



PART OF **nocn** GROUP

QUALIFICATION SPECIFICATION

NOCN Level 2 Diploma in Steelfixing Occupations (Construction)

Qualification No: 601/2022/8

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To know more about NOCN:

- Visit the NOCN website: www.nocn.org.uk
- Call the Customer Service Team: **0300 999 1177**

Introduction

NOCN has been providing a qualification and accreditation service to providers across the UK for over 25 years and is justifiably proud of its reputation as, "...a provider of fully accessible, trusted and flexible qualification and accreditation services".

Over the years, NOCN has worked effectively with our centres for the benefit of learners across the country; with a mutual interest in providing a continuously improving service. NOCN, whilst retaining all the advantages of being a national body, has always provided a personal, bespoke service to its customers and prides itself on its local presence and expertise within communities.

This handbook is a resource for NOCN centres who wish to offer the NOCN Level 2 Diploma in Steelfixing Occupations (Construction)

The qualification is relevant to people who wish to develop a career in the construction and built environment sector working in civil engineering. It is designed to assess the theory and practical skills gained within a simulated or work based environment. The learners are required to provide evidence that they have achieved the skills and knowledge to the level required in the construction industry.

The handbook details the qualification specification and provides guidance to the training provider on assessment criteria and evidence requirements.

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1. NOCN Level 2 Diploma in Steelfixing Occupations (Construction)

The NOCN Level 2 Diploma in Steelfixing Occupations (Construction):

- is nationally recognised
- is based on the CITB Steelfixing National Occupational Standards (NOS)
- has been developed in partnership with Sector Skills Council (CITB), Laing O'Rourke, Bridgwater College and Gateshead College to ensure that the qualification fully meets underpinning knowledge and skills requirements for the industry.

The NOCN Level 2 Diploma in Steelfixing Occupations (Construction) and the NOCN Level 2 NVQ Diploma in Steelfixing Occupations (Construction) have been approved as components for the CITB Steelfixing Apprenticeship framework.

Who is the Qualification for?

This qualification is appropriate for learners who wish to gain a career in steelfixing. It has been designed to enable the learner to develop underpinning knowledge and skills in a simulated training environment and to support progression onto the NOCN Level 2 NVQ Diploma in Steelfixing Occupations (Construction). Learners will be required to demonstrate skills and knowledge to a level required in the construction industry. This qualification is suitable for learners aged 16 years or over.

1.1. Entry Requirements

There are no formal entry requirements for learners undertaking this qualification

2. Qualification Structure

2.1 Qualification Structure

The NOCN Level 2 Diploma in Steelfixing Occupations (Construction) is a 114 credit qualification with a Total Qualification Time (TQT) of 1140, including 846 Guided Learning Hours (GLH).

Learners must achieve all 114 credits from the 11 mandatory units listed below:

Unit Title	Level	Credit Value	Ofqual Unit Reference Number
Operating Safe Working Practices when Fixing Insitu and Prefabricated Reinforcing Steel	2	3	A/505/8157
Moving, Lifting, Handling and Storing Reinforcement Steel and Associated Materials, Equipment and Resources	2	5	F/505/8158
Interpretation of Construction Drawings, Specifications and other Relevant Information Required when Fixing Steel Insitu	2	5	J/505/8159
Fixing Insitu Reinforcing Steel	2	30	F/505/8161
Interpretation of Construction Drawings, Specifications and other Relevant Information Required for Prefabricating Reinforcement Steel Sections	2	5	J/505/8162
Manufacture and Installation of Prefabrication Reinforcement Steel Sections	2	32	L/505/8163
Interpretation of Construction Drawings, Specifications and other Relevant Information Required for Cutting and Bending Reinforcing Steel to Shape	5	35	Y/505/8165
Cutting and Bending Reinforcing Steel to Shape	2	20	D/505/8166
Appreciation of ICT and 3D Building Information Modelling (BIM) for Civil Engineering Operatives	2	3	H/505/8167
Team Working in Construction	2	3	K/505/8168
Self-Management in Construction	2	3	H/505/8170

2.2 Total Qualification Time (TQT)

Through consultation with users, TQT has been agreed by considering the total number of learning hours required for the average learner to achieve this qualification.

TQT is split into two areas:

- Guided Learning Hours (GLH):
 - learning activity under the immediate guidance or supervision of a lecturer, supervisor, tutor or other appropriate provider of education or training
 - includes the activity of being assessed if the assessment takes place under the immediate guidance or supervision of a lecturer, supervisor, tutor or other appropriate provider of education or training.
- Other Learning Hours (OLH):
 - an estimate of the number of hours a learner will spend, as directed by (but not under the immediate guidance or supervision of) a lecturer, supervisor, tutor or other appropriate provider of education or training, including:
 - preparatory work
 - self-study
 - or any other form of education or training, including assessment.

Examples of GLH activities include:

- Classroom-based learning supervised by a teacher
- Work-based learning supervised by a teacher
- Live webinar or telephone tutorial with a teach in real time
- E-learning supervised by a teacher in real time
- All forms of assessment which take place under the immediate guidance or supervision of an appropriate provider of training
- Exam time

Examples of OLH activities include:

- Independent and unsupervised research/learning
- Unsupervised compilation of a portfolio of work experience
- Unsupervised e-learning
- Unsupervised e-assessment
- Unsupervised coursework
- Watching a pre-recorded podcast or webinar
- Unsupervised work-based learning

The agreed Total Qualification Time has been used to identify the qualification's Credit Value.

3. Centre Information

3.1 Offering the qualification

Minimum Standards and Requirements for Centres wishing to offer the NOCN Level 2 Diploma in Steelfixing Occupations (Construction)

Delivery partners must have the training facilities and resources to support the creation of a comprehensive simulated civil engineering site that will allow the delivery of the mandatory practical exercises in accordance with the specifications stated in the NOCN Level 2 Diploma in Steelfixing Occupations (Construction) Mandatory Practical Exercises Specification (MPES). This can be obtained by contacting www.nocn.org.uk

Recognised Centres

If you are already recognised to offer NOCN qualifications and would like more information about offering the NOCN Level 2 Diploma in Steelfixing Occupations (Construction), please contact: business-enquiries@nocn.org.uk.

New Centres

If you are interested in offering this qualification, but are not yet a NOCN Approved Centre and would like more information about becoming a NOCN centre and offering this qualification please see **Become a Registered Centre** on our website <https://www.nocn.org.uk/customers/nocn-centres/> and click Become a Centre.

External Verification

Once recognised as a Centre, NOCN will allocate an External Quality Assurer. The External Quality Assurer will have ongoing responsibility for monitoring the Centre's compliance with the requirements of centre recognised status.

The External Quality Assurer will make regular visits to all Centres. During these visits he/she will:

- Monitor the Centre's compliance with the Centre Recognition agreement by reviewing course documentation, meeting managers, tutors, internal quality assurers, learners and administrative staff.
- Verify recommendations for achievement submitted by the centre via Quartzweb.

Refer to the **NOCN Quality Assurance User Guide** for further information on the External Quality Assurance process.

3.2 Required Resources for Delivering the Qualification

As part of the requirement to deliver this qualification there is an expectation that staff undertaking roles as part of the delivery and assessment of the qualification have a demonstrable level of expertise.

Tutor/Assessors and Internal Verifiers must also comply with the following requirements:

Essential Training Requirements:

- A Site Manager's or Supervisor's CSCS Card
- A Health and Safety Management Qualification (e.g. 2 or 4 day IOSH course or equivalent)

Additional Training Requirements:

Internal Verifiers are required to either have these as existing qualifications or they will need to be given appropriate training by the training provider to achieve them prior to delivering the course:

- NVQ Level 3 in Occupational or Construction Site Supervision or be able to demonstrate an equivalent level of ability based on practical site supervision experience (See below)
- Slinger Signaller Qualification
- Behavioural Safety Training (e.g. Incident and Injury Free or similar)
- Scaffold Inspection or Temporary Works Training.

Essential Competencies / Experience Requirements:

Tutor/Assessors are required to have the following minimum competencies and experience in order to deliver this qualification:

- Minimum 10-15 years' experience of fixing reinforcement in the construction industry.
- Have achieved the existing NVQ Level 2 in Steelfixing or be able to demonstrate an equivalent level of site-based practical experience in a wide range of steelfixing activities.
- Significant experience of fixing heavy reinforcement for large scale heavy civil engineering projects e.g. large scale bridges, airports, power stations, large reinforced concrete structures, water treatment plants, deep basements etc.
- Must have minimum **3** years' experience in a supervisory role e.g. fixer foreperson.
- Significant experience of managing several gangs of steelfixers on a construction site.
- Minimum of Level 2 or equivalent in literacy and numeracy including the ability to calculate quantity, length, area and wastage associated with fixing reinforcement.

- Significant experience of reading and interpreting General Arrangement / Concrete drawings, reinforcement drawings, schedules and construction specifications and other construction documents.
 - Significant experience of managing complex construction programmes including labour, plant, resources and equipment.
 - Significant experience of managing reinforcement call-offs, orders and deliveries including the safe storage and handling of reinforcement on site.
 - Significant experience of being able to identify, manage and implement safe systems of work including the production and implementation of risk assessments and method statements.
 - Significant experience of working closely on a day to day basis with other construction trades including managing relationships and interfaces etc.
 - Significant experience of working to Quality Assurance systems, particularly in relation to the installation, checking and inspection of complex reinforcement.
 - Experience of working to the requirements of BS 8666 including standard shape codes.
- Tutors will hold or be working towards a recognised teaching qualification
 - Assessors will hold or be working towards a recognised assessor qualification.

Centre staff may undertake more than one role, e.g. tutor and assessor or internal verifier, but they cannot carry out any verification on work that they have previously assessed.

