

National Occupational Standards

Sector: Building and Construction

Occupation: Advanced Scaffolder

MQF Level: 4

Units:

- SCF401: Apply Occupational Health and Safety during Work-Practices
- SCF402: Identify systems, equipment and components
- SCF403: Reading of drawings and calculations
- SCF404: Setting Out, Erecting and Dismantling Scaffolds and Access Equipment

SCF401: Apply Occupational Health and Safety during Work-Practices

This unit is about being able to use safe procedures and safe work practices at sites undergoing new construction or maintenance and repair. The persons carrying out this work must possess the necessary knowledge and skills to ensure that their actions do not create health and safety risks to others, can identify risks and hazards associated with the working environment, with tools, equipment, materials and substances used.

Performance Criteria:

The candidate must have the necessary knowledge and skills to supervise and ensure that:

1. Safe working practices to prevent hazards and to ensure the safety of workers and members of the public are being carried out.
2. Safe working practices using appropriate equipment and materials to prevent damages to work areas and injuries to himself and 3rd parties are being carried out.
3. Safety barriers around a work environment hazard to protect workers and members of the public are set up.
4. Appropriate protective clothing and safety equipment and know the whereabouts of first- aid equipment is used.
5. Store materials hazardous to health are used and handled in a safe manner.
6. Risk assessment to cover the job assigned and the working area is carried out.
7. Temporary or fixed electrical switch gear, isolating valves as instructed in the health and safety procedures are located and switched off.
8. There is collaboration with construction team members.
9. The factors affecting safety of scaffold structures are stated.
10. There is a list of all the types of scaffold inspection checklists.
11. The main content should form the scaffold register (inspection authority or company document).
12. Health and safety precautions being applied on day-to-day bases and ensure that colleagues on-site are in good health.
13. All measures to keep adequate working distance from overhead electrical cables are taken.

Required Knowledge

The Level 4 Advanced Scaffolder must know, demonstrate and explain:

1. The roles and responsibilities of themselves and others under the Health and Safety Act.
2. The health and safety risks associated with their role which include tools, materials and equipment used and working practices and procedures.
3. Potential hazardous material at the workplace.
4. The procedures for dealing with potential hazardous material in the place of work.
5. Health concerns associated with the workplace and safe practices when carrying out work.
6. When to seek expert assistance.
7. Hazards and potential hazards at the place of work (such as electricity, slippery and uneven surfaces, dust and fumes, handling and transporting, contaminants and irritants, fire, heights, improper use of tools and equipment).
8. The importance of being alert to the presence of hazards in the place of work.
9. The responsible persons to whom to report health and safety matters.
10. The emergency procedures in the place of work.
11. The first aid facilities that exist within the work area.

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12. The necessary safety precautions including the use of protective clothing and equipment for a range of situations.
13. The methods used for protecting customers' property.
14. When it is required to isolate domestic water services from the main water supply.
15. Any toxic effect of materials used.
16. The preventative and remedial actions to be taken in the case of exposure to materials hazardous to health.
17. The importance to check and follow manufacturer instructions regarding 'expiry dates' and care and condition of Personal Protective Equipment.

Required Skills

The Level 4 Advanced Scaffolder must be able to:

1. Identify which health and safety procedures are relevant to the working environment.
2. Ensure compliance with duties and obligations as defined by the Occupational Health and Safety Act 2000 as amended.
3. Follow workplace policies and superiors' instructions for the safe use and maintenance of tools and equipment.
4. Control health and safety hazards within the job responsibility.
5. Report any hazards which may present risks.
6. Identify, tag according to employer policy and report using standard forms, defective personal protective equipment, defective tools and fittings.
7. Follow correct procedures in the event of injuries to themselves or others.
8. Take remedial action where work methods are not in line with control measures resulting from relevant risk assessment.
9. Adhere to work production and installation processes procedures as officially instructed by the employer.
10. Comply with warning signs and sets up safety barriers around working area.
11. Equip oneself with the appropriate protective clothing and safety equipment according to task.
12. Use and stores materials hazardous to health in a safe manner.
13. Monitor the workplace whilst keeping it free from hazards.
14. Communicate complex information in unfamiliar and unpredictable contexts to colleagues such as: report verbally and by means of pre-printed sketches to supervisors and colleagues the erecting and dismantling stage of a scaffold.
15. Advocate appropriate health and safety procedures.
16. Explain possible hazards with sway transoms considered as a tie with special attention to spacing of ties, box ties and lip ties, tie patterns, abnormal facades.
17. Demonstrate proficiency in carrying out a site risk assessment.
18. Demonstrate proficiency in using standard forms to carry out individual risk assessment, project team risk assessments, routine checks and maintenance of scaffolds following bad weather.

