

Training Standard

A59 Excavators 360 above 10 tonnes - tracked



Title	Excavators 360° above 10 tonnes: Tracked Novice and Experienced
<p>Novice Durations</p>	<p>Minimum 49 (7 Days) hours including assessment time: 1 candidate: 1 trainer: 1 machine 2 candidates: 1 trainer: 2 machines</p> <p>70 (10 Days) hours including assessment time: 2 candidates: 1 trainer: 1 machine 3 candidates: 1 trainer: 2 machines 4 candidates: 1 trainer: 2 machines</p> <p>100 (14 Days)* hours including assessment time: 3 candidates: 1 trainer: 1 machine</p> <p>*(requires 2 x 8 hour Days)</p> <p>The maximum number of candidates is four per group, with a maximum number of two machines per group, all learning outcomes must be covered by each candidate.</p> <p>Trainers must ensure all candidates get equal and sufficient practical engagement time.</p> <p><i>The duration stated in the training standard equals the minimum length of time the course and assessments should take to be completed based on the ratios above. How this is organised is at the discretion of the training provider.</i></p>
<p>Experienced Durations</p>	<p>Minimum 7 (1 Day) hours including assessment time: 1 candidate: 1 trainer: 1 machine</p> <p>14 (2 Days) hours including assessment time: 2 candidates: 1 trainer: 1 machine 3 candidates: 1 trainer: 2 machine 4 candidates: 1 trainer: 2 machine</p> <p>Candidates must cover all learning outcomes of the standard in full, the trainer must decide and be able to demonstrate and document their decisions for choosing the candidates route based on their knowledge and skills through a documented profiling approach. Evidence of the profiling and decisions must be kept and made available on request.</p> <p>The duration must not be reduced.</p>
<p>Purpose/ Scope</p>	<p>The Purpose and Scope of this standard is to provide the candidate with the skills and knowledge to support the following:</p> <ul style="list-style-type: none"> • Operation of a 360 excavator – to carry out basic excavation, loading and grading type work • Fit and use a range of bucket types

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	<ul style="list-style-type: none"> • Site the machine safely and efficiently for excavating, grading, and loading duties • Carry out checks and minor adjustments and prepare the machine for work • Travel the machine within site conditions • Understand the capabilities, purposes, and limitations of using the 360 excavator for excavating, loading, and grading duties • Comply with all safety requirements • Interpret given information to carry out excavating, loading, and grading duties to given tolerances.
<p>Occupational Relevance</p>	<p>Training delivered against this standard would be relevant to the following occupational group(s):</p> <ul style="list-style-type: none"> • Operative and craft
<p>Candidates pre-requisites</p>	<p>Profiling: The trainer will demonstrate and document their decisions for choosing either the Novice or Experienced route based on the candidates knowledge and skills through documented profiling.</p> <p>Novice: The candidate does not hold a current industry recognised card within the plant category and/or has limited or no demonstrable practical experience of operating the category of plant in a construction environment. Experience of working on site and a basic knowledge of construction terminology would be beneficial.</p> <p>Experienced: The candidate holds a current industry recognised red card within the plant category or has equivalent experience. The trainer must decide and be able to demonstrate a thorough initial assessment and document their decisions for choosing the experienced route based on the candidates knowledge and skills through a documented profiling approach.</p>
<p>Trainer Requirements</p>	<p>As a minimum, course trainers must be able to demonstrate that, in relation to this standard, they have:</p> <p>Essential:</p> <ul style="list-style-type: none"> • Either <ul style="list-style-type: none"> a) A current card issued by one of the CSCS partner plant schemes at trainer/trainer/assessor level bearing the category of telescopic handler or b) A current card issued by one of the CSCS partner plant schemes at operator level bearing the category of telescopic handler • Level 3 Award in Education and Training or equivalent qualification listed in Appendix 3 of the Requirements for Approved Training Organisations

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	<ul style="list-style-type: none"> • Health and safety qualification at or equivalent to construction site management level such as: <ul style="list-style-type: none"> – Site Safety Plus Site Management Safety Training Scheme (SMSTS) – Site Safety Plus Site Supervision Safety Training Scheme (SSSTS) – IOSH Managing Safely in Construction – IOSH Safety, Health & Environment for Construction Site Managers – 5-day CISRS Managers course – 5-day CCDO Demolition Managers course and end test – 5-day NPORS Construction Site Safety Manager. • In addition to the required qualifications, the trainer must be able to demonstrate ‘operational’ experience of operating the telescopic handler relating to the training they are delivering. This can be demonstrated with a minimum of 2 years’ experience. <p>Desirable:</p> <ul style="list-style-type: none"> • SCQF Level 5/NVQ Level 2 Plant Operations in the specific category being trained • Level 3 Certificate in Assessing Vocational Achievement.
Delivery	<p>Training and assessment may be delivered in an on or off-site environment. Where training and assessment takes place within a working construction site environment, training must be segregated from productive work within a prescribed training area, which has been risk assessed and has appropriate control measures in place as required by current legislation and regulations. All equipment required for the training must be set aside specifically for the training session and be available for the entire training duration. Equipment is not to be shared with the working construction site. Welfare facilities must be provided wherever training and assessment takes place, and this should meet relevant legislation. All materials and equipment must be of a suitable quality and quantity for candidates to achieve the learning outcomes delivery and assessment criteria, and must comply with relevant legislation, regulations and industry agreed requirements. Irrespective of the number of candidates, effective learning must be maintained for all candidates. The following training delivery methods may be used in the delivery of this standard:</p> <ul style="list-style-type: none"> • Face to face learning environment (such as a classroom/workshop/site office) for theoretical learning and assessment • On or off the job site environment for practical learning and assessment • Simulator for practical training.

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	<p>Note: <i>if a simulator is used, it can only comprise of a total of 20% of overall practical training and must not be used in any assessment.</i></p> <p>This standard is considered to contain 70% or more practical training.</p>
<p>Assessment</p>	<p>For the successful completion of training, candidates must complete an end of course practical assessment and knowledge test that has a clear pass or fail criteria as set out by the card scheme. The marking criteria must effectively measure every aspect of each learning outcome and additional guidance for training and assessment.</p> <p>The test used must be the standard CPCS Theory and Practical Test.</p>
<p>Quality Assurance</p>	<p>CPCS will quality assure against this standard and ensure that all Learning Outcomes have been met. The centre must retain evidence that the learning outcomes are referenced and achieved. This must be held by the training centre for a minimum of six years.</p> <p>CPCS will undertake un-announced or announced quality assurance visits of the training to ensure compliance with the Scheme of Works and the requirements of the Tester and Trainer Scheme Booklet.</p> <p>To ensure that compliance checks are effective, NOCN Job Cards Quality Assurance personnel must be given unrestricted access to all activities associated with the delivery of the Training Standards.</p> <p>Further quality assurance requirements are set out in the Test Centre Scheme Booklet.</p>
<p>Approval Date</p>	<p><i>September 2022</i></p>
<p>Review Cycle</p>	<p>On request or 5 years from approval date</p>

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Learning outcomes <i>Delivery to include and the candidate will be able to:</i>	Additional guidance to support learning outcome <i>Training Content to contain the following as a minimum:</i>	Assessment Criteria
Explain the factors that help maintain a safe working environment in the construction industry, and their responsibilities as a 360 excavator operator		
<ul style="list-style-type: none"> • 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. • Health & Safety at Work Act 1974, Provision and Use of Work Equipment Regulations (PUWER), Management of Health and Safety of Work (MHSW) Regulations, Construction (Design & Management) Regulations (CDM), Vibration at Work Regulations, Road Traffic Act, HSG144, LOLER, HSG46 etc. in accordance with risk assessments, method statements, codes of practice and other relevant legislation, regulations, and industry good practice • Operators' moral obligations, legal obligations, and environmental obligations • Reporting structures, the importance of good communication on site (colleagues, management, and other workers on site) • Previous incidences involving relevant plant and pedestrians 	<ul style="list-style-type: none"> • Industry type • Sector contribution. • Actions required for hazards: <ol style="list-style-type: none"> 1. <i>Noise</i> 2. <i>Vibration</i> 3. <i>Underground and Overhead Services.</i> • Safe working practices. • Effects of hazards: <ol style="list-style-type: none"> 1. <i>Lost time</i> 2. <i>Lost income</i> 3. <i>Expense for the employer</i> 4. <i>Fines</i> 5. <i>Custodial sentences.</i> • Legislation, Regulations and Guidance: <ol style="list-style-type: none"> 1. <i>Health and Safety at Work Act</i> 2. <i>Provision and Use of Work Equipment Regulations (PUWER)</i> 3. <i>Management of Health and Safety of Work (MHSW) Regulations</i> 4. <i>Construction (Design and Management) Regulations</i> 5. <i>Vibration at Work Regulations</i> 6. <i>Road Traffic Act</i> 7. <i>HSG114</i> 8. <i>HSG46.</i> • Risk Assessments, Method Statements and Permit to Work • Social Responsibilities • Environmental issues 	<ul style="list-style-type: none"> • Identify common hazards on a construction site • Explain safe working practices relevant to the role of the 360 excavator operator • Explain personal health and safety relevant to the role of 360 excavator operator • Identify aspects of legislation, regulations, and industry good practice relevant to the role of 360 excavator operator • Describe reporting structures and the importance of good communication on site • Explain the responsibilities of a 360 excavator operator.