Additional Competencies / Experience Requirements that would be advantageous to the delivery of the qualification

In addition to the above minimum competencies and experience, Tutor/Assessors would ideally have additional competencies or experience in some or all of the following areas but these are **not** essential to delivering the course:

- Experience of working and fixing reinforcement within a highly regulated safety critical environment to high safety and quality standards e.g. nuclear.
- Experience of reinforcement detailing or model using 2D or 3D drawing/modelling software packages.
- Experience of working in or managing a cutting and bending facility.
- Experience of fixing reinforcement for precast or post-tensioned concrete.
- Experience in the implementation of environmental Regulations and Codes of Practice including COSHH.
- Previous experience of training / teaching staff and operatives on site.

Internal Verifier

Each centre must have internal verification policies and procedures in place to ensure that decisions made by assessors are appropriate, consistent, fair and transparent, and that

they do not discriminate against any learner. The policies and procedures must be sufficient to secure the quality of the award, ensuring validity, reliability, and consistency.

NOCN expects that the Internal Verifiers are able to demonstrate the following competencies:

Essential Training Requirements:

- Must have a Site Managers or Supervisors CSCS Card (Minimum standard, i.e. Colour of Card to be advised, but likely to be SILVER level).
- A Health and Safety Management Qualification (e.g. 2 or 4 day IOSH course or equivalent)

Additional Training Requirements:

Internal Verifiers are required to either have these as existing qualifications or they will need to be given appropriate training by the training provider to achieve them prior to delivering the course.

- NVQ Level 3 in Occupational or Construction Site Supervision or be able to demonstrate an equivalent level of ability based on practical site supervision experience (See below)
- Slinger Signaller Qualification
- Behavioural Safety Training (e.g. Incident and Injury Free or similar)
- Scaffold Inspection or Temporary Works Training.

Essential Competencies / Experience Requirements:

Internal Verifiers are required to have the following minimum competencies and experience in order to deliver this qualification:

- Minimum 10-15 years' experience of fixing reinforcement in the construction industry.
- Have achieved the existing NVQ Level 2 in Steelfixing or be able to demonstrate an equivalent level of site based practical experience in a wide range of steelfixing activities.
- Significant experience of fixing heavy reinforcement for large scale heavy civil engineering projects e.g. large scale bridges, airports, power stations, large reinforced concrete structures, water treatment plants, deep basements etc.
- Must have minimum **3** years' experience in a supervisory role e.g. fixer foreperson.
- Significant experience of managing several gangs of steelfixers on a construction site.
- Minimum of Level 2 or equivalent in literacy and numeracy including the ability to calculate quantity, length, area and wastage associated with fixing reinforcement.

- Significant experience of reading and interpreting General Arrangement / Concrete drawings, reinforcement drawings, schedules and construction specifications and other construction documents.
 - Significant experience of managing complex construction programmes including labour, plant, resources and equipment.
 - Significant experience of managing reinforcement call-offs, orders and deliveries including the safe storage and handling of reinforcement on site.
 - Significant experience of being able to identify, manage and implement safe systems of work including the production and implementation of risk assessments and method statements.
 - Significant experience of working closely on a day to day basis with other construction trades including managing relationships and interfaces etc.
 - Significant experience of working to Quality Assurance systems, particularly in relation to the installation, checking and inspection of complex reinforcement.
 - Experience of working to the requirements of BS 8666 including standard shape codes.
- Internal Verifiers will hold or be working towards a recognised IQA qualification.

Centre staff may undertake more than one role, e.g. tutor and assessor or internal verifier, but they **cannot** carry out any verification on work that they have previously assessed.

NOCN supports and recognises Centres' internal quality assurance systems that support the above; any system should encourage standardisation and sharing of good practice.

Continuing Professional Development (CPD)

Centres are expected to support their staff, ensuring that their subject knowledge remains current and that their members of staff are up to date with regards to best practice in delivery, assessment and verification.

Mandatory Practical Exercises

Training providers must have a simulated civil engineering site that will accommodate the delivery of all the mandatory practical exercises in accordance with the specifications stated in the NOCN Level 2 Diploma in Steelfixing Occupations (Construction) Mandatory Practical Exercises Specification (MPES). This can be obtained by contacting www.nocn.org.uk

4. Unit and Assessment Information

The NOCN Level 2 Diploma in Steelfixing Occupations (Construction) consists of 11 mandatory units.

To achieve this qualification a learner **must** provide evidence of learning and achievement against **all** of the assessment criteria within each unit, adhering to the mandatory practical exercises requirements and additional scope of learning.

A copy of each of the units follows, with additional mandatory information regarding teaching, learning and assessment.

4.1 Unit 1 - Operating Safe Working Practices when Fixing Insitu and Prefabricated Reinforcing Steel

Unit Title	Operating Safe Working Practices when Fixing Insitu and Prefabricated Reinforcing Steel
Ofqual unit reference number (code)	A/505/8157
Unit Level	Two
Unit Credit Value	3
GLH	24
Assessment Guidance	<p>This unit must be delivered and assessed in accordance with the NOCN Level 2 Diploma in Steelfixing Occupations (Construction) qualification specification. Specific attention must be paid to the following criteria:</p> <ul style="list-style-type: none"> • Delivery partners must have the training facilities and resources to support the creation of a comprehensive simulated civil engineering site. • Additional Knowledge, skills and experience requirements of Tutor/Assessors and Internal Verifiers, to ensure the delivery of the qualification to the required standards. • Mandatory practical exercise specifications. These exercises have been designed to simulate typical steelfixing activities that are likely to be carried out in the workplace. This unit must be assessed using simulated workplace evidence generated as the learner is operating safe working practices whilst carrying out the practical exercises.

This unit has 8 learning outcomes.

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	The learner can:
<p>1. Know how to comply with relevant Health and Safety legislation, statutory regulations, official guidance, organisational procedures and manufacturer's information for fixing insitu and prefabricated reinforcing steel.</p>	<p>1.1. State the current Health and Safety legislation, statutory regulations, official guidance and organisational procedures that apply when fixing insitu and prefabricated reinforcing steel whilst working in a range of situations.</p> <p>1.2. Explain the legal requirements for the production of risk assessments and method statements prior to starting work on site.</p> <p>1.3. Explain what type of safety information should be included within the risk assessments, method statements and task sheets including when each would be required.</p>

LEARNING OUTCOMES	ASSESSMENT CRITERIA
<p>The learner will:</p>	<p>The learner can:</p>
	<ul style="list-style-type: none"> 1.4. Explain the organisation's procedure for the production, approval and revision of risk assessments, method statements and task sheets. 1.5. State the typical safety hazards associated with fixing insitu and prefabricated reinforcing steel and the preparation of the site for steelfixing explaining how these can be mitigated by applying appropriate risk control measures. 1.6. Identify by risk assessment typical safety hazards associated with fixing insitu and prefabricated reinforcing steel explaining appropriate safe work practices to mitigate them. 1.7. Identify the persons responsible for health and safety within the specific area of work to which they have been allocated.
<p>2. Understand the individual's responsibilities to ensure the safety of self and others at work when fixing insitu and prefabricated reinforcing steel.</p>	<ul style="list-style-type: none"> 2.1. Explain the individual's responsibilities under current Health and Safety legislation, statutory regulations, official guidance and organisational procedures for the identification and mitigation of hazards and the avoidance of accidents to self and others by applying safe methods of work when fixing insitu and prefabricated reinforcing steel. 2.2. Demonstrate compliance with the appropriate risk assessment, method statement and/or task sheet for the specific steelfixing activity being carried out. 2.3. Demonstrate compliance with manufacturer's technical information for the avoidance of hazards associated with using tools and equipment required for fixing insitu and prefabricated reinforcing steel. 2.4. Demonstrate safe working practices when fixing insitu and prefabricated reinforcing steel. 2.5. Demonstrate the safe use and storage of materials, hand tools, bending tools, portable power tools and ancillary equipment. 2.6. Explain the organisation's procedure for reporting problems associated with safe methods of working when fixing insitu and prefabricated reinforcing steel, establishing who has the authority to rectify them. 2.7. Explain the organisation's procedures for reporting accidents and near misses including who has a duty to report them.
<p>3. Be able to use Health and Safety Control Equipment correctly when fixing insitu and prefabricated reinforcing steel.</p>	<ul style="list-style-type: none"> 3.1. Select the correct Personal Protective Equipment (PPE) appropriate to the task being carried out in accordance with legislation, official guidance, the risk assessment, method statement and the specification.

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	The learner can:
	<p>3.2. Demonstrate the correct use of PPE appropriate to the task being carried out in accordance with legislation, official guidance, the risk assessment and method statement when fixing insitu and prefabricating reinforcement steel.</p> <p>3.3. Explain why and when the following types of Health and Safety Control Equipment should be used in relation to the specific task being carried out:</p> <ul style="list-style-type: none"> a) Collective protective measures b) Standard PPE c) Respiratory Protective Equipment d) Local Exhaust Ventilation. <p>3.4. Identify the types and purpose of each type of the following, explaining their limitations:</p> <ul style="list-style-type: none"> a) Collective protective measures b) Standard PPE c) Respiratory Protective Equipment d) Local Exhaust Ventilation. <p>3.5. Demonstrate the correct inspection, care and maintenance of Health and Safety Control Equipment.</p>
<p>4. Be able to select and use appropriate access equipment safely when fixing insitu and prefabricated reinforcing steel.</p>	<p>4.1. Demonstrate the correct selection, installation, use and dismantling of standard access equipment appropriate to the task being carried out.</p> <p>4.2. Inspect the installation and condition of standard access equipment, ensuring that it is adequately maintained.</p> <p>4.3. Have an appreciation of other specialist access qualifications and when they are required.</p>
<p>5. Understand the importance of safe storage and handling of reinforcement and other materials associated with fixing insitu and prefabricated reinforcing steel.</p>	<p>5.1. State the typical safety hazards associated with the incorrect use, storage and handling of loose reinforcement, prefabricated units and other materials associated with steelfixing.</p> <p>5.2. Demonstrate the safe use, storage and handling of loose reinforcement, prefabricated units and other materials associated with steelfixing.</p>
<p>6. Understand the importance of safe use, care, maintenance and storage of tools and equipment associated with fixing insitu and prefabricated reinforcing steel.</p>	<p>6.1. Demonstrate the safe use, care, maintenance and storage of standard tools and equipment relevant to fixing insitu and prefabricated reinforcing steel.</p> <p>6.2. Demonstrate how to maintain the security of tools, equipment and personal belongings.</p>

