

National Occupational Standards

Sector: Building and Construction

Occupation: Bar Bending and Steel Fixer

MQF Level: 4

Units:

- SBL401: Apply Occupational Health and Safety during Work-Practices
- SBL402: Identify systems, equipment and components
- SBL403: Reading of drawings and calculations
- SBL404: Bar bending and steel fixing production

SBL401: Apply Occupational Health and Safety during Work-Practices

This unit is about being able to use safe procedures and safe work practices. 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 themselves and others, identify risks and hazards associated within the working environment, tools and equipment and 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 oneself, workers and members of the public are carried out.
2. Safe working practices when using appropriate equipment and materials to prevent damages to work areas and injuries to oneself and 3rd parties are carried out.
3. Safe erection uses and dismantling of simple access platforms less than 2m high are carried out.
4. Safety barriers around a work environment hazard to protect colleagues and members of the public are set up.
5. Protective clothing and safety equipment according to specifications issued by manufacturers and know the whereabouts of first-aid equipment are used.
6. Materials hazardous to health in a safe manner are used, handled and stored.
7. Risk assessment to cover the job assigned and the working area are carried out.
8. Temporary or fixed electrical switch gear are located and switched off, with systems isolating valves as instructed in the health and safety procedures.
9. Health and safety precautions being applied on day-to-day bases are being supervised.

Required Knowledge

The Level 4 Bar Bending and Steel Fixer 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 includes tools, materials and equipment used and working practices and procedures.
3. The potential hazardous material commonly found at the workplace.
4. The procedures for dealing with potential hazardous material in the place of work.
5. The health concerns associated with the workplace and safe practices when carrying out work.
6. The 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).
7. The importance of being alert to the presence of hazards in the place of work.
8. The responsible persons to whom to report health and safety matters or any other occurring hazards.
9. The emergency procedures in the place of work.
10. The first aid facilities that exist within the work area.
11. The best way to make use of barricades, industrial hurdles, and warning signs to make areas clearly marked out of bounds.
12. The safety procedures when using scaffold platforms. (not erecting and dismantling scaffold platforms).
13. The necessary safety precautions including the use of protective clothing and equipment for a range of applications.
14. The methods used for protecting customers' property.
15. When it is required to isolate domestic water services from the main water supply.

16. Any toxic effect from materials commonly used at construction sites.
17. The preventative and remedial actions to be taken in the case of exposure to materials hazardous to health.

Required Skills

The Level 4 Bar Bending and Steel Fixer must be able to:

1. Identify which health and safety procedures are relevant to the working environment.
2. Seek expert assistance when help is needed.
3. Ensure compliance with duties and obligations as defined by the Occupational Health and Safety Act 2000 and recent amendments.
4. Follow workplace policies and employers' instructions for the safe use and maintenance of tools and equipment.
5. Control health and safety hazards within the job responsibility.
6. Report any hazards which may present risk to relevant persons.
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 noted and identified from risk assessment.
9. Adhere to work production and installation processes as agreed with the employer.
10. Apply the necessary skills to erect, use and dismantle access equipment less than 2m in height and use appropriately all access equipment provided;
11. Read, interpret and install warning signs and set up safety barriers, around working areas.
12. Equip oneself and ensure that others are adequately equipped with the appropriate protective clothing and safety equipment for bar bending and steel fixing;
13. Use and store materials hazardous to health in a safe manner.
14. Monitor the workplace and maintain good housekeeping whilst keeping it free from hazards.
15. Communicate complex information regarding unfamiliar and unpredictable situations to colleagues and supervisors.
16. Advocate appropriate health and safety procedures.

SBL402: Identify systems, equipment and components

This unit is about identifying the different materials for specific applications based on their technical properties and to identify direct and indirect environmental impacts.

Performance Criteria

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

1. The difference between the types and grades of reinforcement bars available on the market is known.
2. Records of the quantity of materials used in day to day work are being kept.
3. Stores and production facilities including batch production to ensure correct utilization of bars and accessories are organised.
4. Cutting and bending of bars to facilitate traceability of items are organised.
5. A job is broken down into different operations and estimate the duration and production hours required.

Required Knowledge

The Level 4 Bar Bending and Steel Fixer must know, demonstrate and explain:

1. Knowledge of different production standards.
2. Knowledge of appropriate software to keep production records.
3. Knowledge of what defines an operation or a workstation at the place of work.
4. Knowledge of how to congruent between duration in days, production hours, handling and transport hours and production operations and workforce required.

Required Skills

The Level 4 Bar Bending and Steel Fixer must be able to:

1. Distinguish between British, ISO and EN standards regarding reinforcement bars.
2. Keep digital and hard copies of production records.
3. Draw and monitor production schedules.
4. Calculate the production hours required for a job based on the number of operations required at defined stages.

SBL403: Reading of drawings and calculations

This unit is about understanding and applying dimensions from drawings and calculating quantities in the preparation, costing and estimation.

Performance Criteria

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

1. Steel reinforcement drawings and bending schedules are read and interpreted.
2. Site and building drawings regarding construction and civil engineering projects are read and interpreted.
3. Sections and views as used in construction and building engineering drawings are familiar with.
4. Scales, levels and misalignment reports and read and interpreted.
5. Circular, triangular, rectangular and true lengths of cones and pyramids calculations are familiar with.
6. Assembly drawings of shutters and form work are read and interpreted.
7. Codes and standards the true length, the weights of bars and the weight involved in pre-assembled modules are calculated.
8. Adherence to issued drawings and site instructions from competent authorized persons are ensured.