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<ul style="list-style-type: none"> Working with other related roles e.g. marshallers, supervisors, other plant operatives, other occupations, and support workers Awareness of the limits to their personal knowledge, skills and experience and when situations exceed these limits the need to stop and seek further advice from supervisors. 	<ul style="list-style-type: none"> Reporting structures Operator Role Communication with colleagues/ management/ other trades Customer/ Client needs Accident Statistics. 	
Identify and extract information from the manufacturers' handbook/ operator's manual, and other information sources including digital		
<ul style="list-style-type: none"> Use of the operator's manual (for the specific machine) during the practical elements of training to identify key preparation, operational and safety aspects of the machine Types of information sources including machine control systems. 	<ul style="list-style-type: none"> Operator's Manual: <ol style="list-style-type: none"> Safety Information Operation Maintenance. Codes of practice Site plans/ drawings Risk Assessments and Method Statements. COSHH: <ol style="list-style-type: none"> Safety Data Sheets. Load/ tare sheets Inspection and reporting forms/ procedures. 	<ul style="list-style-type: none"> Identify and extract key elements for the preparation and safe use of the machine using various sources.
Locate and identify the major components, signs and decals and all controls of the excavator and explain their functions		
<ul style="list-style-type: none"> The purpose of principal components, the basic construction, controls, and terminology How correct and sympathetic use of the controls can ensure efficiency and safety of the machine and help prolong machine life by reducing wear and tear 	<ul style="list-style-type: none"> Differing types of machines Functions and applications Braking system Tyres and wheels Cooling system Fuel system Transmission 	<ul style="list-style-type: none"> Identify and explain the function of all controls and warning systems Explain why the correct and sympathetic use of controls aids efficiency, longevity, and safety State the purposes of ROPS and FOPS and other protection systems

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<ul style="list-style-type: none"> • Purposes of Roll Over Protection Systems (ROPS) and Falling Objects Protection Systems (FOPS) and other protection systems • Machine control systems – efficiencies, GPS. 	<ul style="list-style-type: none"> • Hydraulic system • Electrical system • ROPS • FOPS • Optional attachments. 	<ul style="list-style-type: none"> • Locate and identify the major components, signs, decals, and controls of the machine • Outline the purpose, types and function of machine control systems and electronic aids.
Conduct all pre-operational checks in accordance with manufacturers and legislative requirements		
<ul style="list-style-type: none"> • Complete all pre-start and running checks before any activity takes place, including visual checks for damage, functionality, and effectiveness • Checking all componentry systems are fully functional, including mechanical, hydraulic, pneumatic, electrical and electronic etc. • Replenish fuels, fluids and lubricants, and undertake grease-based lubrication activities • Manufacturers periodic checks and operator level maintenance requirements • Defect reporting requirements • Carry out routine adjustments • Safety systems functions including emergency stop • Health and safety requirements when undertaking basic maintenance activities including personal protection equipment (PPE) • Check condition and function of seatbelt and any other restraining equipment 	<p>Perform the following procedures on a daily basis:</p> <ul style="list-style-type: none"> • Cooling system level • Engine oil level • Fuel system • Hydraulic oil system level • Windscreen washer fluid level • Greasing • Indicators and gauges • Seat belts – inspect • Track adjustment • Travel alarm • Mirrors condition and security • Windows. <p>Running checks:</p> <ul style="list-style-type: none"> • Hydraulic system – hydraulic lockout control 	<ul style="list-style-type: none"> • Explain the procedure for defect reporting and why it's important. <p>The following should be observed during the practical assessment:</p> <ul style="list-style-type: none"> • Conduct all pre-operational checks as above in accordance with manufacturer guidance and legislative requirements. Note: verbal description to the trainer of specific pre-start checks will be acceptable if the machine is hot where they cannot be done safely e.g. engine fluids.

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<ul style="list-style-type: none"> • Check condition and function of any lighting and warning systems • Requirements for dealing with fluid spills including prevention and clean-up methods. 	<ul style="list-style-type: none"> • Lights – flashing beacon • Horn • Slew and movement of the excavator. • Quick Hitch: <ol style="list-style-type: none"> 1. <i>Check for any damage</i> 2. <i>Check for cracks</i> 3. <i>Oil leaks</i> 4. <i>Pins and clips.</i> Safety systems: <ul style="list-style-type: none"> • Hydraulic lockout control • Seat belt • Flashing beacon. Defect reporting systems: <ul style="list-style-type: none"> • All checks and inspections to be recorded and reported to relevant person. Health and safety requirements including Personal Protection Equipment (PPE): <ul style="list-style-type: none"> • Head protection • Foot protection • High-visibility clothing • Hear protection (if required) 	

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	<ul style="list-style-type: none"> Gloves. Refuelling procedures: <ul style="list-style-type: none"> Fluid spills including prevention and clean-up methods. 	
Identify and maintain personal protective equipment (PPE) and appropriate safety control equipment for excavator use		
<ul style="list-style-type: none"> What safety control equipment/PPE should be worn/used for machine operations 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. Appropriate use of local exhaust ventilation (LEV), i.e. in confined spaces Why weather conditions, including heat and cold, can determine what PPE is worn when using specific machine and the personal effects of incorrect equipment. 	<ul style="list-style-type: none"> Head protection Foot protection High-visibility clothing Weather-appropriate clothing Hearing protection Eye protection Gloves Respiratory protective equipment. Local exhaust ventilation (LEV): <ul style="list-style-type: none"> Pre-use checks and regular maintenance Defects in local exhaust ventilation systems must be reported and promptly rectified. Weather conditions including heat and cold: <ul style="list-style-type: none"> Supplying suitable PPE: <ol style="list-style-type: none"> <i>Appropriate for the risks involved and the conditions of exposure</i> 	<ul style="list-style-type: none"> Describe what forms of PPE and RPE must be worn for site operations Explain why PPE and RPE must be worn for site operations Give an example of when use of LEV would be appropriate State how severe weather can affect safety and health with insufficient equipment.

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	<ol style="list-style-type: none"> 2. <i>It takes account of the ergonomic requirements and state of health of the user</i> 3. <i>It can fit the wearer properly</i> 4. <i>Effectively prevents or adequately controls exposure to risk</i> 5. <i>Complies with any relevant UK or European Regulation or Directive.</i> 	
Safely get in to and out of the excavator		
<ul style="list-style-type: none"> • Working at height requirements • Safe use of all hand holds and steps • Facing the machine when getting in to and out of the excavator cab for operational and maintenance purposes • Effects of continually getting in to and out of the excavator e.g. fatigue, increased risk of falling etc. • Safe areas to get in to/out of the excavator e.g. ground location, other vehicle movements etc. • Procedures for accessing the excavator when carrying out adjustment and maintenance activities. 	<ul style="list-style-type: none"> • Use grabrails and footsteps provided to reach machine seat: <ol style="list-style-type: none"> 1. <i>Mount and dismount facing machine.</i> • Working at height requirements • Pedestrian routes should be established and segregated from mobile plant and vehicles • Traffic routes should be planned in order to minimise congestion and risk of collision • Parking place designated for vehicles • Operators must be informed of proximity hazards • Ground conditions should be stable and sufficiently level for the operations being carried out • Plant safe zones. <p>Medical Fitness:</p>	<ul style="list-style-type: none"> • Explain the effects of not using correct procedures to get in and out of the machine cab including when carrying out adjustment and maintenance activities • Explain the areas for safely getting in and out the excavator cab. <p>The following should be observed during the practical assessment:</p> <ul style="list-style-type: none"> • Demonstrate the correct procedures as listed above.