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	The learner can:
<p>7. Know how to respond to emergency situations in accordance with organisational procedures and personal skills.</p>	<p>7.1. Explain the organisation's procedures, personal skills and responsibilities required when responding to emergencies on site, including fires, spillages, injuries and other occupational emergencies.</p> <p>7.2. Explain the organisation's procedures for reporting accidents and near misses including who has a duty to report them.</p> <p>7.3. Explain the organisation's security procedures for protecting the site, workplace, company, sensitive information and the operative including partially complete or completed work, plant, tools and equipment.</p> <p>7.4. Explain how the organisation's security procedures are implemented.</p>
<p>8. Know how to comply with relevant environmental legislation, COSHH legislation, organisational procedures and manufacturer's information relating to the disposal of waste resulting from steel fixing activities on site.</p>	<p>8.1. Explain how environmental legislation and COSHH legislation relates to the disposal of waste on site.</p> <p>8.2. Explain the organisation's procedures relating to responsible waste management.</p> <p>8.3. Explain the correct disposal procedures for common waste associated with fixing insitu and prefabricated reinforcing steel.</p> <p>8.4. Explain why it is important to follow the correct disposal procedures for common waste associated with steelfixing.</p>

Unit 1: Operating Safe Working Practices When Fixing In situ and Prefabricating Reinforcing Steel

Unit Summary

The main aim and emphasis of this unit is to ensure the health, safety and welfare of everyone working on, visiting and passing by a civil engineering construction site. This unit encourages the learner to gain knowledge and understanding of the Health and Safety risks to themselves, other people and the environment when working on a construction site. This will be achieved by gaining a comprehensive understanding of current health and safety legislation, official guidance and the organisations safety management systems, practices and procedures that aim to identify and mitigate risks and establish safe working practices. The learner will gain an essential tool kit that will enable them to vigilantly operate safe working practices when fixing in situ and prefabricating reinforcing steel.

Assessment and Evidence Requirements

Learners must provide evidence against all of the assessment criteria; the evidence for this unit will come from **two** main sources; direct evidence produced by the learner demonstrating safe working practices when completing the practical exercise. The underpinning knowledge and understanding can be demonstrated through a variety of assessment methods.

The direct evidence includes naturally occurring documentary evidence (hard copy and electronic), and direct observation of activities that can be evidenced through either digital recordings, assessor observation reports, witness statements, etc.

Underpinning knowledge and understanding can be evidenced through a variety of assessment methods including; multiple choices testing and question and answer exercises (electronic or paper-based)

Additional Evidence Requirements

To complete this unit, the learner will not only need to demonstrate that they have met the main learning outcomes and assessment criteria but will also need to provide evidence that they have gained a knowledge and understanding of the all of the additional specifications stated under the specific learning outcomes (LO) and assessment criteria (AC) listed below:

LO 1: Know how to comply with relevant Health and Safety legislation, statutory regulations official guidance, organisational procedures and manufacturer's information for fixing in situ and prefabricated reinforcing steel.

AC 1.1: State the current Health and Safety legislation, statutory regulations, official guidance and organisational procedures that apply when fixing insitu and prefabricated reinforcing steel whilst working in a range of situations

Evidence that the following situations have been covered must be included to meet this assessment criteria:

- General workplace
- Below ground
- In confined spaces
- Working at height
- With tools and equipment
- With materials and substances
- With the movement and storage of materials by manual handling and mechanical lifting.

Compliance with the following Health and Safety legislation, statutory regulations and official guidance must be covered as a minimum as part of the assessment criteria:

General workplace:

- HASAW Act 1974
- Construction (Health, Safety & Welfare) Regulations 1996
- PPE at Work Regulations 1992
- Control of Noise at Work Regulations 2005
- Control of Vibration at Work Regulations 2005
- Health and Safety First Aid Regulations 1981
- RIDDOR 1995
- HSE Guidance Notes
- Construction Industry Guidance Notes
- CIRIA and other Guides

Below ground

- CIRIA Report 97 – Trenching Practice

Confined spaces

- Confined Spaces Regulations 1997

Working at Height

- Working at Height Regulations 2005

With tools and equipment

- PUWER 1998

With materials and substances

- COSHH Regulations 2002
- Hazardous Materials Regulations

With movement / storage of materials by manual handling and mechanical lifting

- Manual Handling Operations Regulations 1992
- LOLER 1998

AC 1.5: State the typical safety hazards associated with fixing insitu and prefabricated reinforcing steel and the preparation of the site for steel fixing, explaining how these can be mitigated by applying appropriate risk control measures.

The typical risks associated with steelfixing that must be covered as a minimum as part of this assessment criteria, include but are not limited to the following;

- Safe means of access
- Manual handling
- Lifting
- Working at height
- Fire hazards and Hot Works
- Spillages and COSHH incidents
- Confined spaces
- Severing of limbs
- Collapse of structures
- Working below ground
- Service strike/damage
- Moving plant and vehicles
- Repetitive strain injury (RSI)
- Manual handling injuries, e.g. back injuries
- Vibration white finger (VWF)
- Slips, trips and falls
- Cuts and abrasions
- Weils disease (Leptospirosis)
- Animal faeces
- Cold and heat injuries (Exposure, sunstroke, dehydration)
- Ground contamination
- Collapse of excavations
- Temporary works

AC 2.4: Demonstrate safe working practices when fixing insitu and prefabricated reinforcing steel.

Evidence must be provided of safe working practices being demonstrated in all these situations:

- Manual handling of reinforcement, materials, components, fixings and embedments.
- Lifting, moving, handling and positioning loose bundles of stock steel, cut and bent steel, components, fixings, embedments and/or prefabricated elements of reinforcement.
- Sorting, measuring, marking out, fitting, positioning and securing in situ and prefabricated reinforcing steel
- Cutting and bending reinforcement steel to standard shapes using recognised codes for fixing steel insitu and prefabricated reinforcing steel.
- Preparing mesh, loose bar, chairs, cover blocks, spacers, ties and prefabricated reinforcement sections for installation.
- Manufacturing prefabricated reinforcement sections including forming associated wire ties, other fixings, temporary construction bars, bracing and lifting points etc.
- Installing mesh, loose bar, chairs, cover blocks, spacers, ties and prefabricated reinforcement sections insitu.
- Incorporating embedded items in to insitu or prefabricated reinforcement sections.
- Using and maintaining hand bending machines and power bending machines.
- Carrying out hot works including procedures, permits, precautions and emergencies.
- Fixing/tying steel including the safe use of standard steel fixing equipment.
- Incorporating reinforcement coupler and continuity systems.
- Sorting, storing and protecting steel components and fixings.
- Using and maintaining hand tools, portable power tools and equipment.
- Working at height including demonstrating the correct use of standard fall arrest and fall restraint equipment.
- Safe means of access and safe use of access equipment.

LO 3: Be able to use Health and Safety control equipment correctly when fixing insitu and prefabricated reinforcing steel.

AC 3.1: Select the correct personal protective equipment (PPE) appropriate to the task being carried out in accordance with legislation, official guidance, the risk assessment and method statement and the specification.

The use of the following standard personal protective equipment (PPE) must be covered as a minimum as part of the assessment criteria:

- Safety Helmet
- Hi-vis vests
- Protective footwear
- Eye protection
- Hand protection
- Ear protection
- Safety overalls

AC 3.3: Explain why and when the following types of Health and Safety Control Equipment should be used in relation to the specific task being carried out:

- Collective protective measures
- Standard PPE
- Respiratory Protective Equipment
- Local Exhaust Ventilation

AC 3.4: Identify the types and purpose of each type of the following, explaining their limitations:

- Collective protective measures
- Standard PPE
- Respiratory Protective Equipment
- Local Exhaust Ventilation

Collective protective measures that must be covered as a minimum as part of the assessment criteria include but are not limited to the following:

- Fire Equipment
- General ventilation equipment
- Safety barriers and guardrails
- General access equipment
- General escape equipment

Respiratory protective equipment must include as a minimum the selection, use, care and maintenance of standard types of mask and respirator that are likely to be encountered during standard steelfixing operations.

Local exhaust ventilation includes as a minimum the selection, use, care and maintenance of standard types of LEV equipment that are likely to be encountered.

LO 4: Be able to select and use appropriate access equipment safely when fixing insitu and prefabricated reinforcing steel.

AC 4.1: Demonstrate the correct selection, installation, use and dismantling of standard access equipment appropriate to the task being carried out

The correct selection, installation, use and dismantling of standard access equipment must include:

- ladders
- hop-up platforms
- walkway boards
- step ladders

AC 4.2: Inspect the installation and condition of standard access equipment, ensuring that it is adequately maintained.

The inspection of standard access equipment must include:

- ladders
- hop-up platforms
- walkway boards
- step ladders

AC 4.3: Have an appreciation of other specialist access qualifications and when they are required.

Specialist access qualifications may include:

- MEWP (IPAF) training,
- Scaffold Erection
- Crane/Plant operators qualifications

LO 5: Understand the importance of safe storage and handling of reinforcement and other materials associated with fixing insitu and prefabricated reinforcing steel.

AC 5.2: Demonstrate the safe use, storage and handling of loose reinforcement, prefabricated units and other materials associated with steel fixing.

The safe storage and handling of reinforcement and other materials associated with steel fixing must include as a minimum but are not limited to the following;

- The correct methods of storage of loose or bundled reinforcement and prefabricated units (on timber, on suitable surface, clear of mud and water etc.).
- Allowance of adequate space between bundles to allow identification, sorting and handling or moving of reinforcement and prefabricated units.
- Storing of loose reinforcement or prefabricated units in sequence in which they will be required for use on site.
- Safe stacking heights of loose or bundled reinforcement and prefabricated units.
- Long term protection of reinforcement and prefabricated units from the elements e.g. rusting, contamination damage etc.
- Tagging of bundles and prefabricated units to aid identification.

