of method statements, risk assessments, safe systems of work etc.
- slinger-signallers' moral, legal, and environmental obligations
- reporting structures, the importance of good communication on site (colleagues, management, and other workers on site)
- the importance of effective restricted access zones, exclusion zones, and effective plant/personnel interface management
- working with other related ancillary workers

Assessment criteria:

- identify common hazards involved in lifting operations
- explain safe working practices relevant to the role of the slinger-signaller
- explain personal health and safety relevant to the role of slinger-signaller
- identify aspects of legislation, regulations, and industry good practice relevant to the role of slinger-signaller
- describe reporting structures and the importance of good communication on site
- explain the responsibilities of a slinger-signaller

identify the roles and responsibilities of the lift team

Delivery to include:

- appointed person
- crane/lift supervisor
- other slinger-signallers
- excavator operator
- crane co-ordinator

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- ancillary workers

Assessment criteria:

- explain reporting and organisational structures
- identify and describe the roles and responsibilities of each individual with a duty holding role within the lift team as listed above

identify information relating to preparing for lifting operations

Delivery to include:

- why all lifts must be planned, supervised, and carried out safely
- interpreting and extracting appropriate information from: drawings, specifications, schedules, risk assessments, method statements, lift plans, verbal briefings, manufacturers' information

Assessment criteria:

- explain why all lifts should be planned, by whom, and factors to be taken into account when lifting operations using excavators are being planned
- interpret and extract information relevant to the preparation for lifting operations from the given information

identify and explain the different types of lifting accessories / attachments for given types of loads

Delivery to include:

- the uses, application, and functions of the lifting accessories in accordance with a lift plan, to include: shackle, swivel hook, chain sling, webbing sling, and wire rope sling
- the checks to undertake on any integral lift points
- the safe use of any attachments e.g. quick hitch
- authorised accessory attachment points on the excavator / attachments
- the methods of rating for multi-legged slings, and down-rating of lifting accessories for any particular configuration of use
- interpretation of markings on lifting accessories including: working load limit, safe working load, conformity marking, serial numbers, manufacturers marking etc.
- identification and application of multi-legged slings
- hazards associated with slinging methods with emphasis on excavators

Assessment criteria:

- explain typical uses and applications of a shackle, swivel hook, chain sling, webbing sling, and wire rope sling
- explain the checks to undertake on integral lift points
- explain the checks to undertake on any attachments e.g. quick hitch
- explain the methods of rating for multi-legged slings and down-rating of lifting accessories for any particular configuration of use
- explain the markings on lifting accessories including: working load limit, safe working load, conformity marking, serial numbers, manufacturers marking etc.
- describe the safe use of multi-legged slings and assemblies of single leg slings

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- describe the hazards associated with slinging methods with emphasis on excavators
- describe the hazards associated when directing excavators used for object handling

undertake all pre-use checks on lifting accessories

Delivery to include:

- identify non-serviceable lifting accessories; to include visual and functional checks carried out before the start of each shift or period of operation to ensure that the lifting accessories and any attachments have not suffered any damage or failure and are safe to use
- identify possible effects of adverse environmental conditions, e.g. extreme temperature, strong sunlight, humidity, damp, chemicals and corrosive conditions
- identifying and interpreting valid reports and certification for maintenance, inspection, and thorough examination
- the use of declarations of conformity in lieu of reports of thorough examination
- the recommendation that fitting of a quick hitch to an excavator is considered a major modification to the excavator, and therefore the combined equipment should be thoroughly examined after fitting
- checks on reports of thorough examination for lifting accessories, excavator, and any attachments (note any hitch that remains attached to the excavator, and is not removed and re-installed, is ordinarily examined at the same interval as the excavator)
- pre-use checks on a range of lifting accessories to ensure serviceability for intended operations including: shackle, swivel hook, chain sling, webbing sling, and wire rope sling
- pre-use check requirements of specialist lifting accessories / attachments e.g. lifting beams, clamps, vacuum lifters, lifting magnets, and pallet forks

Assessment criteria:

- carry out pre-use checks on a range of lifting accessories to ensure serviceability for intended operations including: shackle, swivel hook, chain sling, webbing sling, and wire rope sling - *this should be observed during practical assessment*
- explain the pre-use check requirements of specialist lifting accessories / attachments e.g. lifting beams, clamps, vacuum lifters, lifting magnets, and pallet forks
- explain possible causes of failure in lifting accessories that would lead to declaring the item as unserviceable
- describe possible effects of adverse environmental conditions, e.g. extreme temperature, strong sunlight, humidity, damp, chemicals and corrosive conditions.
- identify at least one fit for purpose and two unserviceable lifting accessories from each of the following types: shackle, swivel hook, chain sling, webbing sling, and wire rope sling - *this should be observed during practical assessment*
- explain the visual and functional checks to carry out before the start of each shift or period of operation to ensure that the lifting accessories have not suffered any damage or failure and are safe to use
- from a given selection of lifting accessory reports of thorough examination, identify at least two examples that do not meet current legislation - *this should be observed during practical assessment*
- from a given selection of excavator / quick hitch reports of thorough examination identify at least one that does meet the current legislation - *this should be observed during practical assessment*

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identify and maintain personal protective equipment (PPE) and appropriate safety control equipment for slinger-signaller use

Delivery to include:

- what safety control equipment/PPE should be worn/used for slinger-signaller and include the following: suitable safety footwear, ear defenders, face/eye protection, dust mask, suitable gloves, overalls, hard hat, respiratory protective equipment (RPE), protective clothing etc.
- why weather conditions, including heat and cold, can determine what PPE is worn when carrying out the role of slinger-signaller and the personal effects of incorrect equipment

Assessment criteria:

- describe what forms of PPE and RPE must be worn for site operations
- explain why PPE and RPE must be worn for site operations
- state how severe weather can affect safety and health with insufficient equipment

explain procedures for placing non-serviceable items out-of-service

Delivery to include:

- procedure for identifying and rejecting damaged and defective lifting accessories
- the importance of checking all lifting accessories
- types of damage and the implications of using damaged or unsuitable lifting equipment
- the sequence of pre-use checks and procedures for in-service and out-of-service markings
- rejection criteria for removing lifting accessories from service
- purpose of quarantining defective items

Assessment criteria:

- explain the importance of checking all lifting accessories
- describe the types of damage and the implications of using damaged or unsuitable lifting equipment
- explain the procedure for defect reporting and why it is important
- explain the removal of defective items according to organisational requirements
- explain the need for secure storage of defective items
- describe the sequence of pre-use checks and procedures for in-service and out-of-service markings

identify and explain centres of gravity and methods to establish weights of loads

Delivery to include:

- methods of establishing centres of gravity for a range of loads (e.g. balanced loads, unbalanced loads, loose loads, bundled loads, containerised loads) to include: from the given information, calculation, assessment, estimation, and trial lifts
- identification of load types, volumes, characteristics, areas, density, moisture content, load markings, manufacturer's information, lift plans

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- methods of establishing weights of loads for a range of loads (e.g. balanced loads, un-balanced loads, loose loads, bundled loads, containerised loads) to include: from the given information, calculation, assessment, and estimation
- identification of what should be included in the gross load weight, e.g. load, lifting accessories, and any attachment on the excavator

Assessment criteria:

- describe methods of establishing centres of gravity for a range of loads (e.g. balanced loads, un-balanced loads, loose loads, bundled loads, containerised loads) to include: from the given information, calculation, assessment, estimation, and trial lifts
- identify load types, volumes, characteristics, areas, density, moisture content, load markings, manufacturer's information - *this should be observed during practical assessment*
- describe methods of establishing the weights of loads for a range of loads (e.g. balanced loads, un-balanced loads, loose loads, bundled loads, containerised loads) to include: from the given information, calculation, assessment, and estimation

Assessment requirements:

- for the purposes of assessment activities, the weight of all loads must be known

ensure hazards in the work area are identified and managed appropriately and that any necessary safety checks at the work area have been carried out

Delivery to include:

- identifying hazards present in the working location and hazards that may be created / encountered during the lifting operation, and how to implement suitable control measures to manage the hazards appropriately including:
 - load centre of gravity position uncertainty
 - load weight uncertainty
 - instability of loads due to lift point locations (e.g. lifting points below the load centre of gravity)
 - obstructions / snagging locations
 - fragile loads
 - loads designed to rotate when lifted / landed e.g. concrete skips
 - uncertainty of attachment point suitability
 - rapid speed of equipment movement
 - potential oversailing of personnel with loads
 - communication issues (e.g. radio communication failure)
 - moving loads crush zones
 - leading edges
 - working at height
 - adjacent plant and other works
 - poor / limited lighting
 - services (above ground and below ground)
 - environmental conditions
 - lifting to height or depth (e.g. into excavations)