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	<ul style="list-style-type: none"> • Ensure that operators are medically fit to operate • Employee is physically and mentally capable of undertaking the tasks they are required to carry out. <p>Adjustment and maintenance activities: Track adjustment – adjust:</p> <ul style="list-style-type: none"> • Tightening the track: <ol style="list-style-type: none"> 1. <i>Wipe the fitting before you add grease</i> 2. <i>Add grease through grease fitting until the correct track tension is reached</i> 3. <i>Operate the machine back and forth in order to equalise the pressure</i> 4. <i>Check the amount of sag. Adjust the track, as needed.</i> • Loosening the track: <ol style="list-style-type: none"> 1. <i>Loosen relief valve carefully until the track begins to loosen. One turn should be the maximum</i> 2. <i>Tighten relief valve when the desired track tension is reached</i> 3. <i>Operate the machine back and forth in order to equalise the pressure</i> 4. <i>Check the amount of sag. Adjust the track, as needed.</i> 	
Prepare and configure the excavator for site travel		

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<ul style="list-style-type: none"> • Use of seatbelts and other restraining equipment • Adjustment of seating position and mirrors • Undercarriage checks • Isolation controls • Starting and stopping procedures including cold starting and those for turbochargers • Procedural requirements for exhaust particulate filter cleansing activities • Types of visibility aids and what factors can affect effective vision • Where and why effective vision is very important • Where issues can arise where vision is limited during operation • Ensuring warning and safety systems are operable • Legislative requirements and restrictions for being on the public highway • Machine configuration for site travel • Carrying of passengers/non-authorized personnel • Use of travel controls and speed modes. 	<ul style="list-style-type: none"> • Check controls: <ol style="list-style-type: none"> 1. <i>Seat – adjust for comfort/ reach</i> 2. <i>Wear seatbelt – adjust.</i> • Starting procedures: <ol style="list-style-type: none"> 1. <i>Turn the engine speed dial to the operating range</i> 2. <i>Move the hydraulic lockout control to the unlocked position</i> 3. <i>Raise the boom enough in order to provide sufficient ground clearance</i> 4. <i>Select the desired travel speed by operating the travel speed control switch</i> 5. <i>The drive sprockets should be at the rear of the machine.</i> • Visibility aids: <ol style="list-style-type: none"> 1. <i>Mirrors</i> 2. <i>Proximity warning systems.</i> • Safety zones: <ol style="list-style-type: none"> 1. <i>Yellow zone – line of sight of operator and out of danger</i> 2. <i>Amber zone – machine immobilised, and personnel must gain permission from the telescopic handler operator</i> 	<ul style="list-style-type: none"> • Explain why the use of seatbelts and other restraining equipment should be worn at all times • Describe the types and function of isolation systems • Explain the importance of carrying out undercarriage checks • Explain the impact of not following starting and stopping procedures of turbocharged engines • Describe the reasons for exhaust particulate filter cleansing activities • Describe types of visibility aids and what factors can affect effective vision • Explain where and why effective vision is extremely important • Give examples of where poor visibility can arise and the issues this can cause • Explain why the warning, and other safety systems, are important • Outline the legal requirements for being on the public highway • State the purpose of selectable travel speed modes. <p>The following should be observed during the practical assessment:</p>

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	<ol style="list-style-type: none"> 3. <i>Red zone – machine must be immobilised, and permission gained from the telescopic handler operator.</i> <ul style="list-style-type: none"> • Seat belt wearing indicators: <ol style="list-style-type: none"> 1. <i>Rotating green beacon which is activated when the seat belt clasp is engaged</i> 2. <i>Road Vehicle Lighting Regulations specifies that green lights are reserved for medical emergency vehicles – green beacon not to be illuminated when travelling on public highway.</i> • Flashing beacon. • Travelling on the public highway: <ol style="list-style-type: none"> 1. <i>The driver must hold a full car (category B + H) licence.</i> • Do not carry passengers. 	<ul style="list-style-type: none"> • Ensure the seatbelt is worn correctly prior to any machine movement • Identify and confirm that functional checks for all warning and safety systems have been carried out • Ensure that vision systems are in place, clear and functional • Conduct all-round visibility checks before moving away.
Travel and manoeuvre the excavator safely across varying terrain and inclines		
<ul style="list-style-type: none"> • How travel speeds affect tracked excavator chassis longevity • How travel speeds affect excavator stability, safety, and emissions • Issues which can occur if departing from designated travel routes and work areas/restricted zones • Types of underground services and the effects of travelling near to/over services 	<ul style="list-style-type: none"> • Turn the engine speed dial to the operating range • Move the hydraulic lockout control to the unlocked position • Raise the boom enough in order to provide sufficient ground clearance • Select the desired travel speed by operating the travel speed control switch 	<ul style="list-style-type: none"> • Describe the effects on track longevity due to travel speed selection modes • Explain how uncompacted surfaces affect machine stability • Describe what a stockpile is and why precautions should be taken when travelling and working on them • Explain why track drive motors should be kept rearwards

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<ul style="list-style-type: none"> • Effects of travelling close to edges, embankments, structures and trenches • Travelling over various types of terrain • Travelling up, down and across inclines • How certain types of surfaces can affect traction, particularly on inclines • How uncompacted surfaces and inclines affect machine stability • Precautions when working on stockpiled materials • Effects due to changes of centre of gravity when on inclines • Machine configuration when travelling on and across steep inclines • Direction of travel • Precautions and obstructions on travel routes including overhead utilities • Regulative requirements for travelling near to or under overhead power lines. 	<ul style="list-style-type: none"> • The drive sprockets should be at the rear of the machine. • Push both travel levers forward at the same time in order to travel forward: <ol style="list-style-type: none"> 1. <i>The directional steering controls will operate normally if the drive sprockets are at the rear of the machine</i> 2. <i>Travel speeds affect chassis longevity</i> 3. <i>Travel speeds affect stability, safety, and emissions.</i> • When you make turns in soft material, travel in a forward direction occasionally in order to clear the tracks • Slowly move both of the travel levers or both of the travel pedals to the centre position in order to stop the machine. • When you work on side hills and when you work on slopes, consider the following important points: <ol style="list-style-type: none"> 1. <i>Speed of travel – at higher speeds, forces of inertia tend to make the machine less stable</i> 2. <i>Roughness of terrain or surface – the machine may be less stable with uneven terrain</i> 3. <i>Direction of travel – avoid operating the machine across the slope. When possible, operate the machine up the slopes and operate the machine down the slopes. Place the heaviest end of the</i> 	<ul style="list-style-type: none"> • Explain how and when the centre of gravity alters on a machine and the effects on its stability • Explain the effects of extreme turning on tracked machines • Describe how certain types of surfaces can affect traction, particularly on inclines • State how travel speeds affect excavator stability, safety, and emissions • Describe issues which can occur if departing from designated travel routes and work areas/restricted zones • Describe types of underground services and the effects of travelling near to/over services • Explain the effects of travelling close to edges, embankments, structures and trenches <p>The following should be observed during the practical assessment:</p> <ul style="list-style-type: none"> • Demonstrate safe travel over rough, undulating ground, inclines and level surfaces • Demonstrate safe travel speeds in accordance with terrain and environment • Face the direction of travel • Travel up and down a gradient

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	<p><i>machine uphill when you are travelling on an incline (use dipper and boom to achieve this)</i></p> <ol style="list-style-type: none"> 4. <i>Nature of surface – ground that has been newly filled with earth may collapse from the weight of the machine</i> 5. <i>Surface material – rocks and moisture of the surface material may drastically affect the machine’s traction and machine’s stability. Rocky surfaces may promote side slipping of the machine</i> 6. <i>Slippage due to excessive loads – this may cause downhill tracks or downhill tyres to dig into the ground, which will increase the angle of the machine</i> 7. <i>Width of tracks or tyres – Narrower tracks or narrower tyres further increase the digging into the ground which causes the machine to be less stable</i> 8. <i>Height of the working load of the machine – when the working loads are in higher positions, the stability of the machine is reduced</i> 9. <i>Operated equipment – be aware of performance features of the equipment in operation and the effects on machine stability</i> 10. <i>Operating techniques – keep all attachments or pulled loads low to the ground for optimum stability</i> 	<ul style="list-style-type: none"> • Stop and start on the gradient whilst travelling uphill • Stop and start on the gradient whilst travelling downhill • Track through a chicane which requires left and right hand turns • Travel over rough, undulating ground, inclines, level surfaces • Travel the excavator through a restriction either side of the tracks • Maintain full visibility and look at or face direction of travel • Avoiding contact with structures and objects. <p>Assessment requirements:</p> <ul style="list-style-type: none"> • The slope must have an incline of 18% (1:5.5) with sufficient manoeuvring area at the top, or a straight ramp with an up and down route with a flat area at the summit • When tracking through the chicane and restriction, there must be minimal clearance to ensure accuracy of steering

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	<p>11. <i>Machine systems have limitations on slopes – slopes can affect the proper function and operation of the various machine systems. These machine systems are needed for machine control.</i></p> <ul style="list-style-type: none"> • Ground related hazards: <ol style="list-style-type: none"> 1. <i>Soft ground</i> 2. <i>Voids</i> 3. <i>Underground services</i> 4. <i>Lack of maintenance of running surfaces</i> 5. <i>Excavations</i> 6. <i>Open or steep sided edges</i> 7. <i>Slopes</i> 8. <i>Excessive travel speed</i> 9. <i>Wet ground</i> 10. <i>Environmental constraints such as habitat protection</i> 11. <i>Dry and dusty roads – visibility issues.</i> • Working near but not underneath overhead lines: <ol style="list-style-type: none"> 1. <i>Where there will be no work or passage of machinery or equipment under the line, reduce the risk of accidental contact by erecting ground-level barriers</i> 	