LO 6: Understand the importance of safe use, care, maintenance and storage of tools and equipment associated with fixing insitu and prefabricated reinforcing steel.

AC 6.1: Demonstrate the safe use, care, maintenance and storage of standard tools and equipment relevant to fixing insitu and prefabricated reinforcing steel

The standard tools and equipment relevant to fixing insitu and prefabricated reinforcing steel include:

- nips
- hammers
- tapes
- disc cutters
- grinders
- power benders
- torque wrenches

Evidence must be provided of the safe, use, care, maintenance and storage of all relevant tools.

LO 7: Know how to respond to emergency situations in accordance with organisational procedures and personal skills.

AC 7.1: Explain the organisations procedures, personal skills and responsibilities required when responding to emergencies on site, including fires, spillages, injuries and other occupational emergencies.

Organisation's procedures, personal skills and responsibilities required when responding to emergencies on site must include as a minimum but are not limited to the following:

Fires;

- Fire Plans
- Emergency evacuation procedures
- Means of escape / escape routes
- Use of fire extinguishers and other standard fire-fighting equipment

Spillage;

- Standard spillage procedures, actions and containment
- Use of spill kits
- Reporting procedures / requirements
- Cleaning up and disposal of spillage and contaminated materials
- Use of correct PPE
- Protection of water courses and drainage systems
- Potential environmental damage

Injuries;

- Accident and near miss reporting and who has a duty to report accidents and near misses
- Hazard spotting and reporting
- First aid cover requirements and standard site equipment
- Emergency procedures and emergency services

- Typical injuries associated with steel fixing and how to avoid them

Emergencies relating to occupational activities;

- Fire hazards
- Lifting and handling
- Spillages and COSHH incidents
- Falls from height
- Confined spaces
- Severing of limbs
- Collapse of structures
- Service strike/damage including overhead services
- Moving plant and vehicles
- Repetitive strain injury (RSI)
- Manual handling injuries, e.g. back injuries
- Vibration white finger (VWF)

AC 7.3: Explain the organisation's security procedures for protecting the site, workplace, company, sensitive information and the operative including partially complete or completed work, plant, tools and equipment.

AC 7.4: Explain how the organisation's security **procedures** are implemented
 Organisation's procedures, personal skills and responsibilities required when responding to emergencies on site must include as a minimum but are not limited to the following:

- How the security procedures affect them personally, their responsibilities under those procedures, the disciplinary procedures and on-going commitments to security after leaving the project.
- The typical threats to personal and project security such as terrorist, activists, the press, blackmail, bribery, etc.

LO 8: Know how to comply with relevant environmental legislation, COSHH legislation, organisational procedures and manufacturer's information relating to the disposal of waste resulting from steel fixing activities on site.

AC 8.1: Explain how environmental legislation and COSHH legislation relates to the disposal of waste on site.

Compliance with the following current environmental and COSHH statutory regulations and official guidance relating to the disposal of waste on site must be covered as a minimum as part of the assessment criteria:

Statutory regulations:

- Current environmental, waste disposal & COSHH Legislation

Official guidance:

- British Standards
- Codes of Practice
- HSE Guidance Notes
- Environment Agency Guidance
- Other agencies such as Natural England etc.

Manufacturer's information:

- COSHH Data sheets.
- Plant, tools and equipment user manuals
- General construction materials associated with prefabrication of reinforcement
- Construction Industry Guidance

AC 8.2: Explain the organisation's procedures relating to responsible waste management.

The organisation's procedures relating to responsible waste management must include as a minimum the following;

- Environmental Policy, Procedures & Plans
- Site Waste Management Plans
- Site environmental inspections and audits
- Typical site environmental controls to include, waste segregation, COSHH bins, recycling, and hazardous waste disposal

AC 8.3: Explain the correct disposal procedures for common waste associated with fixing insitu and prefabricated reinforcing steel.

The correct disposal procedures for common waste associated with steelfixing must include as a minimum but are not limited to the following;

- Off-cuts of reinforcing bars
- Tying wire
- Concrete spacer blocks
- Timber
- Plastic
- COSHH items such as spray cans, oil/paint tins
- Oils and lubricants

3.1. Unit 2 - Moving, Lifting, Handling and Storing Reinforcement Steel and Associated Materials, Equipment and Resources

Unit Title	Moving, Lifting, Handling and Storing Reinforcement Steel and Associated Materials, Equipment and Resources
Ofqual unit reference number (code)	F/505/8158
Unit Level	Two
Unit Credit Value	5
GLH	35
Assessment Guidance	<p>This unit must be delivered and assessed in accordance with the NOCN Level 2 Diploma in Steelfixing Occupations (Construction) qualification specification. Specific attention must be paid to the following criteria:</p> <ul style="list-style-type: none"> • Delivery partners must have the training facilities and resources to support the creation of a comprehensive simulated civil engineering site. • Additional Knowledge, skills and experience requirements of Tutor/Assessors and Internal Verifiers, to ensure the delivery of the qualification to the required standards. • Mandatory practical exercise specifications. These exercises have been designed to simulate typical steelfixing activities that are likely to be carried out in the workplace. This unit must be assessed using simulated workplace evidence generated as the learner is moving, lifting, handling and storing reinforcement steel and associated materials, equipment and resources whilst carrying out the practical exercises.

This unit has 5 learning outcomes

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	The learner can:
1. Know the requirements for working safely when moving, lifting, handling or storing reinforcement steel, prefabricated units and associated materials, equipment and resources.	1.1. State the current Health and Safety legislation, statutory regulations, official guidance and organisational procedures that apply when lifting, moving, handling and storing reinforcement steel, prefabricated units and associated materials, equipment and resources. 1.2. Explain the organisational procedures that apply and the documentation that has to be in place to allow the safe lifting, moving, handling and storage of reinforcement steel, prefabricated units and associated materials, equipment and resources.

LEARNING OUTCOMES	ASSESSMENT CRITERIA
<p>The learner will:</p>	<p>The learner can:</p>
	<p>1.3. State the typical safety hazards associated with lifting, moving, handling and storing reinforcement steel, prefabricated units and associated materials, equipment and resources identifying how these can be mitigated by applying appropriate risk control measures.</p> <p>1.4. Identify by risk assessment typical safety hazards associated with lifting, moving, handling and storing reinforcement steel, prefabricated units and associated materials, equipment and resources explaining how these can be mitigated by applying appropriate risk control measures.</p> <p>1.5. Identify the person(s) responsible for the management and control of lifting operations within the specific area of work to which they have been allocated.</p>
<p>2. Be able to prepare for the safe moving, lifting, handling and storing of reinforcement steel, prefabricated units and associated materials, equipment and resources.</p>	<p>2.1. Demonstrate compliance with the appropriate risk assessment, method statement, task sheet and specification when lifting, moving, handling and storing reinforcement steel, prefabricated units and associated materials, equipment and resources.</p> <p>2.2. Select the correct Personal Protective Equipment (PPE) appropriate to the task being carried out when moving, lifting, handling and storing reinforcement steel, prefabricated units and associated materials, equipment and resources in accordance with legislation, official guidance, the risk assessment and method statement.</p> <p>2.3. Carry out the required manual handling assessments for the lifting, moving and handling of typical reinforcement bar diameters, lengths and shapes including other materials, equipment and resources associated with fixing insitu and prefabricated reinforcement steel.</p> <p>2.4. Describe the typical lifting equipment and aids that are available for the safe lifting, moving and handling of reinforcing steel prefabricated units and associated materials, equipment and resources.</p> <p>2.5. Explain the procedures for the management and control of lifting operations on site including the requirements for a Crane Appointed Person, Crane Supervisors and for qualified Slinger/Signallers to lift and move loads.</p> <p>2.6. Explain the organisation's procedure for reporting problems associated with the safe moving, lifting, handling and storing of reinforcement steel, prefabricated units and associated materials, equipment and resources establishing who has the authority to rectify them.</p> <p>2.7. Explain the organisation's procedures for reporting accidents and near misses including who has a duty to report them.</p>

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	The learner can:
	2.8. Explain the impact and effects on quality of the incorrect moving, lifting, handling and storage of reinforcement materials on site.
3. Be able to safely lift, move and handle reinforcement steel, prefabricated units and associated materials, equipment and resources.	3.1. Demonstrate the correct use of typical lifting equipment and aids associated with the safe lifting, moving and handling of reinforcing steel prefabricated units and associated materials, equipment and resources. 3.2. Demonstrate correct methods for the safe lifting, moving and handling of reinforcement steel, prefabricated units and associated materials, equipment and resources in accordance with organisational procedures, the risk assessment and method statement for the task being carried out. 3.3. Demonstrate the correct methods for safely lifting, moving and handling standard bundles of reinforcement. 3.4. Describe the manufacturer's recommendations for the inspection, care and maintenance of typical lifting equipment used to lift, move and handle loose and bundled reinforcement. 3.5. Demonstrate the specific requirements for lifting, moving, handling and installing prefabricated reinforcement units.
4. Know how to safely store reinforcement steel, prefabricated units and associated materials, equipment and resources.	4.1. State the effects of incorrect handling and storage of materials on the safety of self and others and the quality of reinforcement steel, prefabricated units and associated materials, equipment and resources. 4.2. Demonstrate the correct methods of storing reinforcement steel, prefabricated units and associated materials, equipment and resources. 4.3. Demonstrate how to minimise damage and maintain quality by applying good practice and maintaining a clean work space when handling and storing reinforcement.
5. Know how to comply with relevant environmental legislation, COSHH legislation, organisational procedures and manufacturer's information relating to the disposal of waste resulting from steelfixing activities on site.	5.1. Explain how environmental legislation, COSHH legislation and manufacturer's information relates to the disposal of waste associated with reinforcement steel on site. 5.2. Explain the organisation's procedures relating to responsible waste management. 5.3. Explain the correct disposal procedures for common waste materials associated with fixing insitu and prefabricated reinforcing steel. 5.4. Explain why it is important to follow the correct disposal procedures for common waste associated with steelfixing.