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- poor ground conditions
- places of limited movement and restricted spaces
- places with limited or no visibility between operator / slinger-signaller
- effects of wind on loads
- unauthorised personnel in the area
- identifying where it will be safe to be positioned during the lift, especially the first raising of the load (including trial lift), taking into account the potential unexpected load movement that may occur at this stage
- understanding the actions to take before directing the equipment to first raise the load (including for trial lift): taking hands off the load, stepping away from the load, and moving to a safe space
- understanding the actions to take after initial raising of the load: stopping the lift if there is an issue, not intervening in an unexpectedly moving load, waiting for the load to become steady and stable, and only approaching when safe and if necessary
- actions to take if any hazards are not managed appropriately in line with site procedures / risk assessments, i.e. report to supervisory/managerial personnel
- actions required for emergency situations
- the effects of operating and lifting on slopes / gradients and the impact on excavator lateral / longitudinal stability
- understanding how slewing at high speeds can affect the excavator stability and safety
- understanding the function of boom and dipper lowering control devices (“burst valves / check valves”) and where they are situated on the excavator
- understanding the function of the excavator’s rated capacity overload warning device and that it must be enabled and functioning correctly for a lifting operation
- understanding the function of any Rated Capacity Indicator (RCI) or Rated Capacity Limiter (RCL) that may be fitted to an excavator
- understanding the use and benefit during a lifting operation of any additional stabilising features on the excavator such as blade
- understanding how the slew position and reach of the excavator is determined for a lifting operation
- understanding the importance of confirming and checking any travel route in advance of the lifting operation for the presence of hazards, e.g. overhead services
- understanding the safety advantages of slewing counterclockwise with the excavator as opposed to slewing clockwise
- understanding that lifting capacities are reduced when lifting a load over the side of the excavator base
- understanding why all loads should be lifted with a swivel hook between the hitch and the load
- understanding what might cause unplanned detachment of a load
- confirming underpinning knowledge of factors that could cause longitudinal / lateral instability of the excavator
- understanding the importance of agreeing a communication method and signals between the slinger-signaller and the excavator operator

Assessment criteria:

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- carry out checks of the working area to ensure suitability of a lifting operation against given information - *this should be observed during practical assessment*
- explain why it is important to report any hazards identified
- prepare and maintain control of the restricted access and exclusion zones and should include discussion of how to construct and maintain safe lifting zones for differing complexities of lifting operation and in various locations - *this should be observed during practical assessment*
- identify where it will be safe to be positioned during the lift, especially the first raising of the load (including trial lift), taking into account the potential unexpected load movement that may occur at this stage - *this should be observed during the practical assessment*
- before initial raising of a load (including for trial lift): ensuring that hands are taken off the load, stepping away from the load, and moving to a safe space - *this should be observed during the practical assessment*
- explain the actions to take after initial raising of the load: stopping the lift if there is an issue, not intervening in an unexpectedly moving load, waiting for the load to become steady and stable, and only approaching when safe and if necessary
- explain the actions to take if any hazards are not managed appropriately in line with site procedures / risk assessments, i.e. report to supervisory/managerial personnel
- explain the actions required for emergency situations
- explain the effects of operating and lifting on slopes / gradients and the impact on excavator lateral / longitudinal stability
- explain how slewing at high speeds can affect the excavator stability and safety
- explain the function of boom and dipper lowering control devices (“burst valves / check valves”) and where they are situated on the excavator - *this should be observed during the practical assessment*
- explain the function of the excavator’s rated capacity overload warning device and confirming with the excavator operator that it is enabled and correctly functioning before a lifting operation - *this should be observed during the practical assessment*
- explain the function of any Rated Capacity Indicator (RCI) or Rated Capacity Limiter (RCL) that may be fitted to an excavator
- explain the use and benefit during a lifting operation of any additional stabilising features on the excavator such as blade
- demonstrate how the slew position and reach of the excavator is determined for a lifting operation, measuring from the centre of the slew ring / centre of rotation to the vertical plane through the load hooking point - *this should be observed during the practical assessment*
- explain the importance of confirming and checking any travel route in advance of the lifting operation for the presence of hazards, e.g. overhead services - *this should be observed during the practical assessment*
- explain the safety advantages of slewing counterclockwise with the excavator as opposed to slewing clockwise and confirming this with the excavator operator the intention “to slew left only”, so far as is reasonably practicable, so as to minimise boom obscuring the view of the slinger-signaller by the operator - *this should be observed during the practical assessment*
- explain that lifting capacities are reduced when lifting a load over the side of the excavator base
- explain why all loads should be lifted with a swivel hook between the hitch and the load
- explain what might cause unplanned detachment of a load