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Learning outcomes <i>Delivery to include and the candidate will be able to:</i>	Additional guidance to support learning outcome <i>Training Content to contain the following as a minimum:</i>	Assessment Criteria
	<ol style="list-style-type: none"> 2. <i>The safety zone should extent 6 m horizontally from the nearest wire on either side of the overhead line.</i> <ul style="list-style-type: none"> • <i>Passing underneath overhead lines:</i> <ol style="list-style-type: none"> 1. <i>If equipment or machinery capable of breaching the safety clearance distance has to pass underneath the overhead line, you will need to create a passageway through the barriers</i> 2. <i>Define the route of the passageway using fences and erect goalposts at each end to act as gateways using a rigid, non-conducting material</i> 3. <i>Put warning notices at either side of the passageway, on or near the goalposts and on approaches to the crossing.</i> 	
Travel and manoeuvre in areas of restricted space		
<ul style="list-style-type: none"> • <i>Precautions to be taken when manoeuvring in areas of restricted space</i> • <i>Requirements when working alongside highways, railways and public areas</i> • <i>Height and slew restriction limiters</i> • <i>Checking machine size including height, width and working radius including tail swing relevant to working area</i> • <i>Lighting requirements and issues that may occur due to poor light.</i> 	<ul style="list-style-type: none"> • <i>Pedestrian routes should be established on site to facilitate safe pedestrian movement and access to work areas</i> • <i>Pedestrian routes should be segregated from mobile plant and vehicles, either by a safe distance or by physical barriers</i> • <i>Traffic routes should be planned in order to minimise congestion and risk of collision. These routes should be free of obstructions and properly maintained, with access points restricted and clearly marked</i> 	<ul style="list-style-type: none"> • <i>Describe typical proximity hazards when in enclosed/restricted areas</i> • <i>Explain the factors to consider before entering areas of restricted space</i> • <i>Explain the factors to consider when setting up to work next to highways, footpaths, areas of public movement, railways</i> • <i>Explain the purpose and use of movement restrictors including height, radius and slew</i> • <i>Explain the potential risks of the tail swing of a machine in a restricted space</i>

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	<ul style="list-style-type: none"> • Height and slew restrictors ensures that the machine works within user defined adjustable limits by producing an audible alarm or stops motion. • Static Dimensions: <ol style="list-style-type: none"> 1. Overall height 2. Overall length 3. Tail-swing 4. Track Width 5. Superstructure Width 6. Track Centres. • Performance Dimensions: <ol style="list-style-type: none"> 1. Max. digging height 2. Max. dumping height 3. Max. vertical digging depth 4. Max. digging depth 5. Max. reach (ground Level) 6. Min. boom swing radius 7. Blade cut above ground (if fitted) 8. Blade cut below ground (if fitted). • Risk caused by tail-swing in a restricted space – controlling the risk: <ol style="list-style-type: none"> 1. Exclusion – provision of suitable barriers 	<ul style="list-style-type: none"> • Explain the control measures to reduce risk caused by tail swing in a restricted space • Describe how poor lighting can affect overall safety.

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	<ol style="list-style-type: none"> 2. <i>Clearance – 0.5m needs to be maintained between any part of the machine, particularly the ballast weight, and the nearest obstruction</i> 3. <i>Visibility – Excavator equipped with visibility aids, LED lights, and approach lighting</i> 4. <i>Plant and vehicle marshaller – provided in a safe position to direct excavator operation.</i> 	
Attach and remove buckets, using quick hitch couplers		
<ul style="list-style-type: none"> • Types of excavating and grading buckets • Removal and attachment of buckets/attachments • Classifications of quick-hitch couplers • Procedures for the removal and fitting of attachments using manual and hydraulically operated quick-hitch couplers, including coupling, securing and checking to ensure safe attachment • Relevant health and safety legislation and legal duties • Risks associated with quick-hitch couplers • Visual inspections • Maintenance and storage. 	<ul style="list-style-type: none"> • Types of excavating and grading buckets: <ol style="list-style-type: none"> 1. <i>Digging</i> 2. <i>Trenching</i> 3. <i>Ditching</i> 4. <i>Grading.</i> • When fitting buckets/ attachments to a quick hitch the following points should be observed: <ol style="list-style-type: none"> 1. <i>The attachment should be compatible with the quick hitch</i> 2. <i>The operator should be familiar with the attachment process for specific make and model of quick hitch</i> 3. <i>Attachment fitting should be carried out in an area designated for the purpose, from which other personnel are excluded.</i> 	<ul style="list-style-type: none"> • List the classifications of quick-hitch couplers • Describe the required procedures for removing and fitting attachments using manual and hydraulically operated quick-hitch couplers that ensures safe attachment • Outline the relevant health and safety requirements applicable to the operation of quick-hitch couplers and the legal duties of operators • Identify the risks associated with attaching attachments using quick-hitch couplers • Explain the consequences of incorrect fitment of attachments • Explain the procedures for maintaining quick-hitch couplers. <p>The following should be observed during the practical assessment:</p>

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	<ul style="list-style-type: none"> • Classifications of quick hitch couplers: <ol style="list-style-type: none"> 1. <i>Manual Quick Hitches – require the operator to manually operate the latching mechanism</i> 2. <i>Semi-automatic Quick Hitches – Hydraulic cylinder to operate the latching mechanism, manually insert a locking pin which will hold the latching mechanism in its closed position</i> 3. <i>Fully Automatic Quick Hitches – operated completely from the cab. Incorporates an independent locking system to secure the latching mechanism once it is fully closed.</i> • Procedures for removal and fitting of attachment: <ol style="list-style-type: none"> 1. <i>Before lifting the quick hitch and bucket the operator should ensure that any locking device (this will depend on the type and make of quick hitch) is in place and secure</i> 2. <i>Manual quick hitch – operator leaving the cab to physically ensure that the quick hitch is securely locked before starting work tasks</i> 3. <i>Fully automatic quick hitch – carry out visual verification from the cab providing that the operator has a clear view of the latching indicator</i> 4. <i>After the bucket has been attached, locked and physically checked, the quick hitch should be crowded out to ensure that the bucket is secured to the quick hitch.</i> 	<ul style="list-style-type: none"> • Conduct visual inspections of quick-hitch couplers – pre-use and after attaching • Attach, secure, and detach at least one attachment using a quick-hitch coupler following manufacturer’s instructions • Apply safe working practices when coupling and disconnecting an attachment using a quick-hitch coupler.

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	<ul style="list-style-type: none"> • Relevant Health and Safety Legislation and Legal Duties: <ol style="list-style-type: none"> 1. <i>Health and Safety at Work Act</i> 2. <i>Lifting operations and Lifting Equipment Regulations (LOLER)</i> 3. <i>Provision and Use of Work Equipment Regulations (PUWER)</i> 4. <i>BS EN 474-1 Earth-moving machinery – Safety Part 1: General Requirements.</i> • Hazards associated with quick hitch couplers: <ol style="list-style-type: none"> 1. <i>Work equipment</i> 2. <i>Crushing</i> 3. <i>Access/ egress</i> 4. <i>Slip, trip and falls</i> 5. <i>Plant movement</i> 6. <i>Environmental etc.</i> • Visual inspections: <ol style="list-style-type: none"> 1. <i>Quick hitch operating controls</i> 2. <i>Hydraulic system</i> 3. <i>Damage to quick hitch</i> 4. <i>Correct functioning of safety device</i> 5. <i>Dirt, debris, wear, and tear</i> 	

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	<ol style="list-style-type: none"> 6. <i>Attachment pins and retainers</i> 7. <i>Greasing in accordance with manufacturer's instructions.</i> <ul style="list-style-type: none"> • Effective maintenance of a quick hitch is essential • Manufacturer's preventive maintenance instructions • Defects that affects the safe operation of the quick hitch must be reported and repaired. • Storage of the attachment: <ol style="list-style-type: none"> 1. <i>Position the bucket on a solid, level surface</i> 2. <i>Place the bucket in a safe position before disengaging the coupler.</i> 	
Conduct all necessary safety checks at the work area		
<ul style="list-style-type: none"> • Safety checks that must be carried out to ensure the excavation area is clear of hazards • Communication and relationship requirements and methods with other machine operators and support workers • Requirements for sufficient manoeuvring area for manoeuvring between work areas • Ground conditions for excavating and maintaining stability • Overhead obstructions and nearby proximity hazards 	<ul style="list-style-type: none"> • Potential hazards identified in the excavation area: <ol style="list-style-type: none"> 1. <i>Ground conditions</i> 2. <i>The route to be traversed</i> 3. <i>Weather conditions</i> 4. <i>Contact with Other vehicles</i> 5. <i>Contact with Site personnel</i> 6. <i>Proximity hazards – obstacles, debris, excavations, over-head power lines.</i> 	<ul style="list-style-type: none"> • Explain the need for restricted, exclusion and segregation zones and how they are determined • Describe the safety checks that must be carried out to ensure the excavation area is clear of hazards • Describe the types of ground conditions including seasonal that can affect safe operations • Describe the methods of preventing contact with overhead lines