Unit 2: Moving, Lifting, Handling and Storing Reinforcement Steel and Associated Materials, Equipment and Resources

Unit summary

The main aim and emphasis of this unit is on injury prevention and to underline the need for the learner to have a knowledge and understanding of health and safety legislation and management systems specific to manual handling activities and the use of mechanical handling or lifting plant and equipment specific to steelfixing activities. On completion of this unit the learner will know a typical organisation's measures and procedures, that they put in place to avoid and/or reduce the risks associated with manual handling and lifting operations and to inform the safe working practices that should be adopted by the learner when moving, lifting, handling and storing reinforcing steel, associated materials, equipment and resources

Assessment and evidence requirements

Learners must provide evidence against all of the assessment criteria; the evidence for this unit will come from **two** main sources; direct evidence produced by the learner demonstrating compliance with health and safety legislation, statutory regulations and office guidance and good practice that relates to moving, lifting, handling and storing reinforcement steel and associated materials, equipment and resources when completing the practical exercises, whilst the underpinning knowledge and understanding can be demonstrated through a variety of assessment methods.

The direct evidence includes naturally occurring documentary evidence (hard copy and electronic), and direct observation of activities that can be evidenced through either digital recordings, assessor observation reports, witness statements, etc.

Underpinning knowledge and understanding can be evidenced through a variety of assessment methods including; multiple choices testing and question and answer exercises (electronic or paper-based).

Additional evidence requirements

To complete this unit, the learner will not only need to demonstrate that they have met the main learning outcomes and assessment criteria but will also need to provide evidence that they have gained a knowledge and understanding of the all of the additional specifications stated under the specific learning outcomes (LO) and assessment criteria (AC) listed below:

LO 1: Know the requirements for working safely when moving, lifting, handling or storing reinforcement steel, prefabricated units and associated materials, equipment and resources.

AC1.1: State the current Health and Safety legislation, statutory regulations, official guidance and organisational procedures that apply when lifting, moving, handling and storing reinforcement steel, prefabricated units and associated materials, equipment and resources.

Compliance with the following Health and Safety legislation, statutory regulations and official guidance must be covered as a minimum as part of the assessment criteria:

General workplace:

- HASAW Act 1974
- Construction (Health, Safety & Welfare) Regulations 1996
- PPE at Work Regulations 1992
- Control of Noise at Work Regulations 2005
- Control of Vibration at Work Regulations 2005
- Health and Safety First Aid Regulations 1981
- RIDDOR 1995
- HSE Guidance Notes
- Construction Industry Guidance Notes
- CIRIA and other Guides

Working at Height:

- Working at Height Regulations 2005

With tools and equipment:

- PUWER 1998

With movement / storage of materials by manual handling and mechanical lifting:

- Manual Handling Operations Regulations 1992
- LOLER 1998
- The organisations specific Lifting Operations Procedures and safe working practices

AC 1.3: State the typical safety hazards associated with lifting, moving, handling and storing reinforcement steel, prefabricated units and associated materials, equipment and resources explaining how these can be mitigated by applying appropriate risk control measures.

The typical risks associated with manual handling, lifting, moving and storing reinforcement that must be covered as a minimum as part of this assessment criteria include but are not limited to the following;

- Safe means of access
- Manual handling

- Lifting
- Working at height
- Severing of limbs
- Repetitive strain injury (RSI)
- Manual handling injuries, e.g. back injuries
- Slips, trips and falls
- Cuts and abrasions

LO 2: Be able to prepare for the safe moving, lifting, handling and storing of reinforcement steel, prefabricated units and associated materials, equipment and resources.

AC 2.2: Select the correct personal protective equipment (PPE) appropriate to the task being carried out when moving, lifting, handling and storing reinforcement steel, prefabricated units and associated materials, equipment and resources in accordance with legislation, official guidance and the risk assessment and method statement.

The use of the following standard personal protective equipment (PPE) must be covered as a minimum as part of the assessment criteria:

Safety Helmet

- Hi-vis vests
- Protective footwear
- Eye protection
- Hand protection
- Ear protection
- Safety overalls

AC 2.3: Carry out the required manual handling assessments for the lifting, moving and handling of typical reinforcement bar diameters, lengths and shapes including other materials, equipment and resources associated with fixing in situ and prefabricated reinforcement steel.

Learners must be able to carry out manual handling assessments for the lifting, moving and handling of typical reinforcement bar diameters, lengths and shapes. They should also be able to carry out similar assessments for other materials, equipment and resources associated with fixing insitu and prefabricated reinforcement steel that need to be moved by hand. The learner must demonstrate the completion of a manual handling assessment for **each** of the mandatory practical exercises.

Where required, compliance with the LOLER and PUWER statutory regulations and official guidance must be covered within each of the manual handling assessments

AC 2.4: Describe the typical lifting equipment and aids that are available for the safe lifting, moving and handling of reinforcing steel prefabricated units and associated materials, equipment and resources.

The learner is not expected to obtain an approved Slinger Signaller qualification as part of this overall steelfixing qualification as this is a specific qualification that would only be held by a selected number of individuals on site within a typical construction organisation and those individuals would be especially selected to carry out a Slinger Signaller role by the employing organisation.

However, the intention of this unit is to give the learner a basic knowledge and understanding of the typical lifting equipment and aids that are commonly available on a construction site for the safe lifting, moving and handling of loose reinforcement bars, bundles of bars, prefabricated units and associated materials, equipment and resources. The learner would also be expected to have a basic knowledge and understanding of the safe means of slinging typical items of reinforcement such as loose bars, bundles of bars and typical prefabricated reinforcement units as a result of carrying out each of the mandatory practical exercises.

This should include an ability to identify and mitigate the risks associated with the particular lifting, moving and handling operation being carried out and also an ability to assess and select the correct lifting equipment that should be used to safely lift typical loose reinforcement bars, bundles of bars and typical prefabricated reinforcement units. The learner should also be able to recognise when the incorrect lifting equipment and aids are being used for a particular reinforcement lifting operation and have the knowledge and confidence to stop any unsafe lifting practices in which they are either involved or have identified taking place on site.

AC 2.5: Explain the procedures for the management and control of lifting operations on site including the requirements for a Crane Appointed Person, Crane Supervisors and for qualified Slinger/Signallers to lift and move loads.

The learner should have a basic knowledge and understanding of the key requirements that have to be in place for carrying out lifting operations on a construction site in accordance with the Lifting Operations and Lifting Equipment Regulations, BS 7121 – Code of Practice for the Safe Use of Cranes and other official guidance documents. The learner should have a basic knowledge and understanding of the key appointments required for carrying out lifting operations on site such as the Crane Appointed Person, Crane Supervisor and Slinger/Signallers and their main duties and responsibilities, such that they have an appreciation of the process that needs to be followed prior to lifting any item of reinforcement or equipment on site. They should also have a clear understanding of what they are allowed and more importantly not allowed to do with regards to lifting and slinging and signalling operations on site.

LO 3: Be able to safely lift, move and handle reinforcement steel, prefabricated units and associated materials, equipment and resources.

AC 3.2: Demonstrate correct methods for the safe lifting, moving and handling of reinforcement steel, prefabricated units and associated materials, equipment and resources in accordance with organisational procedures and the risk assessment and method statement for the task being carried out.

The safe lifting, moving and handling of reinforcement steel, prefabricated units and associated materials, equipment and resources must include:

- Ensuring that loose bars, bundles of bars and cut and bent reinforcement are placed to allow adequate space for the identification, sorting and handling and moving of reinforcement.
- Ensuring that loose, bundled, cut and bent reinforcement and prefabricated units are stacked at a safe height.

AC 3.3: Demonstrate the correct methods for safely lifting, moving and handling of standard bundles of reinforcement

Standard bundles of reinforcement include:

- straight bar
- L-bars
- U-Bars
- Links
- Chairs
- Hooks

AC 3.5: Demonstrate the specific requirements for lifting, moving, handling and installing prefabricated reinforcement units.

The specific requirements for lifting, moving, handling and installing prefabricated reinforcement units must include:

- Selecting, installing and inspecting suitable types of load bearing ties, clamps, and lifting points etc. required for lifting.
- Assessing the centre of gravity and balance of the unit for safe lifting.
- Installing, additional bracing and/or strengthening bars and any other additional non-scheduled reinforcement required for safe lifting.
- Securing of any loose reinforcement required for splicing etc. within the element to prevent it from falling out.

LO 4: Know how to safely store reinforcement steel, prefabricated units and associated materials, equipment and resources

AC 4.2: Demonstrate the correct methods of storing reinforcement steel, prefabricated units and associated materials, equipment and resources

Evidence is require of demonstrating the correct methods of storing reinforcement steel, prefabricated units and associated materials, equipment and resources including: Ensuring that loose or bundled reinforcement is stored correctly on timber, on a suitable surface, clear of mud, water and contamination etc.

- Ensuring that adequate space is maintained between bundled or prefabricated reinforcement to allow it to be identified, sorted, lifted and moved.
- Ensuring that reinforcement is stored in the correct sequence for use on site.
- Ensuring that bundled or prefabricated reinforcement is correctly tagged to aid identification on site.
- Ensuring adequate protection is provided for the long term storage of bundled or prefabricated reinforcement.

LO 5: Know how to comply with relevant environmental legislation, COSHH legislation, organisational procedures and manufacturer's information relating to the disposal of waste resulting from steel fixing activities on site

AC 5.1: Explain how environmental legislation, COSHH legislation and manufacturer's information relates to the disposal of waste on site.

Compliance with the following current environmental, COSHH statutory regulations and official manufacturer's information relating to the disposal of waste on site must be covered as a minimum as part of the assessment criteria:

Statutory regulations:

- Current environmental, waste disposal & COSHH Legislation

Official guidance:

- British Standards
- Codes of Practice
- HSE Guidance Notes
- Environment Agency Guidance
- Other agencies such as Natural England etc.

