Unit 325: Install, maintain and remove temporary excavation support

# Delivery guide

Unit information

The aim of this unit is to provide learners with the relevant practical skills and understanding required for installing, maintaining and removing temporary excavation support in a construction and civil engineering environment. It also covers interpreting information, adopting safe, healthy and environmentally responsible work practices, and selecting, preparing and using materials, components, tools and equipment.

Learners may be introduced to this unit by asking themselves questions such as:

* What is classed as an excavation?
* Do all excavations need support?
* What is classed as temporary excavation support?
* Why is working in excavations dangerous?

Learning outcomes

1. Understand resource selection
2. Understand working to a contract specification
3. Comply with the given contract information to carry out the work safely and efficiently to the required specification

Suggested resources

Textbooks

* Copson, M., Kendrick, P., Beresford, S. (2019) *Roadwork Theory & Practice*. Oxford: Routledge.

ISBN 978-0-8153-8318-5

* Chudley, R. (2020) *Chudley and Greeno’s Building Construction Handbook.* Oxford:Routledge.

ISBN 978-0-3671-3543-0

* Health and Safety Executive (HSE) (2014) *Avoiding Danger from Underground Services*. HSG47. London: HSE Books.

ISBN 978-0-7176-6584-6

* Health and Safety Executive (HSE) (2006) *Health and Safety in Construction*. London: HSE Books.

ISBN 978-0-7176-6182-2

Websites

* [The Constructor | Types of Excavation Supports or Earth Retaining Structures and their Applications](https://theconstructor.org/building/types-excavation-supports-earth-retaining-structures/17370/)

Legislation

* [GOV.UK | The Work at Height Regulations 2005](https://www.legislation.gov.uk/uksi/2005/735/contents/made)
* [GOV.UK | The Manual Handling Operations Regulations 1992](https://www.legislation.gov.uk/uksi/1992/2793/made)
* [GOV.UK | The Provision and Use of Work Equipment Regulations 1998](https://www.legislation.gov.uk/uksi/1998/2306/contents/made)
* [GOV.UK | Health and Safety at Work etc. Act 1974](https://www.legislation.gov.uk/ukpga/1974/37/contents)
* [GOV.UK | The Control of Substances Hazardous to Health Regulations 2002](https://www.legislation.gov.uk/uksi/2002/2677/regulation/7/made)
* [GOV.UK | The Traffic Signs Regulations and General Directions 2016](https://www.legislation.gov.uk/uksi/2016/362/contents/made)
* [HSE | Homepage](https://www.hse.gov.uk/)
* [HSE | Excavations](https://www.hse.gov.uk/construction/safetytopics/excavations.htm)
* [HSE | Mobile elevating work platforms (MEWPS)](https://www.hse.gov.uk/construction/safetytopics/mewp.htm)