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Learning outcomes <i>Delivery to include and the candidate will be able to:</i>	Additional guidance to support learning outcome <i>Training Content to contain the following as a minimum:</i>	Assessment Criteria
<ul style="list-style-type: none"> • Awareness of other machines and workers • Restricted, segregation and exclusion zoning requirements • People/plant interface, procedures and dangers of allowing others near to a working machine • Danger zones of a working excavator • Working in hours of darkness and lighting requirements. 	<ul style="list-style-type: none"> • A plant and vehicle marshaller should be provided in a safe position to direct excavator operation and any pedestrian movements • Pedestrian routes should be segregated from mobile plant and vehicles • Traffic routes should be planned in order to minimise congestion and risk of collision. These routes should be kept free of obstructions and properly maintained, with access points restricted and clearly marked • Clearance of over 0.5 m needs to be maintained between any part of the machine, particularly the ballast weight, and the nearest obstruction • Ground conditions should be stable and sufficiently level for the operations being carried out and the equipment being used • Working near but not underneath overhead lines – where there will be no work or passage of machinery or equipment under the overhead lines, you can reduce the risk of accidental contact by erecting ground-level barriers to establish a safety zone. • Plant safe zones: <ol style="list-style-type: none"> 1. <i>Yellow zone – The marshaller must remain within this zone to be able to direct the plant. All personnel approaching operating plant must do so from this zone to gain visual contact with the plant operator</i> 	<ul style="list-style-type: none"> • Describe the need for having sufficient manoeuvring space within the work area • Explain the importance of being aware of other machines, vehicles and workers • Explain the procedures and dangers of allowing others near to a working machine • Identify the danger zones around the working machine for others • Explain procedures for working in hours of darkness and lighting requirements. <p>The following should be observed during the practical observation:</p> <ul style="list-style-type: none"> • Ensure ground conditions are suitable for excavating and maintaining stability • Identify any overhead obstructions and nearby proximity hazards • Ensure the integrity of restricted zones • Identify and use designated excavation area entry and exit locations • Ensure loading areas are clear of hazards • Establish communication methods with supporting workers.

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Learning outcomes <i>Delivery to include and the candidate will be able to:</i>	Additional guidance to support learning outcome <i>Training Content to contain the following as a minimum:</i>	Assessment Criteria
	<ol style="list-style-type: none"> 2. Amber zone - Entry prohibited until positive visual contact is confirmed by the plant operator. The machine is immobilised using the safety lever. 3. Red zone – Entry unless the machine is completely isolated, the engine is switched off and a safe system of work is in place that prevents the machine being operated. <ul style="list-style-type: none"> • When working in the hours of darkness or in reduced visibility, lights must be fitted and used to enable the work area to be adequately illuminated. 	
Configure and set-up for excavating and loading duties		
<ul style="list-style-type: none"> • Working radius – minimum to maximum • Required configuration for intended activity • Methods of relaying and interpreting excavation work specification • Visual reference points for excavation work • Temporary works requirements and efficiencies of working safely on raised platforms • Where spoil can and should not be placed • Why segregation of materials should be maintained • Positioning of excavator and vehicles for loading • Use of blades to maintain stability 	<ul style="list-style-type: none"> • People should be kept away from areas of excavator operation by the provision of suitable barriers to create and maintain a pedestrian exclusion area. • Observations to be made prior to and during manoeuvring machine: <ol style="list-style-type: none"> 1. <i>Appropriate site organisation is required in order to minimise hazards that are caused by restricted visibility:</i> <ul style="list-style-type: none"> - <i>Restricted areas</i> - <i>Controlled patterns of machine movement</i> - <i>A system of communication</i> 2. <i>Whenever possible, manoeuvre into a position which combines safety and efficiency.</i> 	<ul style="list-style-type: none"> • Explain how to establish the working range of the machine • Describe the types and methods of communication that are used to convey • Excavation and other work criteria to the operator • Explain types of site markings for excavations, what they mean and how they are interpreted • Outline regulatory requirements for working on temporary, raised platforms • Explain where spoil should be placed for different types of excavations and effects of placing spoil in incorrect places

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<ul style="list-style-type: none"> • Selection of correct bucket to meet work specification. 	<ul style="list-style-type: none"> • Correct machine set-up: <ol style="list-style-type: none"> 1. <i>To ensure the sides of the trench remain vertical when digging the machine must be level</i> 2. <i>When slewing whenever possible slew to the left because this is the best side for vision</i> 3. <i>When choosing a digging position, avoid digging downhill if possible</i> 4. <i>When the machine is in the desired position on the site, lower the dozer to the ground (if fitted).</i> • Visual reference points for excavation work: <ol style="list-style-type: none"> 1. <i>Excavating Drawing:</i> <ul style="list-style-type: none"> - <i>Length</i> - <i>Width</i> - <i>Depth</i> • Temporary Works must be designed, installed and maintained to withstand foreseeable loads which may be imposed on it: <ol style="list-style-type: none"> 1. <i>Shoring for excavations</i> 2. <i>Haul roads and working platforms for plant</i> 3. <i>Earthworks, including stockpiles, that will be removed later</i> 4. <i>Construction (Design and Management) Regulations 2015 – Temporary Works Design.</i> 	<ul style="list-style-type: none"> • Explain why excavated materials may need to be segregated and where they are placed • Explain how dozing blades aid stability. <p>The following should be observed during the practical assessment:</p> <ul style="list-style-type: none"> • Position and set up the machine for given excavating tasks.

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	<ul style="list-style-type: none"> • Spoil Placement: <ol style="list-style-type: none"> 1. <i>The minimum distance from the side of the excavation that material should put is 1 m</i> 2. <i>As a rule the material is placed the same distance from the side of the trench as the depth</i> 3. <i>Have a suitable provision for the storage or removal of the spoil.</i> • Careful management of topsoil and subsoil is an important aspect of sustainable use of materials that are being stripped: <ol style="list-style-type: none"> 1. <i>Clay</i> 2. <i>Silt</i> 3. <i>Sand</i> 4. <i>Rock/ Bedrock.</i> • Loading Vehicles: <ol style="list-style-type: none"> 1. <i>Vehicle is on level solid ground</i> 2. <i>Vehicle is secure</i> 3. <i>Vehicle is capable of taking the weight</i> 4. <i>Do not drop materials from excessive heights as this can damage the body of the vehicle</i> 5. <i>Excavators are short cycle machines. To ensure good efficiency the vehicle should be placed in a position which requires the least movement from the excavator.</i> 	

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	<ul style="list-style-type: none"> • When working on inclines, position the dozer for maximum stability. This may mean the dozer and the boom are at the same end of the machine, especially if digging down hill, lower the dozer sufficiently to bring the machine level • If necessary, to prevent an instability problem, cut a level platform for the machine to stand on. • Choosing the right size of bucket: <ol style="list-style-type: none"> 1. <i>Excavator specifications</i> 2. <i>Material density</i> 3. <i>Hauler/ truck capacity.</i> • Choosing the right type of bucket: <ol style="list-style-type: none"> 1. <i>General purpose buckets</i> 2. <i>Heavy duty buckets</i> 3. <i>Grading buckets.</i> 	
Explain actions required for hazards, underground and overhead services		
<ul style="list-style-type: none"> • Regulatory requirements for working near to or under overhead services • Types of services, including buried and surface laid, and the various methods on how they are identified • Emergency and reporting procedures if contact is made with services • Minimum clearances when near to services 	<ul style="list-style-type: none"> • The law requires that work may be carried out in close proximity to live overhead lines only when there is no alternative and only when the risks are acceptable and can be properly controlled • Good management, planning and consultation with interested parties before and during any work close to overhead lines will reduce the risk of accidents 	<ul style="list-style-type: none"> • Explain regulative distances that machines should be kept from different types of overhead services • Describe the types of services that may be encountered on site • Explain the emergency and evacuation procedures if contact is made with services on site

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<ul style="list-style-type: none"> • Permit to break ground requirements. 	<ul style="list-style-type: none"> • If equipment or machinery capable of breaching the safety clearance distance has to pass underneath the overhead line, you will need to create a passageway through the barriers. • Underground services: <ol style="list-style-type: none"> 1. <i>Electricity cables</i> 2. <i>Gas pipes</i> 3. <i>Water pipes and sewers</i> 4. <i>Telecommunications cables.</i> • National Colour Coding System for Underground Utilities: <ol style="list-style-type: none"> 1. <i>Red – Electricity</i> 2. <i>Black – Electricity</i> 3. <i>Orange – Street Lighting (England and Wales) and Traffic Control</i> 4. <i>Yellow – Gas</i> 5. <i>Green – Some Telecommunications</i> 6. <i>Blue – Water</i> 7. <i>Purple – Street Lighting (Scotland) or Communications</i> 8. <i>Grey – Telecommunications or Water</i> 9. <i>White – Telecommunications.</i> • Emergency procedures overhead cables: 	<ul style="list-style-type: none"> • State the minimum distances to be kept from buried and surface laid services • Explain methods and hierarchy of establishing buried services within the work area • Explain how and why contact to services must be reported • Explain why permits to break ground are required, who issues them and on what basis.