Manufacturer's information:

- COSHH Data sheets.
- Plant, tools and equipment user manuals
- General construction materials associated with prefabrication of reinforcement
- Construction Industry Guidance

AC 5.2: Explain the organisation's procedures relating to responsible waste management

The organisation's procedures relating to responsible waste management must include as a minimum the following;

- Environmental Policy, Procedures & Plans
- Site Waste Management Plans
- Site environmental inspections and audits.
- Typical site environmental controls to include, waste segregation, COSHH bins, recycling, and hazardous waste disposal.

AC 5.3: Explain the correct disposal procedures for common waste associated with fixing insitu and prefabricated reinforcing steel

The correct disposal procedures for common waste associated with steelfixing must include as a minimum but are not limited to the following;

- Off-cuts of reinforcing bars
- Tying wire
- Concrete spacer blocks
- Timber
- Plastic
- COSHH items such as spray cans, oil/paint tins
- Oils and lubricants

3.2. Unit 3 - Interpretation of Construction Drawings, Specifications and other Relevant Information Required when Fixing Steel Insitu

Unit Title	Interpretation of Construction Drawings, Specifications and other Relevant Information Required when Fixing Steel Insitu
Ofqual unit reference number (code)	J/505/8159
Unit Level	Two
Unit Credit Value	5
Assessment Guidance	<p>This unit must be delivered and assessed in accordance with the NOCN Level 2 Diploma in Steelfixing Occupations (Construction) qualification specification. Specific attention must be paid to the following criteria:</p> <ul style="list-style-type: none"> • Delivery partners must have the training facilities and resources to support the creation of a comprehensive simulated civil engineering site. • Additional Knowledge, skills and experience requirements of Tutor/Assessors and Internal Verifiers, to ensure the delivery of the qualification to the required standards. • Mandatory practical exercise specifications. These exercises have been designed to simulate typical steelfixing activities that are likely to be carried out in the workplace. This unit must be assessed using simulated workplace evidence generated as the learner is interpreting construction drawings, specifications and other relevant information required whilst carrying out the fixing steel insitu practical exercises.

This unit has 11 learning outcomes.

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	The learner can:
1. Understand the role of drawings, schedules, specifications and other types of key construction documentation and information in relation to fixing steel insitu on site.	1.1. Identify drawings, schedules, specifications and other types of key construction documentation and information in terms of their function and application in relation to fixing steel insitu on site. 1.2. Explain the key information given by drawings, schedules, specifications and other types of key construction documentation and information in relation to fixing steel insitu on site. 1.3. Identify the key users of the drawings, schedules, specifications and other types of key construction

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	The learner can:
	<p>documentation and information in terms of work responsibility when fixing steel insitu on site.</p> <p>1.4. Describe the pros and cons of the different mediums that are used to display site construction documentation and information for fixing steel insitu on site.</p> <p>1.5. Explain the procedures for receiving, issuing and communicating key construction information and documentation including drawings, schedules, specifications, method statements and ITPs for fixing steel insitu on site.</p> <p>1.6. Explain the organisation's documentation updating and revisions procedure in relation to drawings, schedules and other types of key construction documentation and information including how to ensure that the correct revision is being used for fixing steel insitu on site.</p> <p>1.7. Describe the organisation's procedures for reporting errors, discrepancies and omissions on the drawings, schedules and other types of key construction documentation and information including how these can be rectified when fixing steel insitu on site.</p> <p>1.8. Explain the organisation's procedures and the practical measures for ensuring that the security and confidentiality of construction documentation and information is maintained at all times when fixing steel insitu on site.</p>
<p>2. Be able to interpret drawings to identify the location of work areas for fixing steel insitu on site in relation to project gridlines.</p>	<p>2.1. Identify the location of a specific drawing in relation to the overall project grid system across a wide range of drawing types from the simple to the complex when fixing steel insitu on site.</p> <p>2.2. Identify the location of a number of different work areas of reinforcement in relation to the location drawing and the overall site grid system across a wide range of drawing types from the simple to the complex when fixing steel insitu on site.</p>
<p>3. Be able to interpret concrete general arrangement (GA) drawings in relation to fixing steel insitu on site.</p>	<p>3.1. Explain the scale used on a concrete GA drawing in relation to fixing steel insitu on site.</p> <p>3.2. Use the general arrangement drawings to interpret the dimensions of the element being constructed including beams, bases, columns, slabs, walls and staircases, when fixing steel insitu on site specifically:</p> <ul style="list-style-type: none"> a) Plan dimensions b) Lengths c) Depth d) Width e) Heights f) Thicknesses

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	The learner can:
	<ul style="list-style-type: none"> g) Voids and box-outs h) Complex shapes.
<p>4. Be able to interpret the reinforced concrete detail drawings and standard formats of bending schedules.</p>	<p>4.1. Use the reinforced concrete drawings and bending schedules to interpret the following information for fixing typical insitu reinforcement elements:</p> <ul style="list-style-type: none"> a) Member b) Bar marks c) Bar grade d) Bar diameters e) Shape codes f) Number of bars g) Lengths h) Spacing i) Cover j) Splice lengths k) Coupler location and types l) Shear/blast link requirements m) Chairs n) Trimming steel.
<p>5. Be able to interpret cast-in item and embedment drawings and schedules using them to identify the interface between embedded items and insitu reinforcement.</p>	<p>5.1. Use the cast-in item and embedment drawings to interpret the following information for individual embedments:</p> <ul style="list-style-type: none"> a) Type b) Size c) Grade d) Material e) Location f) Level g) Orientation/angle h) Tolerance i) Interface with reinforcement. <p>5.2. Explain the procedures for identifying and reporting clashes between embedded items and insitu reinforcement to allow them to be resolved.</p>
<p>6. Be able to interpret manufacturers' information relating to other components used to install insitu reinforcement on site.</p>	<p>6.1. Interpret the manufacturers' information to explain the correct use and installation of common components used to install insitu reinforcement steel on site.</p>
<p>7. Be able to interpret installation sequence drawings for the installation of insitu reinforcement on site.</p>	<p>7.1. Explain why the correct installation sequence is important for fixing insitu reinforcing steel on site.</p> <p>7.2. Use the installation sequence drawings to interpret the order of bar and coupler installation from the sequence.</p>

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	The learner can:
<p>8. Understand temporary works drawings and equipment.</p>	<p>8.1. Explain what temporary works are and when temporary works drawings and equipment would be used in relation to the installation of insitu reinforcing steel on site.</p> <p>8.2. Explain the importance of temporary works and the implications of unauthorised interference with them when used in relation to the installation of insitu reinforcing steel on site.</p> <p>8.3. Explain the functions, installation and inspection of standard temporary works components relating to the installation of insitu reinforcing steel on site in accordance with the temporary works drawings including:</p> <ul style="list-style-type: none"> a) Ties b) Clamps c) Bolts d) Lifting devices. <p>8.4. Explain the types of interface between reinforcement and items of temporary works when fixing insitu reinforcing steel on site including:</p> <ul style="list-style-type: none"> a) Ties b) Props c) Lifting devices d) Anchors e) Bolts.
<p>9. Be able to use the specification to access information relevant to minimum standards for fixing reinforcement steel insitu.</p>	<p>9.1. Interpret the standard forms of specifications relevant to fixing insitu reinforcing steel on site.</p> <p>9.2. State why compliance with the specifications is important when fixing insitu reinforcing steel on site.</p> <p>9.3. Identify the key users of the specifications in terms of work responsibility in relation to fixing insitu reinforcing steel on site.</p> <p>9.4. Describe how the specification relates to drawings and other key construction information to support the build when fixing insitu reinforcing steel on site.</p> <p>9.5. Use specifications to identify information relevant to fixing insitu reinforcing steel including:</p> <ul style="list-style-type: none"> a) Concrete grade b) Cover c) Steel grades d) Splice lengths e) Testing requirements f) Tolerances g) Inspection requirements.
<p>10. Be able to use the ICT equipment and software likely to be encountered by operatives on site to access</p>	<p>10.1. Demonstrate how the common ICT equipment is used for sharing and viewing information on site in relation to fixing insitu reinforcing steel.</p>

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	The learner can:
information relevant to fixing insitu reinforcement on site.	10.2. Explain how this ICT equipment is currently used to aid the fixing of insitu reinforcing steel on site.
11. Use Building Information Modelling (BIM) viewer software and the information produced from the model to interpret details for fixing insitu reinforcement.	11.1. Describe what BIM is and how a BIM model is produced for use in fixing insitu reinforcing steel on site. 11.2. Describe the benefits of using a BIM software viewer as an aid to fixing insitu reinforcing steel on site. 11.3. Describe the types of 2D and 3D reinforcement drawing information that can be produced from the BIM model to support fixing insitu reinforcing steel on site. 11.4. Use a 3D model and the BIM viewer software to identify and interpret reinforced concrete detail information including: <ul style="list-style-type: none"> a) Bar shapes b) Bar lengths c) Bar diameters d) Coupler sizes, types, numbers and positions. e) Bar installation sequences f) Avoiding and overcoming clashes between bars and embedded items. 11.5. Interpret 2D and 3D construction information, construction sequences, visual method statements and drawings produced from a 3D BIM model for insitu steelfixing operations on site. 11.6. Describe how a steelfixer can input into the production and use of a 3D BIM model to support the installation of insitu reinforcing steel on site.

Unit 3: Interpretation of Construction Drawings, Specifications and other relevant information required when fixing steel insitu

Unit summary

Interpretation of construction drawings, specifications and other relevant information required when fixing reinforcing steel insitu is one of the underpinning knowledge units that has been designed to ensure the learner can interpret all of the information that a steelfixer needs to obtain, collate and interpret to inform and guide the work practices on site and achieve the successful execution of the task on time and to the required standards. This unit should be assessed through a mixture of theoretical exercises and demonstration during the mandatory practical exercises.