SCF402: Identify systems, equipment and components

This unit is about identifying the different access and scaffold systems, equipment and components for specific applications based on their technical properties. Typical workplace systems such as the direct and indirect environmental impacts of materials used for scaffolds are also discussed.

Performance Criteria:

The candidate must have the necessary knowledge and skills to supervise and ensure that:

1. There is a distinction between types of scaffolding and access equipment based on their characteristics and classification.
2. The criteria for the selection of scaffold is stated.
3. The tools, accessories and equipment used for scaffold erection and dismantling are stated.
4. The characteristics and material requirements for Frame Scaffold, Birdcage scaffold, tower scaffold, modular scaffold, hanging scaffold, special scaffold and cantilever scaffold are identified and explained.
5. Records of the quantity of materials used by project are kept.
6. Stores and construction sites facilities are organized.
7. Functional checks on plant and equipment including routine checks for accuracy on tools and instruments and organized and performed.
8. A job is broken down into different phases and that the estimated duration and production of hours required is established.
9. There is coordination with others to ensure project plans consider site, roads, neighbors and neighborhood concerns and environmental legislation.

Required Knowledge

The Level 4 Advanced Scaffolder must know, demonstrate and explain:

1. The knowledge of environmental management.
2. Metric units of weight and object centre of weight (centre of gravity) and effective line of force.
3. Knows the rule of thumb and recommended instructions by suppliers regarding couplers, tubes and cantilever beam design.
4. The definition of unsymmetrical beams and prefabricated beams.
5. The technical characteristics of aluminum and steel tubes.
6. The different types of ladders available on the market for specific access from scaffolds.
7. The common defects of aluminum and steel tubes and fittings.
8. The construction site hazards commonly encountered.
9. The hollow concrete block (brick) wall and the limestone wall limitation to anchor scaffolds.
10. The type of wood suitable for scaffold platforms.
11. Wood preservation methods.
12. Typical causes of scaffold incidents and the resulting learning points.
13. Digital and hard copies systems used to keep records and control of materials and equipment.
14. Workplace procedures regarding final decisions and work permits.
15. Environmental Regulatory requirements and Project environmental plans including equipment specifications dedicated for such tasks.
16. The routine checking procedures for accuracy checks of levelling instruments.
17. The familiarity with workplace storage codes methods.
18. How to assess the condition of the scaffold structural elements.

Required Skills

The Level 4 Advanced Scaffolder must be able to:

1. Evaluate counterweighting given specifications and establish site installation method to erect a hanging scaffold.
2. Evaluate a truss-out scaffold for inadequate couplers and inadequate ties considering and giving special attention to the slab and bearing loads;
3. Evaluate cantilever scaffolds designs for stability and structure integrity and generate possible site installation methods.
4. Evaluate tower and bridge scaffolds designs for stability and structure integrity and generate site installation methods.
5. Discuss recommended best practices to install prefabricated beams considering and giving special attention to safe working loads; specified close spacing requirements; beam max lxx (upside down beams), appropriate tightening of knee braces; adequate rolling over provision; appropriate use of unsymmetrical beams.
6. Explain recommended best practices in the use of ladders considering and giving special attention not to use the following situations: mid-span supports, ladders at the end of platforms, ladders resting on the projected ends of the scaffold boards forming the platform, length and angle constrains, top not securely tied, the use of wedges under legs, no projection at the top, obstruction to foothold.
7. Identify the correct use of the following scaffolding and access equipment: System Scaffold, Tube and Fitting (Coupler) Scaffold, Base-supported Scaffold, Birdcage Scaffold, Bracket (Tank Builder's) Scaffold, Independent Run (Façade or Independent Tied) Scaffold, Mobile Scaffold, Tower Scaffold.
8. Identify and describe the main features of demolition scaffolds, structural scaffolds, weather protection and sheeted stone cleaning scaffolds, temporary roofs and canopies;
9. Assess and carry out a visual survey of the following Materials: accessories and Technical data presented with detailed specifications to ensure sound erection of scaffolds: Scaffold tubes, scaffold couplers and fittings, scaffold boards and timber, technical data of prefabricated beams, prefabricated frames and scaffold systems, ropes, lashings, rigging, guys and anchors.
10. Identify hazards and describe appropriate safe working methods in constructing and dismantling Independent ties scaffold considering and giving special attention to absence of bracings; wrong coaxial joint in tubes; undermined foundations; attachment of tarpaulins; unnecessary working lifts; overloading; neglected scaffolds over long periods.
11. Identify hazards and describe appropriate safe working methods in constructing and dismantling prefabricated frame scaffold and system scaffolds with special attention to bad assumptions that prefabricated, and system scaffold do not require additional bracings; failure to use locking pins or wedges; lack of longitudinal stiffness when dismantling long projection components.
12. Identify hazards and describe appropriate safe working methods in constructing and dismantling putlog scaffolds with special attention to insufficient grip of the putlog ends in stone and brickwork; dislodgement of the lower lift; removal of guard rail which leaves the joint in the ledger unassisted.
13. Identify and describe hazards as a result of: use of rotten boards; placing standards (posts) at the end of boards or across joints of boards; waterlogged ground; site surface water washing; excavation near sole plates; boards levelled with rubble; inadequate size of sole plate; sole plates on sloping surfaces.
14. Identify and describe hazards in bracing configuration with special attention to weak-in- line joints by using spigot pins; poor tightening of sleeve couplers; poor attachment of lifts to bracing systems; bracing not across ground level to top level scaffold; bracing not in two directions; vertical and horizontal forces not related to forces in braces.
15. Interpret the project environmental plan and establish resources required for its