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	<ol style="list-style-type: none"> 1. <i>Never touch the overhead line's wires</i> 2. <i>Assume that the wires are live</i> 3. <i>If you can, call the emergency services. Give them your location, tell them what has happened and that electricity wires are involved, and ask them to contact the line's owner</i> 4. <i>If you are in a vehicle that has touched a wire, either stay in the vehicle or, if you need to get out, jump out of it as far as you can. Do not touch the vehicle while standing on the ground. Do not return to the vehicle until it has been confirmed that it is safe to do so</i> 5. <i>Keep a safe distance away from the wire or anything else it may be touching and keep others away.</i> <ul style="list-style-type: none"> • Exclusion zones around the line and any other equipment that may be fitted to pole or pylon. The minimum extent of these zones varies according to the voltage of the line – GS6: <ol style="list-style-type: none"> 1. <i>Low voltage line – 1 m</i> 2. <i>11 kV and 33 kV lines – 3 m</i> 3. <i>132 kV line – 6 m</i> 4. <i>275 kV and 400 kV lines – 7 m.</i> • A permit-to-work system is a formal recorded process used to control work that is identified as potentially hazardous. 	

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	<ul style="list-style-type: none"> • It is a means of communication between managers, supervisors, and operatives who carry out the work • A permit-to-work system aims to ensure that proper consideration is given to the risks of a particular job, and authorises people to carry out specific work at a specific site at a certain time – and sets out the precautions needed to complete the job safely. 	
Excavate different types of excavations in various types of ground to given dimensions		
<ul style="list-style-type: none"> • Typical types of excavations able to be created by 360 excavators • How soil types determine excavation types and methods • Methods of minimising excavation collapse including benching, trench boxes, other shoring and support methods etc. • Causes of excavation collapse • Method statements, job specifications, risk assessments, • Placement or disposal of spoil • Segregation of excavated materials • Typical excavation tolerances • Reasons for excavation dimensions and effects of not conforming to given tolerances • Methods of efficient excavation techniques for different types of ground and support requirements 	<ul style="list-style-type: none"> • Material types: <ol style="list-style-type: none"> 1. <i>Topsoil excavation – this involves the removal of the exposed layer of the earth’s surface, including any vegetation or decaying matter</i> 2. <i>Earth excavation – this involves the removal of the layer of soil directly beneath the topsoil. The removed material is often stockpiled</i> 3. <i>Rock excavation – this is the removal of material that cannot be excavated without using special excavation methods such as breaking or blasting</i> 4. <i>Muck excavation – this is the removal of excessively wet material and soil that is unsuitable for stockpiling</i> 5. <i>Unclassified excavation – this is the removal of a combination of the above materials, such as where it is difficult to distinguish between the materials encountered.</i> 	<ul style="list-style-type: none"> • Describe types and purposes of typical construction-based excavation • Explain how excavations should be carried out on differing soil types e.g. granular and cohesive • Describe causes of excavation collapse and effects of environmental conditions – dryness/high moisture • Explain the methods of minimising excavation collapse and methods of shoring • Explain what methods are used to transfer excavation specifications and requirements to the operator • Explain the reason for segregation of different soil types and how they should be segregated during excavation • Explain the reasons for limiting off-site disposal of spoil

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<p style="text-align: center;">Learning outcomes</p> <p style="text-align: center;"><i>Delivery to include and the candidate will be able to:</i></p>	<p style="text-align: center;">Additional guidance to support learning outcome</p> <p style="text-align: center;"><i>Training Content to contain the following as a minimum:</i></p>	<p style="text-align: center;">Assessment Criteria</p>
<ul style="list-style-type: none"> • Carrying out a range of excavating activities following given dimensions and tolerances • Working near to edges and deep excavations • Required control methods for open excavations • Methods of establishing excavation dimensions and tolerances • Establishing and maintaining visual contact with dedicated supporting workers. 	<ul style="list-style-type: none"> • Excavation purpose: <ol style="list-style-type: none"> 1. <i>Cut and fill excavation – this is the process of excavation whereby the material that is cut or stripped</i> 2. <i>Trench excavation – a trench is an excavation in which the length greatly exceeds the depth</i> 3. <i>Trench, or footing, excavation is typically used to form strip foundations, buried services etc.</i> 4. <i>Basement excavation – part of a building that is either partially or completely below ground level</i> 5. <i>Road excavation – this typically involves stripping topsoil and cut and fill</i> 6. <i>Bridge excavation – this typically involves the removal of material for the footing and abutments of bridges.</i> • Excavation support. • The type and extent of temporary support that is required will depend on the following factors: <ol style="list-style-type: none"> 1. <i>The stability and angle of repose of the subsoil</i> 2. <i>The proximity of the excavation to vehicles, services and buildings</i> 3. <i>The level of the water table</i> 4. <i>The type(s) of subsoil</i> 5. <i>The depth of the excavation</i> 	<ul style="list-style-type: none"> • State the typical excavation tolerances in construction excavations and explain the effects of not conforming to given tolerances • Describe methods of efficient excavation techniques for different types of ground • Explain the importance of maintaining visual contact with dedicated supporting workers. <p>The following should be observed during the practical assessment:</p> <ul style="list-style-type: none"> • On level ground excavate a straight excavation with vertical ends to given dimensions and tolerances • Excavate a square excavation to given dimensions and tolerances. <p><i>Assessment requirements:</i></p> <ul style="list-style-type: none"> • The length of the excavation will be determined by the machine weight as follows: <ul style="list-style-type: none"> - below 10 tonnes – 10 metres - above 10 tonnes – 15 to 20 metres. • The square box must be 3x the width of the bucket • Excavation and box depths must be a minimum of 1 metre and be within +/- 35mm of the given size

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	<ol style="list-style-type: none"> 6. <i>The length of time the excavation will be left open</i> 7. <i>The time of year and weather conditions.</i> <ul style="list-style-type: none"> • The types of support that can be used include: <ol style="list-style-type: none"> 1. <i>Timber support</i> 2. <i>Trench boxes</i> 3. <i>Trench sheets</i> 4. <i>Caissons</i> 5. <i>Cofferdams.</i> • Excavations may become unstable or collapse due to: <ol style="list-style-type: none"> 1. <i>Vibration from vehicles or machinery</i> 2. <i>Weather conditions and surface water</i> 3. <i>Severe impact including explosions</i> 4. <i>Loads, such as vehicle, machinery or building materials, being positioned close to an edge</i> 5. <i>Failure of supports.</i> • Risk Assessments, Method Statements, permit to dig. • Stockpile location and stability: <ol style="list-style-type: none"> 1. <i>Stockpiles should not be positioned within the root or crown spread of trees, or adjacent to ditches, watercourses or existing or future excavations</i> 2. <i>Soil will have a natural angle of repose depending on texture and moisture content</i> 	<ul style="list-style-type: none"> • The excavation must be straight within +/- 60mm.

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Learning outcomes <i>Delivery to include and the candidate will be able to:</i>	Additional guidance to support learning outcome <i>Training Content to contain the following as a minimum:</i>	Assessment Criteria
	<ol style="list-style-type: none"> 3. <i>Once the stockpile has been completed the area should be cordoned off with secure fencing to prevent any disturbance or contamination by other construction activities.</i> <ul style="list-style-type: none"> • <i>Knowing what soils are on site:</i> <ol style="list-style-type: none"> 1. <i>Inadequate identification of clean soil resources not only risks good soil becoming mixed with spoil or contaminated materials, thereby restricting or preventing its reuse</i> 2. <i>Soil survey carried out on the site by suitably qualified persons prior to any earthworks operations.</i> • <i>Provision of information:</i> <ol style="list-style-type: none"> 1. <i>Clear and fully detailed drawings should be available on site to enable work to be carried out in accordance with the design</i> 2. <i>All necessary dimensions and levels should be indicated and relate to at least one benchmark and reference points on the site.</i> • <i>Setting out:</i> <ol style="list-style-type: none"> 1. <i>The accuracy of setting out should be checked by control measurements of trenches. Levels should be checked against accepted benchmarks</i> 2. <i>For excavations, check:</i> <ul style="list-style-type: none"> - <i>Trench lengths</i> 	

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	<ul style="list-style-type: none"> - <i>Trench widths</i> - <i>Length of diagonals between external corners.</i> • Guard rails and toe boards inserted into the ground immediately next to the supported excavation side; or fabricated guard rail assemblies that connect to the sides of the trench box • Be aware of surcharging when heavy items of construction plant are near to an excavation. • Where this cannot be avoided, it must be considered in the design of the support system that will be installed • Stop blocks must be used if vehicles are required to tip into an excavation • Use a vehicle marshaller to give directions to the vehicle driver or plant operator. • Construction measuring tools: <ol style="list-style-type: none"> 1. <i>Laser Level</i> 2. <i>Site Level</i> 3. <i>Travellers and boning rods</i> 4. <i>GPS.</i> • Communication and Risk Assessment <ol style="list-style-type: none"> 1. <i>Does the workforce need to be working around the excavator?</i> 	