| **Learning outcomes** | **Criteria** | **Delivery guidance** |
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| 1. Understand resource selection | * 1. Characteristics of the resources | * Learners to understand the range of resources used to install, maintain and remove temporary excavation support to drawings, specifications and schedules. * Learners to understand the characteristics and suitability of materials when selecting resources for installing, maintaining and removing temporary excavation support for residential or larger civil engineering projects. * Learners to have a sound knowledge of how to install, maintain and remove temporary excavation support components. * Learners to be able to identify those defects that can affect the structural integrity and need replacing and those that only affect the aesthetics, their uses and limitations and sustainable alternatives. * Learners to be given examples of typical scenarios in groundworks when excavating. Literature and past construction projects should be used to give guidance on the components below: * power sources, including fuel type, air lines, electric cables, chargers * materials, including poling boards, waling, lippings, wedges, puncheons, foot blocks * equipment, including hydraulic frames, secure ladders, handrails, physical barriers, suitable vehicles and plant, pumps, local exhaust ventilation plant, generators. |
| * 1. Use of resources | * Learners to understand how the resources should be used and how any problems associated with the resources are reported. * Learners to understand which materials are to be used in specific locations. * Learners to understand the procedures and reporting protocols to follow to report any problems, as well as defects or concerns with selected resources. Learners to have highlighted to them typical issues or defects on resources and be set tasks to demonstrate where they would need to look to find these issues or defects. * Learners to know how to select and use tools and equipment for their intended purpose and how to rectify or report any defects. * Learners to know how to install, maintain and remove temporary excavation support. |
| * 1. Organisational procedures to select resources | * Learners to understand the working procedures used to select the most appropriate methods to install, maintain and remove temporary excavation support in accordance with written instructions, drawings, schedules and verbal instructions to meet the contract size/needs. * Learners to be given examples of raising requisitions – either from their own company or if they need to be hired or manufactured – and how to order resources to complete a specific task using organisational procedures. |
| * 1. Hazards | * Learners to know and be able to identify the hazards associated with installing, maintaining and removing temporary excavation supports. * Learners to know how to maintain and replace groundworker components as well as the correct method of work required to install, maintain and remove temporary excavation support whilst working in a construction and civil engineering environment. * Learners to be given examples of poor practices and be able to explain what dangers these pose. Learners to use HSE website for recent issues and any legislation to follow. * Learners to have reinforced to them the importance of pre-checks and an awareness of the surrounding area and any weather factors. * Learners to be shown examples of elements of risk assessments or safe systems of work to identify the best practices to be mindful of when encountering the following hazards: * not working to method statements and risk assessments * open excavations * moving plant and equipment * slips, trips and falls * working at height * hand and eye injuries * being hit by falling objects * collapse of sides * water ingress * presence of gases. |
| 1. Understand working to a contract specification | * 1. Methods of work | * Learners to understand the application of knowledge for safe and healthy work practices, procedures and skills relating to the method, process and area of work. * Learners to be given examples of typical scenarios and, in each case, be able to list what should be prepared first and what PPE is needed for specific items of equipment. * Learners to know how to plan their work efficiently from the given instructions and how to complete the work to the agreed specifications. Learners to be set a task to plan their work, based on real-world scenarios, to ensure they understand the specification and how the work should be conducted. * Learners to understand the importance of communication amongst team members during activities, as well as the needs of other occupations working alongside them. * Learners to be given examples of who may be working alongside them and what needs to be implemented, such as designated working areas, site protection measures (e.g. barriers) and ensuring there are suitable restrictions in place. * Learners to be shown site drawings and specifications to understand the correct methods used to install, maintain and remove temporary excavation from drawings, specifications and verbal instructions. * Learners to understand how to identify problems and how to report these to the relevant people. |
| * 1. Tools and equipment | * Learners to understand the importance of maintaining tools and equipment and the operative care associated with hand tools, portable power tools, powered units, machinery and ancillary equipment. * Learners to understand procedures such as start-up and shut-down checks, calibration and planned maintenance schedules. * Learners to be given examples of maintenance schedules to ensure they can identify when tools may no longer be suitable, or when they are unsafe. * Learners to know how to maintain equipment to ensure its accuracy in future use and to know how equipment should be cleaned and maintained after use. * Learners to be given common equipment to demonstrate methods of maintaining tools and equipment, including checking for accuracy of use, cleaning and safe return. |
