

Training Standard

Excavator 180° below 5 tonnes – Lifting Operations (novice)

Learning outcomes

Including additional guidance to support training delivery and final assessment

The delegate will be able to:

Lift planning and lifting operations preparation

Delivery to include:

- why all lifts must be planned, supervised, and carried out safely
- competence requirements for those involved in lifting operations
- function of a lift planner, lift plan and typical information that should be detailed in the plan
- type, limitations and extent of information contained within load capacity charts
- extracting information from, and interpreting, lifting/load capacity charts
- load centres/centres of gravity, lifting capacities relevant to reach, height and slew
- methods of establishing the weight of loads, including shape, size, and density
- type of lifting accessories for given types of loads
- machine mode settings for lifting operations
- required boom/dipper configurations for intended activities
- factors that can impact the lateral and longitudinal stability including reach, height, overloading, ground type and compaction, load swing, levelling requirements
- how lifting on inclines can affect machine stability
- methods of communication including radio protocol and hand signals for unit loads
- use of stabilisers and other stability aids
- Rated Capacity Indicators (RCIs) and other types of indicators and warning systems for machine stability
- safety devices-connected with lifting operations
- factors for exclusion and segregation zones
- identification of proximity hazards
- authorised and non-authorised accessory attachment points to the machine
- thorough examinations and other certification requirements
- manufacturers authorisation/approval for the lifting of suspended loads
- why suspended loads cannot be transported using 180° excavators

Assessment criteria:

- explain why all lifts should be planned, by whom and factors to be taken into account when lifting activities using excavators are being planned
- explain the type and level of information that would be contained within the manufacturer's issued load/lift capacity chart
- explain why all lifts must be planned, supervised, and carried out safely
- explain the roles involved in lifting operations
- explain why lifting capacities vary according to reach, height, and slew
- explain the methods of establishing weights and centres of gravity
- list typical types of lifting accessories used for excavator-related lifting activities

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- explain why machine mode settings for lifting operations should be selected at all times
- explain the factors that can impact the lateral and longitudinal stability of the machine
- explain how lifting on inclines and soft ground can affect machine stability
- describe the methods of communication including radio protocol and hand signals that would be used and with whom
- explain how the use of stabilisers and other aids can help stability
- explain why exclusion and segregation zones should be in place before operations commence
- explain the importance for the identification of proximity hazards
- explain authorised and non-authorised accessory attachment points
- explain why thorough examinations need to be carried out on the machine and lifting accessories and what is used to confirm that they have been carried out
- explain the function of the Rated Capacity Indicator (RCI) or, other warning systems for stability
- explain the function of height/slew limits and how they are set up
- explain why suspended loads cannot be transported using 180° excavators

configure the machine to pick up a range of loads

Delivery to include:

- the correct use and application of travel controls to include braking controls to position the machine for lifting activities
- the importance of maintaining good all-round visibility
- the correct use of all hydraulic controls
- how attachments and lifting accessories can reduce the stated lifting capacity of the machine
- correct machine configuration for different lifting activities
- how the front loader should be set for lifting operations
- how the positioning of the backhoe carriage and use of an extending dipper can severely affect machine stability
- why ride-control systems must be disengaged for lifting operations
- employing stabilisers, lock-outs and levelling systems
- checking security/integrity of load
- checking ground conditions to support the total machine weight including load
- determining the load capability of the machine at various configurations
- prior confirmation on where each load needs to be lifted to and where to be placed
- how stabilisers increase stability
- effects of stabilisers on ground pressures and on finished surfaces
- stabiliser sinkage and effects on stability
- positioning of excavator for lifting and placing a range of given loads
- how long loads can contact the machine when lifting and slewing
- why the front loaders should not be used for suspended load lifting activities

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Assessment criteria:

- demonstrate the correct use and application of steering, transmission, and braking controls – *this should be observed during practical assessment*
- explain the importance of maintaining good visibility
- demonstrate the correct machine configuration for different load types – *this should be observed during practical assessment*
- demonstrate correct use of dozer blades, stabilisers, and levelling systems (if fitted)– *this should be observed during practical assessment*
- demonstrate the correct use of all hydraulic controls for lifting and travelling activities
- explain why front loader positioning is important for lifting operations
- explain how the positioning of the backhoe carriage and use of an extending dipper can severely affect machine stability
- explain why ride-control systems must be disengaged for lifting operations
- explain how the total machine weight including load can affect stability on uncompacted/soft ground
- explain why prior confirmation on where each load needs to be lifted to and where to be placed is required
- describe the effects of stabilisers on ground pressures and on finished surfaces
- explain why the lifting of long and/or large area loads requires additional care
- explain why the front loaders should not be used for suspended load lifting activities
- demonstrate the positioning of excavator for lifting and placing a range of given loads - *this should be observed during practical assessment*
- travel to various locations for lifting of pre-set loads – *this should be observed during practical assessment*
- demonstrate how to configure, set, and prepare the machine to lift a range of applicable loads – *this should be observed during practical assessment*
- demonstrate that full visibility is maintained during manoeuvring activities – *this should be observed during practical assessment*
- check that ground conditions can support the machine's total weight for the working height and reach – *this should be observed during practical assessment*
- establish the weight of load and then check against lift/load capacity chart/s for intended height and reach – *this should be observed during practical assessment*

lift and place loads accurately and safely at given places

Delivery to include:

- quick coupler positioning during lift
- checks on the security/integrity of load
- placing the hook/accessories directly above the centre of gravity of the load
- use of boom and king post locks
- following given signals and instructions from the slinger/signaller
- maintaining full all-round observation, including with the slinger/signaller
- mode selection for the given activity

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- factors and examples that determine where loads can and cannot be placed
- smooth use of all controls
- methods of controlling of load movement/swing and load security including environmental factors
- how loads should be guided and controlled
- carrying out trial lifts and the reasons for
- controls isolated/deactivated during accessory attachment and detachment activities
- stabiliser employment for the given activity
- effects on load integrity and security and machine stability when slewing with loads
- effects on stability when slewing beyond 45 degrees to the machine's centre line
- how to minimise load swings and the effects of load swing on stability
- lifting and placing loads which may be partially or fully out of sight of the operator
- how load shapes, size, weight, length, centre of gravity and securing arrangements affect load security and safe movement of suspended loads
- how moisture content within a load can affect stability
- how to lift and place a range of loads at various locations where a change of radius (from minimum to maximum) and slewing of up to 180° degrees is required
- identification of and function of check/burst valves
- why suspended loads should not be left unattended

Assessment criteria:

- explain why checks on the security/integrity of load are important
- explain why the hook/accessories should be directly above the centre of gravity of the load
- explain the function and application of use of boom and king post locks
- explain the identification of and function of check/burst valves
- follow given signals and instructions from the slinger/signaller (demonstration)
- maintaining full all-round observation, including with the slinger/signaller (demonstration)
- mode selection for the given activity (demonstration)
- explain the factors and give examples that determine where loads can and cannot be placed
- smooth use of all controls (demonstration)
- explain what causes load swing/load movement and methods that should be used to control any movement/swing
- explain the effects on stability when slewing beyond 45 degrees to the machine's centre line
- explain how environmental factors can cause load swing
- explain how loads should be guided and controlled by the slinger/signaller
- explain the reasons for the carrying out of a trial lift
- explain why the controls must be isolated/deactivated during accessory attachment and detachment activities and what dangers could occur if not followed
- stabiliser employment for the given activity (demonstration)
- lifting and placing loads which may be partially or fully out of sight of the operator (demonstration)

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- explain how load shapes, size, weight, length, centre of gravity, moisture content and securing arrangements affect load security and safe movement
- lift and place a range of loads at various locations where a change of radius (from minimum to maximum) and slewing of up to 180° degrees is required - *this should be observed during practical assessment*
- explain why the quick coupler should remain in vertical position throughout the lift and why it should not impede on master link and attachment hinge pin
- keep within designated travel routes - *this should be observed during practical assessment*
- demonstrate locking of inner boom once fully retracted and king post in central plane for 180° excavators – *this should be observed during practical assessment*
- maintain full observation - *this should be observed during practical assessment*
- explain why harsh or incorrect use of hydraulic controls should be avoided
- explain the factors and give examples that determine where loads can and cannot be placed
- explain methods of communication, radio protocol and hand signals for unit loads
- demonstrate correct method of controlling a load swing – *this should be observed as part of the practical assessment.*
- demonstrate correct use of stabilisers – *this should be observed during practical assessment*
- demonstrate use of control isolation devices during attachment/disconnection of loads – *this should be observed during practical assessment*
- check that loads are appropriately restrained and guided during movement by the load handler *this should be observed during practical assessment*
- place all loads accurately at given predetermined points – *this should be observed during practical assessment*
- follow given signals and instructions – *this should be observed during practical assessment*
- maintain machine stability and ensure safe parameters are not exceeded on a lift – *this should be observed during practical assessment*
- demonstrate that during lifting and movement, the load and lifting accessories should always remain freely suspended from the excavator's lift point – *this should be observed during the practical assessment.*
- demonstrate that the hydraulics are deactivated when the slinger/signaller is hooking or unhooking the load – this should be observed during practical assessment
- demonstrate that the learner/novice has addressed any foreseeable hazards – this should be confirmed before the practical assessment
- explain why suspended loads should not be left unattended