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	<ol style="list-style-type: none"> 2. <i>Where personnel are close to plant, are exclusion zones in place and are the required safety critical items fitted to the excavator fully functional?</i> 3. <i>Are Vehicle Plant Marshaller's required for the safe system of work?</i> 4. <i>Is everyone wearing appropriate high-visibility clothing, which is in good order?</i> 	
Place materials into transporting vehicles and hoppers		
<ul style="list-style-type: none"> • Types of transporting vehicle typically loaded by 360 excavators • Visibility requirements for loading purposes including raised platforms • Transporting vehicle positioning for loading and how this varies with type • Communication methods – signals etc. • Positioning of excavator for loading • Maintaining safety and stability of transporting vehicle during loading • Sequence of loading a vehicle • How incorrect loading can cause stability issues for transporting vehicle • Effects of overloading a transporting vehicle • Vision issues of overloading front-facing skip/body types 	<ul style="list-style-type: none"> • Types of transporting vehicle: <ol style="list-style-type: none"> 1. <i>Forward tipping dumpers</i> 2. <i>Rear tipping dumpers</i> 3. <i>Tipper lorries.</i> • Loading procedures using an Excavator: <ol style="list-style-type: none"> 1. <i>Forward loading – the vehicle needs to approach the loading machine in line with the excavator's discharge point</i> 2. <i>Side loading – the vehicle needs to approach the loading machine towards the cab-side of the excavator and 90 degrees to the excavator's discharge point.</i> • Loading from a raised platform: <ol style="list-style-type: none"> 1. <i>The ideal height should be about the length of your excavator's dipper arm. If you are loading unstable material, the height should be lower</i> 	<ul style="list-style-type: none"> • State the types of transporting vehicle which are typically loaded by 360 excavators within construction activities • Explain how visibility can be improved when loading high-sided vehicles • State requirements for constructing and working on raised platforms/stockpiles • Describe the considerations for positioning of the excavator in relation to various transporting vehicle types for loading activities • Explain the types of communication methods for loading activities • Explain the causes of lateral and longitudinal instability and vision issues of a transporting vehicle when being loaded • Explain why the sequence of loading a vehicle is important

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<ul style="list-style-type: none"> • Safe positioning of loading vehicle driver prior to loading • Efficient methods of loading vehicles to capacity • Carrying out loading activities to capacity of various transporting vehicle types. 	<ol style="list-style-type: none"> 2. <i>Minimise the cycle times and make the swing distance as short as possible</i> 3. <i>Work from top down and work your way across in layers.</i> 4. <i>Do not load across the top of the vehicle cab, load across the side or rear of the vehicle</i> 5. <i>Create a full even load across the vehicle bed as you dump your materials</i> 6. <i>Keep the excavator stabilised and make sure the tracks are facing the excavation area.</i> <ul style="list-style-type: none"> • Overloading of the vehicle: <ol style="list-style-type: none"> 1. <i>The level of the load placed within the vehicle should not be above the top of the vehicle body (struck load)</i> 2. <i>The operator's forward vision is severely restricted, risking a collision with structures, people, other plant etc. or risking an overturn</i> 3. <i>The excess material adds weight which places extra strain.</i> • Loading Procedure by an Excavator: <ol style="list-style-type: none"> 1. <i>Loading of the skip should not start until the Operator has applied the parking brake and stopped the engine and (for non-FOPS cabbed versions) dismount the machine.</i> 	<ul style="list-style-type: none"> • Explain the potential effects (safety, legal and commercial) of overloading and underloading a transporting vehicle • Explain where the driver of the loading vehicle should be stationed prior to loading on a range of vehicle types. <p>The following should be observed during the practical assessment:</p> <ul style="list-style-type: none"> • Load material into a transporting vehicle to capacity. <p><i>Assessment requirements:</i></p> <ul style="list-style-type: none"> • The loading vehicle must require at least 5 x bucket loads to be filled to the capacity • The vehicle must be loaded and discharged at least twice.

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	<ol style="list-style-type: none"> 2. <i>This ensures that the machine cannot move unintentionally</i> 3. <i>Where the operator must leave the vehicle driving position and stand to one side whilst the vehicle is being loaded, they should ensure:</i> <ul style="list-style-type: none"> - <i>They are in a safe, designated place which should be ideally at least 3 metres away from the vehicle, they are not between the loading machine and the vehicle</i> - <i>Are on ground of a sufficient height so that they have eye contact with the operator of the loading machine (360 Excavator).</i> 4. <i>The designated place or places should be planned and relayed to the operator during a pre-work briefing, including potential danger areas and revised positioning due to changing operational factors.</i> <ul style="list-style-type: none"> • <i>Efficient methods of loading:</i> <ol style="list-style-type: none"> 1. <i>The bucket size of the machine will determine the number of loading passes required to fill the vehicle</i> 2. <i>Once loaded to capacity, the loading machine operator will signal to the vehicle operator that the machine may be moved. The loading machine operator must keep the bucket away from the vehicle until the vehicle has cleared the loading area</i> 	

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	<p>3. <i>The vehicle operator must ensure that the operating platform is clear of any overspill.</i></p>	
Reinstate excavation – grade, spread and level ground and materials		
<ul style="list-style-type: none"> • The importance of ground compaction and settlement • Methods of grading and spreading various types of soil • Use of grading buckets and blades • Method statements, risk assessments for grading and levelling purposes • Types of attachments for grading and levelling activities • Methods of establishing grading and levelling dimensions and tolerances • Carrying out grading and levelling activities following given dimensions and tolerances. 	<ul style="list-style-type: none"> • Backfill and compaction: <ol style="list-style-type: none"> 1. <i>Backfill and sub-base layers are critical to the overall performance of the reinstatement</i> 2. <i>The trench width should be big enough so that access can be made for the compaction of backfill/ sub-base materials</i> 3. <i>Excavations should be protected from water getting into the trench</i> 4. <i>The suitability of excavated materials for backfill must be assessed before use</i> 5. <i>To ensure the backfill/ sub-base materials are compacted correctly they should be laid in stages.</i> • Types of soil: <ol style="list-style-type: none"> 1. <i>Different types of soil respond differently with respect to compaction</i> 2. <i>Soils are classified by their particle size and their water content.</i> • Grading and Spreading <ol style="list-style-type: none"> 1. <i>Use of laser level to maintain specification</i> 	<ul style="list-style-type: none"> • Describe how ground compaction, settlement and void elimination is catered for following reinstatement activities • Explain the purposes of grading and how various material types should be spread • State the types of grading buckets and explain the use of grading blades to level surfaces • State why method statements and risk assessments are required for grading and levelling activities • State other types of attachments for grading and levelling activities • Explain how grading and levelling tolerances are established. <p>The following should be observed during the practical assessment:</p> <ul style="list-style-type: none"> • Backfill and reinstate previous excavations back to original level.

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	<ol style="list-style-type: none"> 2. <i>Quarter Over Lap - Use the area you have already levelled as a guide to start you next move. Check level regularly to maintain specification</i> 3. <i>Use the Bucket Edge – when extended start by using the bucket edge to keep a straight clean pull, keep it as even and steady as possible</i> 4. <i>Watch the boom – If you have to raise or lower the boom to compensate for uneven ground.</i> <ul style="list-style-type: none"> • Working with the Dozer Blade: <ol style="list-style-type: none"> 1. <i>When working with the dozer blade – keep alert for pedestrians and possible hazards</i> 2. <i>Keep the bottom of the dozer parallel to the ground. When grading a site remove high spots first, then use this soil to fill in low spots</i> 3. <i>Do not use excessive downward pressure on the dozer or machine traction could be lost</i> 4. <i>Move the dozer blade level to the ground. Work at right angles to the trench, fill a dozer width at a time. Leave any spillage until the trench is filled</i> 5. <i>Use the spillage to finish the job by driving the length of the trench with the dozer blade low to the ground.</i> • Types of Grading and Levelling attachment: <ol style="list-style-type: none"> 1. <i>Grading Bucket is a wide, shallow bucket with a straight edge, designed for ground levelling and smoothing out aggregates and soil</i> 	

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	<ol style="list-style-type: none"> 2. <i>Grading Beam is a wide, flat bottomed attachment used for levelling and profiling loose aggregates.</i> <ul style="list-style-type: none"> • Grade and Level to dimensions and tolerances: <ol style="list-style-type: none"> 1. <i>Level the area with approved filling materials as per the requirements of the project and approved drawings.</i> 	
Explain environmental considerations of machine use		
<ul style="list-style-type: none"> • Health and social reasons to reduce machine emissions • Government industry zero emission initiatives • What ‘tailpipe’ emissions are caused by IC (diesel) engines • Air quality and the component gases of air • How engine emissions, including particulate matter, 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. • Efficient use of the machine and when and how minimising engine use can aid air quality and fuel savings • Eco-friendly oils, fluids and lubricants • Fuel-saving techniques for specific item of plant 	<ul style="list-style-type: none"> • Common construction activities that contribute to air pollution include: <ol style="list-style-type: none"> 2. <i>Use of plant and vehicles on site</i> 3. <i>Land clearing and demolition</i> 4. <i>Chemicals.</i> • Consequences of air pollution: <ol style="list-style-type: none"> 1. <i>Employees</i> 2. <i>Local Residents</i> 3. <i>Environmental.</i> <p>Water Pollution:</p> <ul style="list-style-type: none"> • Common construction sources that contribute to air pollution include: <ol style="list-style-type: none"> 1. <i>Diesel and oil</i> 2. <i>Cement</i> 3. <i>Other toxic chemicals.</i> 	<ul style="list-style-type: none"> • 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 • Describe the need to keep engine speed and load to a minimum whilst maintaining working efficiency.