Assessment and evidence

Learners must provide evidence against all of the assessment criteria; the evidence for this unit will come from **two** main sources; direct evidence produced by the learner demonstrating knowledge and skills when completing the fixing insitu reinforcing steel practical exercises, whilst the underpinning knowledge and understanding can be demonstrated through a variety of assessment methods.

The direct evidence includes naturally occurring documentary evidence (hard copy and electronic), and direct observation of activities that can be evidenced through either digital recordings, assessor observation reports, witness statements, etc.

Underpinning knowledge and understanding can be evidenced through a variety of assessment methods including; multiple choice testing and question and answer exercises (electronic or paper-based).

Additional evidence requirements

To complete this unit, the learner will not **only** need to demonstrate that they have met the learning outcomes and assessment criteria but will also need to provide evidence that they have gained a knowledge and understanding of all of the additional specifications stated under the specific learning outcomes (LO) and assessment criteria (AC) listed below:

LO 1: Understand the role of drawings, schedules, specifications and other types of key construction documentation and information in relation to fixing steel insitu on site.

AC1.1: Identify drawings, schedules, specifications and other types of key construction documentation and information in terms of their function and application in relation to fixing steel insitu on site.

The typical drawings, schedules, specifications and other types of key construction documentation that must be covered as a minimum part of the assessment criteria include but are not limited to the following:

Drawings

- General arrangement drawings (Plans, Sections and Elevations etc.)
- Reinforced concrete drawings
- Cast-in item and embedment drawings
- Installation sequence drawings
- Temporary Works drawings

Specifications

- Standard forms of project specification
- National building specifications relevant to steel fixing

Schedules

- Bending schedules
- Component and embedded items schedules
- Programme schedules

Other Documentation

- Work plans
- Written Work Instructions
- Confirmations of Verbal Instructions (CVI's)
- Risk assessments, method statements and task sheets
- Manufacturers information
- Organisations policies and procedures

AC 1.2: Explain the key information given by drawings, schedules, specifications and other types of key construction documentation and information in relation to fixing steel insitu on site.

The learner should be able to identify, explain and interpret typical key items of construction information that can be obtained from drawings, schedules, specifications and other types of key construction documentation listed in AC 1.1 above and as specified in the unit itself.

AC 1.3: Identify the key users of the drawings, schedules, specifications and other types of key construction documentation and information in terms of work responsibility when fixing steel insitu on site.

The learner should know who are the key users of drawings, schedules, specifications and other types of key construction documentation listed in AC 1.1 above on a construction site. These might include but are not limited to the following:

- The Client
- The Designer
- Project Manager
- Construction Manager
- Engineers
- Quality Managers / Inspectors
- Planners
- Commercial Manager
- Logistics Manager
- General and Trade Foreman
- Gangers /Supervisors
- Steelfixing Operatives

LO 2: Interpret drawings to identify the location of work areas for fixing steel insitu on site in relation to project gridlines.

AC 2.1: Identify the location of a specific drawing in relation to the overall project grid system across a wide range of drawings types from the simple to the complex when fixing steel insitu on site.

The learner must be able access information relevant to fixing insitu reinforcement steel on site by interpreting traditional hard copy, paper based drawing systems as well as being able to view common electronic drawing formats using common types of electronic viewing devices and software likely to be encountered by operatives on a construction site. This will include the use of hand-held and robust site tablets and standard ICT equipment along with typical CAD and Building Information Modelling (BIM) viewer software to interpret both 2D and 3D drawing information, as well as to support evidence collection for this unit.

As part of the assessment criteria, the learner must be able to identify the location of a specific work area on site in relation to the overall project grid system for different types of drawings from the simple to the complex.

AC 2.2: Identify the location of a number of different work areas of reinforcement in relation to the location drawing and the overall site grid system across a wide range of drawing types from the simple to the complex when fixing steel insitu on site.

The learner must be able access information relevant to fixing insitu reinforcement steel in a particular location on site by interpreting traditional hard copy, paper based drawing systems as well as being able to view common electronic drawing formats using common types of electronic viewing devices and software likely to be encountered by operatives on

a construction site. This will include the use of hand-held and robust site tablets and standard ICT equipment along with typical CAD and Building Information Modelling (BIM) viewer software to interpret both 2D and 3D drawing information, as well as to support evidence collection for this unit.

As for AC 2.1 above, the learner must be able to identify the location of a specific area of reinforcement on site in relation to the General Arrangement drawings for a particular area of the project and the overall project grid system for different types of drawings from the simple to the complex.

LO 6: Be able to interpret manufacturers' information relating to other components used to install insitu reinforcement on site.

AC 6.1: Follow the manufacturers' information to explain the correct use and installation of common components used to install insitu reinforcement steel on site

Common components used when installing reinforcement steel on site include:

- Reinforcement couplers – threaded & MBT
- Continuity strips
- Expanded Metal stop ends
- Lifting eyes/points
- Cast-in items and embedments
- Spacer block, tying wire and chairs etc.
- Clamps, bolts, wire slings, tie rods etc.

Clear evidence must be included of explanations of the correct use and installation of these components, using hand tools, power tools and other equipment and demonstrating awareness of COSHH where appropriate.

LO10: Be able to use the ICT equipment and software likely to be encountered by operatives on site to access information relevant to fixing in situ reinforcement on site.

AC 10.1: Demonstrate how common ICT equipment is used for sharing and viewing information on site and how this is currently used to aid the fixing of insitu reinforcing steel on site.

The use of the following standard ICT equipment must be covered as a minimum as part of the assessment criteria:

- Standard laptop/desktop
- Typical tablet computer
- Rugged site tablets / handheld devices e.g. Trimble

3.3. Unit 4 - Fixing Insitu Reinforcing Steel

Unit Title	Fixing Insitu Reinforcing Steel
Ofqual unit reference number (code)	F/505/8161
Unit Level	Two
Unit Credit Value	30
GLH	250
Assessment Guidance	<p>This unit must be delivered and assessed in accordance with the NOCN Level 2 Diploma in Steelfixing Occupations (Construction) qualification specification. Specific attention must be paid to the following criteria:</p> <ul style="list-style-type: none"> • Delivery partners must have the training facilities and resources to support the creation of a comprehensive simulated civil engineering site. • Additional Knowledge, skills and experience requirements of Tutor/Assessors and Internal Verifiers, to ensure the delivery of the qualification to the required standards. • Mandatory practical exercise specifications. These exercises have been designed to simulate typical steelfixing activities that are likely to be carried out in the workplace. This unit must be assessed using simulated workplace evidence generated as the learner is carrying out the practical exercises for fixing reinforcement steel insitu.

This unit has 11 learning outcomes.

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	The learner can:
1. Know the requirements for fixing insitu reinforcing steel.	1.1. Interpret drawings, schedules, specifications and other key information such as risk assessments, method statements, quality documentation and manufacturer's information relative to the insitu steelfixing task being carried out. 1.2. Explain the organisation's procedures for clarifying information, errors or discrepancies where required. 1.3. Explain the current Health and Safety legislation, statutory regulations, official guidance, and organisational procedures for the identification and mitigation of hazards, producing safe methods of work and for dealing with accidents, emergencies and problems when fixing insitu reinforcing steel.
2. Know how to prepare for fixing insitu reinforced steel	2.1. Select the correct Personal Protective Equipment (PPE) appropriate to the task being carried out in accordance

LEARNING OUTCOMES	ASSESSMENT CRITERIA
<p>The learner will:</p>	<p>The learner can:</p>
<p>by selecting the correct tools and equipment for the type of work being carried out.</p>	<p>with legislation, official guidance, the risk assessment and method statement and the specification when fixing insitu reinforcing steel.</p> <p>2.2. Select the correct hand tools, bending tools, portable power tools and other equipment required for the type of work being carried out in accordance with the risk assessment, method statement and specification when fixing insitu reinforcing steel.</p> <p>2.3. Describe the manufacturers' recommendations for use, inspection, care and maintenance of the tools and equipment relevant to the specific task being carried out when fixing insitu reinforcing steel.</p> <p>2.4. Explain the organisation's procedure for reporting problems associated with the resources, tools and equipment and how these are applied when fixing insitu reinforcing steel.</p>
<p>3. Be able to select the required quantity and quality of materials, components, fixings and resource for the method of work to fix insitu reinforcing steel.</p>	<p>3.1. Interpret the reinforced concrete detail drawings, specification and manufacturers' information to identify the correct types of materials, components and fixings for the fixing of typical insitu reinforcement elements.</p> <p>3.2. Demonstrate the correct selection of common types of materials, components and fixings in accordance with the drawing, specification and manufacturers' information for the fixing of typical insitu reinforcement elements including beams, bases, columns, slabs and walls.</p> <p>3.3. Describe the characteristics, qualities, uses, limitations and common causes of damage or defects associated with the materials, components, fixings and resources being used to fix insitu reinforcing steel.</p> <p>3.4. State the typical hazards associated with the materials, components, fixings and resources being used to fix insitu reinforcing steel, explaining how these can be mitigated by applying appropriate risk control measures and safe methods of work.</p> <p>3.5. Demonstrate the safe use, storage and handling of materials, components and fixings for the fixing of typical insitu reinforcement.</p> <p>3.6. Demonstrate how to calculate quantity, length, area and wastage associated with the methods and procedures for installing reinforcing steel or prefabricated reinforcing steel insitu.</p>
<p>4. Be able to comply with the given contract information to fix insitu reinforcing steel efficiently to given working</p>	<p>4.1. Demonstrate the work skills to sort, measure, mark out, fit, position and secure reinforcing steel in situ in accordance with the drawings, schedules and specifications.</p>