implementation.

16. Use standard forms to apply for working permits and brief neighbors.

SCF403: Reading of drawings and calculations

This unit is about understanding and interpreting scaffold and building drawings, methods to calculate quantities of fittings and elements, and methods to transform setting out measurements from drawings to site setting out.

Performance Criteria:

The candidate must have the necessary knowledge and skills to supervise and ensure that:

1. Plans and specifications to select scaffold fittings and elements are read and interpreted.
2. Plans to establish important building datum grids and levels are read and interpreted.
3. The quantities of scaffold fittings required to meet work schedules are calculated.
4. Linear measurements of diagonals, diameters and right-angle triangles in 2D and 3D structures are calculated.
5. Scaffold 'standards' (posts) correctly spaced as indicated in drawings are set out.
6. Scaffold 'standards' on pitch circle diameter around circular structures are set out.
7. There is consultation and preparation with the scaffold engineer / architect in charge the scaffold designs where applicable.

Required Knowledge

The Level 4 Advanced Scaffolder must know, demonstrate and explain:

1. Horizontal levels and horizontal planes underpinning knowledge, the vertical plumb line and the use of the spirit level and other appropriate equipment in this context.
2. Compilations of overall linear dimensions from drawings.
3. Calculations involving quantities and costs of materials.
4. Calculations with ratios.
5. X-axis, y-axis, variable charts and tables.
6. Drawings annotations used for levels, gradients and bearings.
7. Scientific parameters as used in digital calculators.
8. A wide range of hand tools specifications and their use.
9. The techniques to produce manual simplified scaffold drawings.
10. The metric units of linear measurements, areas, force, pressure and fluid measurements.
11. With whom and when to discuss and coordinate scaffold designs.

Required Skills

The Level 4 Advanced Scaffolder must be able to:

1. Explain height to base ratio requirements when using towers subjected to combined weights and wind forces.
2. Explain possible hazards when using Gim Wheels and Pulleys with special attention to when pulling at wide angles.
3. Convert linear dimension in metric units from millimeter to centimeters to meter.
4. Interpret drawing symbols, elevations and plans.
5. Measure, cut to size and prepare pipes for ready for use.
6. Use the 3:4:5 method to set right-angles on site and apply corrections required on slanting slopes.
7. Interpret common structural charts and structural plans.
8. Calculate areas and volumes of counterweights.
9. Convert between units of measurements: meters; centimeters and millimeters.
10. Use scientific calculators and digital measuring instruments to measure linear and angular measurements.

11. Convert between tones to kilograms and milliliters to liters.
12. Use established factors to convert volume of material to weight (specific density).
13. Consult and prepare with the scaffold engineer / architect in charge the scaffold designs where applicable.

SCF404: Setting Out, Erecting and Dismantling Scaffolds and Access Equipment

This unit is about Setting Out, Erecting and Dismantling Scaffolds and Access Equipment.