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<ul style="list-style-type: none"> • Appropriate disposal of waste • Spillage procedures. 	<ul style="list-style-type: none"> • Consequences of water pollution: <ol style="list-style-type: none"> 1. <i>People</i> 2. <i>Environmental – water contamination.</i> Noise Pollution: <ul style="list-style-type: none"> • Effects of noise pollution: <ol style="list-style-type: none"> 1. <i>Potential hearing loss.</i> Pollution Prevention Strategies: <ul style="list-style-type: none"> • Air pollution: <ol style="list-style-type: none"> 2. <i>Adopt hybrid technology</i> 3. <i>Use low sulphur diesel</i> 4. <i>Improve existing equipment</i> 5. <i>Wear appropriate PPE.</i> • Water pollution <ol style="list-style-type: none"> 1. <i>Monitor and improve your management and disposal of site waste</i> 2. <i>Keep materials secure</i> 3. <i>Cover up all drains</i> 4. <i>Keep the road and footpath to the site clean</i> 5. <i>Properly treat any chemical spillages</i> 6. <i>Ensure plant and equipment is properly maintained and operated.</i> 	

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	<ul style="list-style-type: none"> • Noise pollution <ol style="list-style-type: none"> 1. <i>Use quiet equipment</i> 2. <i>Schedule work during sociable hours</i> 3. <i>Put acoustic (movable noise) barriers in place</i> 4. <i>Ensure plant and equipment is properly maintained and operated</i> 5. <i>Switch off plant when it's not in use</i> 6. <i>Ensure employees wear the correct PPE.</i> 	
Explain loading/ unloading procedures for machine transportation		
<ul style="list-style-type: none"> • Procedures for preparing the machine for loading onto a transporter • Traction and surface preparation requirements • Understanding of agreed methods of communication between the plant operator and others • Working at height requirements when driving onto or off a transporter bed. 	<ul style="list-style-type: none"> • Clear of other traffic, pedestrians, and people • Clear of overhead electric cables • Level, to maintain stability, trailers should be parked on firm level ground • Ensure the vehicle or trailer has its brakes applied and all stabilisers are used • Working at height to be considered • Always check the floor or deck of the transportation <p>Loading Procedure:</p> <ol style="list-style-type: none"> 1. <i>Remove any dirt or debris from the trailer</i> 2. <i>Check the operation of the parking brake</i> 3. <i>Check the trailer bodywork for signs of damage</i> 	<ul style="list-style-type: none"> • Describe the preparation required of both machine and transporter for loading and unloading of the machine • Explain the precautions to be taken when driving the machine onto and off the transporter bed • State the methods of communication between the plant operator and others • Describe the dangers of and requirements for working at height when on the vehicle bed.

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	<ol style="list-style-type: none"> 4. <i>Position the loading ramps securely on the transporter/ lower ramps depending on manufacturer</i> 5. <i>Align the machine with the loading ramps, position the dozer blade to the front and fully raised. Slightly extend the boom and dipper for stability. With the machine in low speed mode, track forward onto the ramp slowly and smoothly. Ensure the bucket will not contact the transporter ramps when loading the machine</i> 6. <i>Slowly drive the machine to the top of the ramps. Lower the boom slowly drive forward. As the tracks begin to clear the ramps, gently raise the boom allowing the machine to rock forward onto the transporter bed</i> 7. <i>Lower the bucket onto the transporter in the position as agreed with the transporter driver</i> 8. <i>Stop the engine and secure the machine using the manufacturer's securing points</i> 9. <i>Remove and secure both ramps/ raise ramps and secure depending on manufacturer.</i> 	
Carry out all end of work and shut down procedures		
<ul style="list-style-type: none"> • Types of safe locations, areas, and ground/terrain types where an excavator may be parked and should not be parked 	<ul style="list-style-type: none"> • Security: <ol style="list-style-type: none"> 1. <i>Ensure that all vehicles are securely immobilised whenever the site is unoccupied</i> 2. <i>Anti – vandalism equipment fitted (if required).</i> • When parking the machine at the end of the shift ensure the machine is not parked: 	<ul style="list-style-type: none"> • Describe the use of anti-vandalism equipment. <p>The following should be observed during the practical assessment:</p>

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<ul style="list-style-type: none"> • Reasons for ensuring safe parking and unintentional movement and ground support requirements • Carrying out parking, shut down and isolation requirements according to manufacturer's instructions • Reasons for machine isolation including security and non-authorized use by others • Use of anti-vandalism equipment. 	<ol style="list-style-type: none"> 1. <i>Site roads</i> 2. <i>Pedestrian routes</i> 3. <i>Soft/ wet/ steep ground</i> 4. <i>Access/ egress routes from buildings.</i> <ul style="list-style-type: none"> • Parking: <ol style="list-style-type: none"> 1. <i>Park on a level surface. If the machine must be parked on a grade, chock the tracks securely</i> 2. <i>Turn the engine speed dial counter-clockwise in order to reduce engine speed</i> 3. <i>Lower the attachment to the ground</i> 4. <i>Move the hydraulic lockout control to the Locked position</i> 5. <i>While the machine is stopped, run the engine at low idle.</i> 6. <i>Turn the engine start switch to the off position and remove the key</i> 7. <i>Use the steps and the hand holds when you dismount. When you dismount, face the machine and use both hands</i> 8. <i>Turn the battery disconnect switch to the off position before leaving the machine</i> 9. <i>Lock all compartments and all vandalism covers (if equipped).</i> 	<ul style="list-style-type: none"> • Demonstrate and explain safe parking of the machine - machine is parked in a safe, designated location, clear of hazards on level, firm ground • Demonstrate how to isolate and secure the machine to prevent non-authorized use and explain why this is important.

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Additional information about this standard

Emphasis to be placed on the following topics:

- Quick-hitch bucket systems - Manufacturer's procedures must be strictly adhered to, Security of bucket to be fully checked (physically) prior to use, Guidance issued by the Health and Safety Executive (HSE), The Construction Plant-hire Association (CPA) and the Off-highway and Plant Equipment Research Centre (OPERC) should be followed and recommended to candidates
- Manoeuvring - Facing the direction of travel and no reversing unless authorised by a nominated vehicle marshaller
- Machine isolation - When exiting the cab, attachment must be grounded and machine switched off with the key removed before exiting the cab at any time
- Working/ danger/hazard zone - Ensuring that all personnel are out of the machine's working radius whilst hydraulically active (unless hydraulic-operated restrictors are fitted and active) Controls must be isolated when loads are being attached/detached.

Note: The listed training content should not be considered exhaustive and subjects may be added to reflect the individuals' working environment.

To identify a machine within this category, a typical 360° Excavator would normally have the listed features and be used within the described characteristics:

Category features:

- Tracks.
- 360 degree rotating upper structure containing the operator position; power, hydraulic and electrical units and excavating components.
- Boom (one or two piece) with attached dipper arm and bucket, all hydraulically operated.

Category characteristics:

- Able to travel in forward and reverse and change direction during travel.
- Can travel and operate on uneven and loose ground and slopes.
- Carry out excavation and extraction duties in a liner motion using a bucket within the confines of the operating radius, depth and height.
- Can lift and place materials using a combination of slew and liner motions within the confines of the operating radius, depth and height.
- Carry out lifting duties (as stated in the machines manufacturers manual).

Theory Resource:

- PUWER 1998 Regulations
- LOLER 1998 Regulations
- HSE GS6
- Codes of Practice
- Operator's manual
- Specifications for types of 360°Excavators (Tracked and Wheeled).
- Site traffic management requirements
- Industry Guidance.

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Measure of this training standard

The candidate is required to pass the following tests:

CPCS Theory Test: Excavator 360°Tracked (All endorsements):

- Course Trainers can use the published CPCS Theory Questions during training to confirm that the candidate is able to demonstrate the required knowledge understanding and retention to undertake the CPCS Standard Technical Theory Test.

CPCS Practical Test: Excavator 360°Tracked (Specific Endorsement):

- Course Trainers can use the published CPCS Practical Test criteria during training to confirm that the candidate is able to demonstrate the required practical ability and understanding to undertake the CPCS Standard Technical Practical Test.

Note - Course Trainers can find the current versions of the CPCS Technical Test Theory Questions and CPCS Technical Practical Test NOCN Job Cards website and are subject to review, ensure you are using the most current version as printed versions are uncontrolled.

www.nocnjobcards.org