Required Knowledge

The Level 4 Bar Bending and Steel Fixer must know, demonstrate and explain:

1. Scales and ratios.
2. Drawing annotations used for levels, gradients and bearings.
3. Scientific parameters as used in digital calculators.
4. A wide range of hand tool specifications and their use.
5. The common tolerances allowed in construction and civil engineering projects.
6. The techniques to produce manual simplified workshop drawings.
7. The competent authorised persons in charge on site.

Required Skills

The Level 4 Bar Bending and Steel Fixer must be able to:

1. Translate scaled dimension to full size dimensions just for rough checking.
2. Translate orientation bearings and level readings.
3. Use scientific calculators and digital measuring equipment to measure linear and angular parameters.
4. Use hand tools such as spanners, ratchets to assemble and adjust formwork
5. Covert between units of measurements and weights.
6. Interpret tolerance specifications.
7. Produce simplified workshop drawings from design main drawings.
8. Ensure adherence to issued drawings and site instructions from competent authorised persons.

SBL404: Bar bending and steel fixing production

This unit is about using tools and equipment to fabricate and assemble and set out reinforcement bars.

Performance Criteria

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

1. Bars and steel are measured, cut, bent and set out.
2. Nest cutting schedules are maintained to minimise scrap.
3. Hand and power tools and equipment are operated and maintained.
4. Cuts and bends as per the requirements of the schedule within tolerance stipulated are reinforced.
5. Bended bars by type and diameter for maximum traceability are organised.
6. Sound and appropriate ties on assembled modules and cast-in-situ mesh are performed.
7. Spacing of bars is kept uniform and according to specified tolerance, staggers laps and maintain the required cover.
8. Sequence of reinforcement placing is planned and executed.
9. Mesh and modular cages including additional bars for handling and lifting safely are fabricated.
10. Steel bars and use mechanical connection systems for the extension of bars are prepared.
11. There is organisation to protect steel from corrosion.
12. The time required and man-hours requirements for a job and project is estimated.
13. Progress of material and labour are programmed and maintained.
14. Production safety requirements, equipment and training requirements are planned.
15. 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 constantly supervised.
16. Set production priorities and delegate with accurate instructions.
17. Coaching to others to maintain and improve their commitment and performance is done constantly.
18. The approach problem solving is a logical one.
19. The roles and responsibilities of others are recognized.
20. Interpersonal relationship to understand and develop others and to avoid conflict are maintained.
21. Materials used are of good quality, in good condition and compliant with requirements. Report to immediate superior if this is not the case.

Required Knowledge

The Level 4 Bar Bending and Steel Fixer must know, demonstrate and explain:

1. Steel fixing schedules including annotated codes and associated calculations.
2. The routine maintenance requirements for all the tools and equipment.
3. Various methods of calculating weights of interim cut bars and total weight of assemble cage as a module
4. A range of steel reinforcement drawings.
5. Regular and common terms used in the construction industry.
6. The criteria for selection of formers and rollers for different diameters of steel.
7. Methods and techniques to extend bars.
8. The theoretical knowledge such as concentric columns, offset columns, cantilever beams, compression and tension loading of bars.
9. Ratios such as 1:10 crank and distances and bending radius in terms of diameter of bars.
10. The technology behind aligning and levelling instruments used at construction sites.
11. Contribute ideas to improve productivity.

12. Monitor stock levels of bars and report on condition.
13. Carry out scheduling of bars to minimise of-cuts and scrap.
14. Identify and communicate instructions regarding different types of mesh to standard specifications.
15. Advise on best practice to use power tools and equipment available.
16. Report any materials which are not in good state and condition and compliant with requirements to immediate superior.

Required Skills

The Level 4 Bar Bending and Steel Fixer must be able to:

1. Read and interpret drawings and schedules to set out fixing steel reinforcement
2. Calculate using codes, the true length of bar to make a given shape of bend.
3. Mark and bend bars to meet specifications on different types of bending machines, including hooks links and hop bars.
4. Plan the sequence of reinforcement and carry out assembly of bars appropriately.
5. Draw and cut templates to assist in cutting, bending and assembly of complex structures.
6. Fabricate mesh and cages and carry out handling stability checks.
7. Discuss with designers and communicates solutions to specific problems.
8. Draw bending and cutting schedules, file and communicate data using digital means.
9. Computes and keep detailed records of quantity of materials used in day-to-day work by project defined zones and elements.
10. Program and monitor progress of all resources required.
11. Plans workforce requirements by level and operation for the job.
12. Draw cutting schedules to minimize off-cuts and scrap.
13. Draw schedules from given parts of a drawing, interpreting codes and key configuration and cut and bend to correct lengths.
14. Uses lifting gear to handle steel reinforcement in a safe manner.
15. Add additional bars to lift and handle cage modules safely.
16. Set up hand and power benders and select correct size formers and rollers to bend specified shapes to within a tolerance of +5mm/ -5mm to specified measurements in the flat plane.
17. Ensure that materials used are of good quality, in good condition and compliant with requirements. Report to immediate superior if this is not the case.