Course Objectives for C202
Excavator 360° Wheeled - Above 10 tonnes - Novice

It is envisaged that by the end of this course of training the learner will be able to answer questions on and perform the following:

- Explain the factors that help maintain a safe working environment in the construction industry, and their responsibilities as a 360° excavator operator
- Identify and extract information from the manufacturer's handbook / operator's manual, and other information sources including digital
- Locate and identify the major components, signs, decals, and all controls of the excavator and explain their functions
- Conduct all pre – operational checks in accordance with manufacturers and legislative requirements
- Identify and maintain personal protective equipment (PPE) and appropriate safety control equipment for excavator use
- Safely get on and off the excavator
- Prepare and configure the excavator for site travel
- Travel and manoeuvre the excavator safely across varying terrain and inclines
- Travel and manoeuvre in areas of restricted space
- Attach and remove buckets, using quick hitch couplers
- Conduct all necessary safety checks at the work area
- Configure and set up for excavating and loading duties
- Explain actions required for hazards, underground and overhead services
- Excavate different types of excavations in various types of ground to given dimensions
- Place materials into transporting vehicles and hoppers
- Reinstate excavation – grade, spread and level ground and materials

Course Objectives for C202
Excavator 360° Wheeled - Above 10 tonnes - Novice

- Explain environmental considerations of machine use
- Explain loading/unloading procedures for machine transportation
- Carry out all end of work and shut down procedures

Learning Outcomes for C202 Excavator 360° Wheeled – Above 10 tonnes - Novice

Learning Outcome	Instructor Notes
Explain the factors that help maintain a safe working environment in the construction industry, and their responsibilities as a 360° excavator operator	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, HSG47 etc. in accordance with risk assessments, method statements, codes of practice and other relevant legislation, regulations, and industry good practice • operators' moral, legal, 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 • working with other related roles e.g., marshallers, supervisors, other plant operatives, other occupations • 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 or mentors
Identify and extract information from the manufacturer's handbook / operator's manual, and other information sources including digital	• 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
Locate and identify the major components, signs, decals, and all controls of the excavator and explain their functions	Delivery to include: • 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 • purposes of Roll Over Protection Systems (ROPS) and Falling Objects Protection Systems (FOPS) and other protection systems • machine control systems – efficiencies, GPS
Conduct all pre – operational checks in accordance with manufacturers and legislative requirements	• 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 • check condition and function of any lighting and warning systems • requirements for dealing with fluid spills including prevention and clean-up methods
Identify and maintain personal protective equipment (PPE) and appropriate safety control equipment for excavator use	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
Safely get on and off the excavator	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 on and off the excavator e.g., fatigue, increased risk of falling etc. • safe areas to get on and off the excavator e.g., ground location, other vehicle movements etc. • procedures for accessing the excavator when carrying out adjustment and maintenance activities
Prepare and configure the excavator for site travel	Use of seatbelts and other restraining equipment • adjustment of seating position and mirrors • chassis checks to include wheels and tyres, stabilisers, axles, steering, and braking systems • 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-authorised personnel • transmission/speed modes, and braking controls to include parking brakes settings • steering systems steerable mode setting

Learning Outcomes for C202 Excavator 360° Wheeled – Above 10 tonnes - Novice

Learning Outcome	Instructor Notes
Travel and manoeuvre the excavator safely across varying terrain and inclines	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 • effects of travelling close to edges, embankments, structures, and trenches • travelling over various types of terrain • effects of direction changes in various steering modes e.g., rear steering, front steering, and all-axle steering • 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, particularly with wheeled types • precautions, procedures, and dangers 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 • selection of steering modes for given applications • limitations of axle articulation on uneven surfaces • precautions and obstructions on travel routes including overhead utilities • regulative requirements for travelling near to or under overhead power lines • effects of direction changes in various steering modes including rear steering, front steering, and all axle steering • limitations of axle articulation on uneven surfaces
Travel and manoeuvre in areas of restricted space	Precautions to be taken when manoeuvring in areas of restricted space • requirements when working alongside highways, railways, and public areas • height and slew restriction limiters • checking machine size including height, width and working radius including tail swing relevant to working area • lighting requirements and issues that may occur due to poor light
Attach and remove buckets, using quick hitch couplers	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, including external intervention/support from others • visual inspections • maintenance and storage • exclusion zone requirements, with all personnel clear of the attachment change area

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Conduct all necessary safety checks at the work area	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 • 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
Configure and set up for excavating and loading duties	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, stabilisers etc. to maintain stability • effects and limitations of stabiliser use in soft ground, uncompacted ground or finished surfaces • deployment of axle oscillation locks • selection of correct bucket to meet work specification • the effects and limitations of stabiliser usage in soft ground, uncompacted ground, and finished surfaces • the deployment of axle oscillation locks
Explain actions required for hazards, underground and overhead services	• 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 • permit to break ground requirements
Excavate different types of excavations in various types of ground to given dimension	Typical types of excavations able to be created by 360° excavators • how soil types determine excavation types and methods, including unexpected uncovering of contaminated material • 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

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	Carrying out a range of excavating activities following given dimensions and tolerances • working near to edges and deep excavations • potential sinkage of stabiliser pads in soft ground • required control methods for open excavations • methods of establishing excavation dimensions and tolerances • establishing and maintaining visual contact with dedicated supporting workers
Place materials into transporting vehicles and hoppers	Types of transporting vehicle typically loaded by 360° excavators • visibility requirements for loading purposes including being on raised platforms and stockpiles • 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 • effects of the density of a material when loading • how incorrect loading can cause stability issues for transporting vehicle • effects and implications of overloading, including heaped loads on a range of typical transporting vehicles • vision issues of overloading front-facing skip/body types • safe positioning of loading vehicle driver prior to loading • efficient methods of loading vehicles to capacity • definition of 'heaped' and 'struck' capacities • carrying out loading activities to capacity of various transporting vehicle types
Reinstate excavation – grade, spread and level ground and materials	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 • the protection of installed services
Explain environmental considerations of machine use	Health and social reasons to reduce machine emissions • government industry zero emission initiatives • what 'tailpipe' emissions are caused by compression ignition (CI) diesel engines during internal combustion • 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

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	Fuel-saving techniques for specific item of plant • appropriate disposal of waste • spillage procedures
Explain loading/unloading procedures for machine transportation	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
Carry out all end of work and shut down procedures	• Types of safe locations, areas, and ground/terrain types where an excavator may be parked and should not be parked • 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-authorised use by others • use of anti-vandalism equipment

The learning outcomes listed should not be considered in isolation and may be added to in order to accurately reflect the learner's duties and working environment