| 1. Comply with the given contract information to carry out the work safely and efficiently to the required specification | * 1. Use and maintain hand tools, measuring and marking equipment and ancillary equipment to install, maintain and remove temporary excavation support to given working instructions relating to at least one of the following: proprietary systems (e.g., drag box, trench box, manhole box, open and closed support systems)  piling systems (e.g., diaphragm wall, trench sheets, sheet piles, secant support or contiguous support and bespoke support systems) | * Learners to be given tasks to plan for installing, maintaining and removing excavation supports by following the information and guidance given to them by using the relevant documentation. * Learners to be able to produce a method statement and work programme to plan efficiently for the work to be carried out within the agreed timescale for centre-based scenarios. * Learners to be able to identify and extract suitable information from a range of sources for installing, maintaining and removing excavation supports. * Learners to be shown and know how to use documentation, which includes: * specifications * drawings * manufacturer’s literature * risk assessments * method statements * suppliers contact information * safe systems of work * permit to dig * excavation inspection reports * overhead services checklists. * Learners to be given tasks to install, maintain and remove temporary excavation support as per instructions or methods of work to establish oneof the following: * proprietary systems including either a drag box, trench box, manhole box or open and closed support systems * piling systems including diaphragm wall, trench sheets, sheet piles, secant support or contiguous support, bespoke support systems. * Learners to be able to follow the sector regulations when carrying out this work. For tasks completed, the relevant regulations below would be selected: * Working at Height Regulations 2005 (WAH) * Manual Handling Operations Regulations 1992 * mobile elevating work platforms (MEWPs) * Provision and Use of Work Equipment Regulations 1998 (PUWER) * Health and Safety at Work etc. Act 1974 (HASAWA) * Control of Substances Hazardous to Health Regulations 2002 (COSHH) * Traffic Signs Regulations and General Directions 2016 (TSRGD). * Learners to be able to identify and use suitable personal protective equipment (PPE) whilst installing, maintaining and removing excavation supports. In groups, learners should be given a number of tasks associated with this unit and asked to select correct personal protective equipment (PPE) required, including: * safety boots * hard hats * high-visibility jackets * goggles * gloves * dust masks * respiratory equipment * local exhaust ventilation (LEV). * Learners to be able to access and use the appropriate ancillary equipment such as ladders and step ladders. * Learners to be able to identify and extract suitable information to ensure equipment is used safely whilst installing, maintaining and removing excavation supports. * Learners to ensure supplier literature, MEWPs and COSHH are all adhered to. * From given working drawings and specifications, learners to extract information to identify the signage and barrier protection types required and to place them in the correct location whilst preparing and mixing construction-related materials. * Learners to be shown and know types of barrier protection, including: * fencing * hoardings * sheeting * netting * pedestrian barriers * vehicular barriers. * Signage types include: * mandatory (gloves, masks, goggles must be worn, high-visibility vests and hard hats must be worn, pedestrians only, sound horn) * warning (slippery surface, corrosive, forklifts and plant operating) * prohibition (not drinking water, no smoking, no entry, scaffold incomplete, do not touch) * traffic signs (notification of works, lane closures, speed restrictions) must conform to Traffic Signs Regulations and General Directions 2016 (TSRGD) in force at the time of the works. * Learners to be able to identify and use tools and equipment to install, maintain and remove excavation supports. * In groups, learners to each identify a different component from the given list, explain its function and state how it is fixed: * hydraulic frames * secure ladders * handrails * physical barriers * suitable vehicles and plant * pumps * local exhaust ventilation plant * generators plus * handheld non-power tools * handheld petrol power tools * electrical tools (saws – circular saw, chop saw, drills, hammers) * battery-operated tools * air-driven tools * plate vibrators * compactor/vibrating plates * pneumatic drills * angle grinders * disc cutters * demolition/breaker hammers * hammer drills * rollers * excavators * loading shovels. |
| * 1. Demonstrate work skills to measure, mark out, prepare, position, fit, support, fix, secure, dismantle and remove | * Using site-based scenarios, ask learners to select the relevant sector regulations when carrying out this work. * Learners to be able to identify suitable PPE for use whilst installing, maintaining and removing excavation supports. * Learners to be able to access and use the appropriate ancillary equipment such as ladders/step ladders, scaffold/tower scaffolds or podiums. * From given working drawings and specifications, learners to be able to identify and extract suitable information to ensure equipment is used safely whilst installing, maintaining and removing excavation supports. * Learners to be able to identify and use tools and equipment to install, maintain and remove excavation supports. * Learners to be able to maintain the equipment in good condition for future use. * Learners to be able to wash down equipment using chemicals, store tools and equipment safely and ensure the work area is kept clean and tidy. * Learners to know to place all designated waste into the correct containers. Waste to include: * metal * timber * hardcore * chemicals and gypsum (hazardous and non-hazardous). |