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- confirm underpinning knowledge of factors that could cause longitudinal / lateral instability of the excavator
- demonstrate a typical agreed communication / hand signal that requires the excavator operator to deactivate / isolate the machine hydraulics (by deploying “deadman handle”) - *this should be observed in the practical assessment*

attach various types of loads to an excavator using the relevant lifting accessories and procedures ensuring load balance, security, and integrity

Delivery to include:

- selecting, handling, assessing, protecting, and using (assemble, set up and adjust) lifting accessories and aids
- different attachment points for types of excavators
- manual handling requirements for various types of lifting accessories
- conforming with lifting equipment rated capacities and corresponding working radius
- understanding the basis of the rated lift capacity charts and any reduction that may be required, to the stated capacity, for pick and carry operations
- undertaking trial lifts
- attaching loads to lifting equipment, to include the following: balanced, un-balanced, and loose/bundled loads
- ensuring the vertical alignment of the load hooking point and load
- methods of ensuring integrity and security of loads e.g. netting, sheeting, and strapping

Assessment criteria:

- select the appropriate lifting accessory for a load from given information - *this should be observed during practical assessment*
- attach the lifting accessory to the excavator and to a range of different load types and weights - *this should be observed during practical assessment*
- ensure the selected load is suitable for movement - *this should be observed during practical assessment*
- undertake trial lifts - *this should be observed during practical assessment*
- identify the different attachment points for types of excavators - *this should be observed during practical assessment*
- explain the manual handling requirements for various types of lifting accessories
- confirm the lift is within the excavator rated capacity and corresponding working radius - *this should be observed during practical assessment*
- explain the basis of the rated lift capacity charts and any reduction that may be required, to the stated capacity, for pick and carry operations
- explain the factors that can impact the lateral and longitudinal stability of the excavator
- attach loads to an excavator, to include the following: balanced, un-balanced, and loose/bundled loads - *this should be observed during practical assessment*
- ensure the alignment of the load hooking point and load - *this should be observed during practical assessment*
- explain the methods of ensuring integrity and security of loads e.g. netting, sheeting, and strapping

Assessment requirements:

- For the purposes of assessment activities, all load weights should be either confirmed from provided information or calculated, and suitable attachment methods should be established, e.g. integral lifting points where provided or double choked slings on bundled loads.

direct and guide the movement of loads to different types of location using different methods of communication with the excavator operator

Delivery to include:

- the purpose of a trial run/lift
- communicating using hand signals in line with published guidance material
- electronic communication, voice commands, procedures, and limitations
- guiding, controlling, and placing suspended loads by recognised methods of communication and agreed operational procedures
- determining and checking the load path before and during the lift including distances, obstructions, clearances, landing position and other activities (including lifting) in the area
- load movement where loads are blind to the equipment operator
- load movement where pick and carry activity is required to complete the task
- the most appropriate excavator configuration for undertaking pick and carry operations
- risks for slinger-signaller and others affected by a pick and carry operation
- controlling loads using equipment e.g. tag lines, push/pull poles, remote load manipulation devices
- methods of controlling loads using equipment e.g. tag lines, push/pull poles, and remote manipulation devices, and determining when this approach is necessary / safe to undertake (i.e. not all loads will require control using equipment, and the use of equipment must only be considered when it is safe and doesn't place the user at an enhanced level of risk)
- understanding the purpose of controlling loads using equipment, i.e. to control rotation of the load to avoid obstructions and to aid accurate positioning but not to fight the forces imposed by wind, and identifying the appropriate place to attach equipment to, e.g. at strong points on the corner of loads
- landing the load to allow lifting accessories to be retrieved safely

Assessment criteria:

- explain the purpose of a trial run/lift
- describe the importance of communicating using hand signals in line with published guidance material
- give examples of electronic communication, voice commands, procedures, and limitations
- determine and check the load path before and during the lift including distances, obstructions, clearances, landing position and other activities (including lifting) in the area - *this should be observed during practical assessment*
- direct and guide the excavator operator to lift a balanced load from ground level and land it in a designated place - *this should be observed during practical assessment*
- direct and guide the excavator operator to lift an unbalanced load from ground level - *this should be observed during practical assessment*

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- direct and guide the excavator operator to lift a load of tubes (or similar bundled items) no less than 4m in length using a pair of slings in double choke hitch from ground level - *this should be observed during practical assessment*
- direct and guide the movement of a load where the initial lifting or the landing of a load is out of sight of the excavator operator - *this should be observed during practical assessment*
- control the movement of all loads using relevant equipment - *this should be observed during practical assessment*
- control the movement of a selection of loads using relevant equipment – *this should be observed during practical assessment*
- provide clear and accurate signals and instructions to excavator operators - *this should be observed during practical assessment*
- give examples of the additional hazards posed by pick and carry operations and measures to be taken
- confirm with the operator that the excavator is appropriately configured for a pick and carry operation – *this should be observed during practical assessment*
- control the movement of a load under pick-and-carry duties - *this should be observed during practical assessment*
- land all loads accurately at given places - *this should be observed during practical assessment*

Assessment requirements:

- once each load has been landed, the load must be detached, and the excavator load hooking point moved away from the load for at least 90° before any reattachment occurs
- one load must be placed at 90% of the maximum radius of the excavator
- one load movement which involves at least 360° of slew
- one load to be landed at the excavator's minimum operating radius (but safely clear of the excavator's substructure)
- one long load to be slewed for at least 180° with the load at the minimum achievable radius
- one load to be moved under pick-and-carry duties for a minimum distance of 10 metres
- the slinger-signaller must keep control of all loads via a guide/tag line that is secured in a way which it cannot be inadvertently disconnected
- all loads must be kept under control, through appropriate communication / signalling and the use of equipment, as appropriate
- at least one load should be controlled using a tag line that is secured in a way in which it cannot be inadvertently disconnected
- loads must be accurately landed on the designated landing point
- at least one lift must use electronic communication (radio), and at least one lift must use hand signals
- loads must be made safe and secure after landing

detach various types of loads from the excavator using relevant procedures

Delivery to include:

- ensuring stability of loads once landed
- detaching procedures for accessories from loads and excavator

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- ensuring load integrity following disconnection
- how to reconfigure lifting accessories after detachment following placing of a load so that any component part does not foul structures or objects

Assessment criteria:

- ensure stability of loads once landed - *this should be observed during practical assessment*
- detach a range of lifting accessories from the excavator using relevant procedures - *this should be observed during practical assessment*
- ensure load integrity following disconnection - *this should be observed during practical assessment*
- guide accessories away from a landed load whilst ensuring that structures or objects are cleared - *this should be observed during practical assessment*

Assessment requirements:

- once each load has been landed, the load must be detached, and the excavator load hooking point moved away from the load by at least 90° or ensure any structures or objects are cleared (whichever is greater) before any reattachment occurs

explain environmental considerations

Delivery to include:

- health and social reasons to reduce machine emissions
- government industry zero emission initiatives
- air quality and the component gases of air
- how engine emissions affect air quality and the effects on human and environmental wellbeing
- measures to reduce emissions during operations including alternative/low emission fuels, fuel treatments and particulate filtration systems etc.
- minimising engine usage
- appropriate disposal of waste
- spillage procedures

Assessment criteria:

- explain the health and social reasons for reducing machine emissions
- discuss government industry zero emission initiatives
- list two or more effects on human and environmental wellbeing as a result of engine emissions
- identify measures to reduce emissions on site
- explain appropriate disposal of waste
- explain spillage procedures

carry out all post lifting checks and securing procedures

Delivery to include:

- function and requirements of end of service procedures

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- requirements for cleaning and protecting accessories when out of use
- typical types of lifting operation damage on accessories
- security and storage procedures
- post lifting documentation requirements

Assessment criteria:

- undertake end-of-service checks in accordance with procedures - *this should be observed during practical assessment*
- store lifting accessories in accordance with procedures - *this should be observed during practical assessment*
- describe the requirements for cleaning and protecting accessories when out of use
- describe the typical types of lifting operation damage on accessories e.g. cuts, tears and stretches
- explain the post lifting requirements, e.g. defect reports, lift plan reviews, post-lift reviews and paper work sign off