Performance Criteria:

The candidate must have the necessary knowledge and skills to supervise and ensure that:

1. Plant, tools and equipment according to manufacturer recommendations and workplace practices are cleaned, checked and stored.
2. Teams to dispose unwanted materials according to project environmental policy and keep areas cleared from unwanted materials are organized and lead.
3. Records and follow workplace procedures regarding scaffold inspections and for reported damaged items, structural elements' integrity and other temporary changes carried out are kept.
4. Frame scaffolds, birdcage scaffolds, tower scaffolds, modular scaffolds and hanging scaffolds are set out, constructed and dismantled.
5. Independent tied scaffolds and set up, constructed and dismantled.
6. Complex information in unfamiliar and unpredictable context to colleagues and first line supervisors using the correct scaffold technical terms is communicated.
7. There is coordination and cooperation with colleagues, self-employed sub-contractors and all other construction site workers.
8. There is agreed responsibility for completing given scaffold erecting and dismantling tasks and interact with the immediate environment to solve technical and supervision issues at one's own initiative is taken.
9. Progress of material and labour are programmed and maintained.
10. Review processes are planned and organized.
11. There is contribution to improve work activities.
12. Safety requirements, equipment and training requirements ahead of production are planned.
13. The quality of work and advice on the necessary adjustments to the work procedures and setting out of work to achieve the required accuracy is supervised.
14. Production priorities and delegate with accurate instructions are set.
15. Others are coached to maintain and improve their commitment and performance.
16. The right logical approach to problem solving is taken.
17. The roles and responsibilities of construction and civil engineering teams are recognized.
18. Interpersonal relationship to understand and develop others and to avoid conflict are maintained.
19. Inspections of the scaffolding's integrity and report any changes to scaffolding immediately to superiors are done periodically.
20. The scaffolder is aware of the intended use of the scaffold prior to erection, and that the scaffold is used for its intended purposes.

Required Knowledge

The Level 4 Advanced Scaffolder must know, demonstrate and explain:

1. Residential areas requirements.
2. Height of the top rail, mid rail, cross braces conditions, alternatives to guardrails.
3. The condition when to use fall arrest systems and personal fall arrest systems requirements.
4. Conditions of when guardrails are not required and under what conditions can be removed.
5. The general types of 'access' recommendations.
6. The type of toe boards, screens, guardrail systems, debris nets, catch platforms, canopy structures and barricades that are available to protect from overhead falling objects.
7. The maximum vertical tie spacing allowed.

8. Planning and scheduling of methods.
9. Various procedures to calculate materials requirements.
10. Environmentally friendly waste management procedures.
11. Safety data sheets of various products.
12. Site isolation and traffic control responsibilities and authorities.
13. Traffic signs appropriate for roads approaching construction sites.
14. Equipment data sheets and routine maintenance manuals.
15. Leadership, managerial and supervision styles.
16. Production hours estimating techniques.
17. When to carry out the necessary inspections.
18. The intended use of the scaffold prior to erection.

Required Skills

The Level 4 Advanced Scaffolder must be able to:

1. Explain recommended best practices to minimize hazards when installing pavement frames with special attention to: not/ leaving long and un-braced bottom standards (posts); overloading; placing of all joint in the standards at the same level; longitudinal instability; not providing an equivalent of bottom standards to the upper standards; not adequate traffic fenders; lack of ties.
2. Explain recommended best practices regarding inside boards, guard rails and toe boards with special attention to bay window and recess covering, fixing of boards at the ends of scaffold, around ladders, lapped boards.
3. Construct and dismantle the following Ordinary Access Scaffolding complete with all access equipment: Platforms and scaffoldings tied to the face of a building, platforms hanging down the face of a building, Broad-area platforms, Movable gangways, towers and masts,
4. Identify different types of ties, best practice rules and their specific use.
5. Identify best practice to form frames at right angle and parallel to buildings.
6. Identify best practice to form lifts forming three dimensional rectangular structures.
7. Construct and dismantle the following Special Scaffolds complete with all access equipment: Access birdcages, access towers in tube and couplers, towers-and-bridge scaffoldings, frame scaffoldings and system scaffoldings, cantilever scaffoldings, truss-out scaffoldings and drop scaffoldings, hanging scaffoldings, gangways, pedestrian bridges.
8. Identify, confirm and communicate technical information including hazards and breakdown.
9. Interpret technical specifications from material schedules and data sheets.
10. Communicate with builders, steel fixers, formwork and falsework erectors and engineers.
11. Use planning tools consistently.
12. Carry out preventive maintenance to hand tools, power tools and equipment.
13. Compute and keep detailed records of plant and equipment used by defined zones.
14. Programme and monitor progress of all resources required.
15. Plan workforce requirements by competence level and operation.
16. Use lifting gear appropriately to assist in material handling operations.
17. Carry out the necessary periodical inspections.
18. Ensure that the scaffolder is aware of the intended use of the scaffold prior to erection, and that the scaffold is used for its intended purposes.