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	The learner can:
<p>instructions agreed quality criteria and tolerances in accordance with the drawings, schedules and specification.</p>	<p>4.2. Install reinforcement steel or prefabricated sections of reinforcement steel insitu to given working instructions, agreed quality criteria and tolerances in accordance with the given working instructions and the specification to form all of the following concrete structures:</p> <ul style="list-style-type: none"> a) Beams b) Bases c) Columns d) Slabs e) Staircases f) Walls.
<p>5. Be able to avoid risk and operate safe working practices when fixing insitu reinforcing steel.</p>	<p>5.1. Demonstrate compliance with the appropriate risk assessment, method statement and task sheet for the specific steelfixing activity being carried out.</p> <p>5.2. Demonstrate safe working practices when installing insitu reinforcing steel.</p> <p>5.3. Demonstrate the safe use and storage of materials, hand tools, bending tools, portable power tools and ancillary equipment when fixing insitu reinforcing steel.</p> <p>5.4. Explain the organisation's procedure for reporting problems associated with safe methods of work, establishing who has authority to rectify them.</p>
<p>6. Be able to complete the work within the allocated time in accordance with the agreed programme of work to meet the needs of other occupations and the client when fixing insitu reinforcing steel.</p>	<p>6.1. Demonstrate completion of the work within the allocated time in accordance with the agreed programme of work to meet the needs of other occupations and the client when fixing insitu reinforcing steel.</p> <p>6.2. State the purpose of the work programme explaining why deadlines should be adhered to.</p> <p>6.3. Explain the types of programme, progress charts and timetables that are available and how these can be used to plan work on site when fixing insitu reinforcing steel.</p> <p>6.4. Interpret programmes, progress charts, and timetables to obtain programme and progress information relative to the installation of insitu reinforcing steel.</p> <p>6.5. State the typical installation rates for fixing steel for standard bar sizes per ton per person per day.</p> <p>6.6. Explain the organisational procedures for reporting circumstances which will affect the work programme for fixing reinforcing steel insitu.</p>
<p>7. Be able to minimise the risk of damage to the work and surrounding area when fixing insitu reinforcing steel.</p>	<p>7.1. Explain the common causes and types of damage that can occur to the work and surrounding areas when fixing insitu reinforcing steel.</p> <p>7.2. Explain what good practices should be put in place to avoid damage occurring to the work and surrounding</p>

LEARNING OUTCOMES	ASSESSMENT CRITERIA
<p>The learner will:</p>	<p>The learner can:</p>
	<p>areas as a result of general workplace activities, other occupations and adverse weather conditions when fixing insitu reinforcing steel.</p> <p>7.3. Explain the standards of preparation required by other trades on the site prior to commencing steelfixing insitu.</p> <p>7.4. Demonstrate how to minimise damage by applying good practice and maintaining a clean work space for the specific task being carried out.</p>
<p>8. Be able to dispose of waste associated with fixing insitu reinforcing steel in accordance with current environmental legislation, organisational procedures, manufacturers' information and official guidance.</p>	<p>8.1. Explain how environmental legislation and COSHH legislation relates to the disposal of waste on site.</p> <p>8.2. Explain the correct disposal procedures for common waste materials associated with fixing insitu and prefabricated reinforcing steel.</p> <p>8.3. Explain why it is important to follow the correct disposal procedures for common waste associated with steelfixing.</p>
<p>9. Be able to comply with the organisation's security procedures for protecting the site, workplace, company, sensitive information and the operative when fixing insitu and prefabricated reinforcing steel.</p>	<p>9.1. Explain the organisation's security procedures for protecting the site, workplace, company, sensitive information and the operative, including how the procedures are implemented for partially complete or completed work, plant, tools and equipment when fixing insitu and prefabricated reinforcing steel.</p> <p>9.2. Explain the organisation's procedures for reporting breaches of security to the relevant authorities when fixing insitu and prefabricated reinforcing steel.</p>
<p>10. Be able to complete work to agreed quality criteria in accordance with the requirements of the specification for fixing insitu reinforcing steel.</p>	<p>10.1. Demonstrate compliance with agreed quality criteria as stated in the specification for fixing insitu reinforcing steel.</p> <p>10.2. Extract quality criteria from the specification for fixing insitu reinforcing steel.</p> <p>10.3. Identify types and grades of steel and other materials associated with fixing reinforcing steel insitu.</p> <p>10.4. Work to given tolerances when fixing reinforcing steel insitu.</p>
<p>11. Understand the importance of working with other occupations when fixing insitu reinforcing steel.</p>	<p>11.1. Explain the needs of other occupations in relation to fixing reinforcing steel insitu.</p> <p>11.2. Demonstrate effective communication with other occupations when fixing insitu reinforcing steel.</p> <p>11.3. Explain the importance of teamwork when fixing insitu reinforcing steel.</p> <p>11.4. Demonstrate effective teamwork when fixing reinforcing steel insitu and installing prefabricated reinforcement sections.</p>

Unit 4: Fixing Insitu Reinforcing Steel

Unit summary

Fixing insitu reinforcing steel is one of the main practical skills required by steelfixers. Fixing reinforcement is a practical, “hands on” trade that cannot be taught through structured classroom learning alone and as such, this unit has been designed to be assessed through the learners spending a significant amount of time during the course completing practical exercises in accordance with the ‘fixing insitu reinforcing steel’ practical exercise specification. The exercises are designed to be realistic representations of typical steel fixing situations that the learners are likely to encounter on most construction sites and they will be delivered in a realistic, simulated environment that portrays the conditions that they are likely to encounter on a typical construction site.

The practical exercises, combined with the structured learning of basic steel fixing skills at the start of the course, will prepare the learner with demonstrable work skills, which combined with the realistic nature of the training environment, are easily transferred to carrying out typical fixing insitu reinforcing steel tasks on most construction sites.

Assessment and evidence

Learners must provide evidence against all of the assessment criteria; the evidence for this unit will come from **two** main sources; direct evidence produced by the learner demonstrating knowledge and skills when completing the fixing insitu reinforcing steel practical exercises, whilst the underpinning knowledge and understanding can be demonstrated through a variety of assessment methods.

The direct evidence includes naturally occurring documentary evidence (hard copy and electronic), and direct observation of activities that can be evidenced through either digital recordings, assessor observation reports, witness statements, etc.

Underpinning knowledge and understanding can be evidenced through a variety of assessment methods including; multiple choice testing and question and answer exercises (electronic or paper-based).

Additional evidence requirements

To complete this unit, the learner will not only need to demonstrate that they have met the main learning outcomes and assessment criteria but will also need to provide evidence that they have gained a knowledge and understanding of all of the additional specifications stated under the specific learning outcomes (LO) and assessment criteria (AC) listed below:

LO 1: Know the requirements for fixing insitu reinforcing steel

AC 1.1: Interpret drawings, schedules, specifications and other key information such as risk assessments, method statements, quality documentation and manufacturer's information relative to insitu steel fixing task being carried out.

The typical drawings, schedules, specifications and other types of key construction documentation that must be covered as a minimum part of the assessment criteria, must include, but are not limited to, the following:

Drawings

- General arrangement drawings (Plans, Sections and Elevations etc.)
- Reinforced concrete drawings
- Cast-in item and embedment drawings
- Installation sequence drawings
- Temporary Works drawings

Specifications

- Standard forms of project specification
- National building specifications relevant to steel fixing

Schedules

- Bending schedules
- Component and embedded items schedules
- Programme schedules

Other Documentation

- Work plans
- Written Work Instructions
- Confirmations of Verbal Instructions (CVI's)
- Risk assessments, method statements and task sheets
- Manufacturers information
- Organisations policies and procedures

AC 1.3: Explain the current Health and Safety legislation, statutory regulations, official guidance, and organisational procedures for the identification and mitigation of hazards, producing safe methods of work and for dealing with accidents, emergencies and problems when fixing insitu reinforcing steel.

in the following situations:

- General workplace
- Below ground
- In confined spaces
- Working at height
- With tools and equipment

- With materials and substances
- With the movement and storage of materials by manual handling and mechanical lifting.

Compliance with the following Health and Safety legislation, statutory regulations and official guidance must be covered as a minimum as part of the assessment criteria.

General workplace:

- HASAW Act 1974
- Construction (Health, Safety & Welfare) Regulations 1996
- PPE at Work Regulations 1992
- Control of Noise at Work Regulations 2005
- Control of Vibration at Work Regulations 2005
- Health and Safety First Aid Regulations 1981
- RIDDOR 1995
- HSE Guidance Notes
- Construction Industry Guidance Notes
- CIRIA and other Guides

Below ground

- CIRIA Report 97 – Trenching Practice

Confined spaces

- Confined Spaces Regulations 1997

Working at Height

- Working at Height Regulations 2005

With tools and equipment

- PUWER 1998

With materials and substances

- COSHH Regulations 2002
- Hazardous Materials Regulations

With movement / storage of materials by manual handling and mechanical lifting

- Manual Handling Operations Regulations 1992
- LOLER 1998

LO 2: Know how to prepare for fixing insitu reinforced steel by selecting the correct tools and equipment for the type of work being carried out

AC 2.1: Select the correct personal protective equipment (PPE) appropriate to the task being carried out in accordance with legislation, official guidance, the risk assessment and method statement and the specification when fixing insitu reinforcing steel.

The use of the following standard personal protective equipment (PPE) must be covered as a minimum as part of the assessment criteria:

- Safety Helmet
- Hi-vis vests
- Protective footwear
- Eye protection
- Hand protection
- Ear protection
- Safety overalls

AC 2.2: Select the correct hand tools, bending tools, portable power tools and other equipment required for the type of work being carried out in accordance with the risk assessment, method statement and specification when fixing insitu reinforcing steel.

When selecting the tools, in accordance with the criteria above, the learner must be able to correctly identify and select the required tools and equipment for the type of work being carried out and demonstrate the ability to inspect all of the tools selected to ensure that they are of good condition, safe to use and fit for purpose. They must also be able to demonstrate the correct inspection, care, maintenance and storage of the tools and equipment required for fixing insitu reinforcing steel.

AC 2.3: Describe the manufacturers' recommendations for use, inspection, care and maintenance of the tools and equipment relevant to the specific task being carried out when fixing insitu reinforcing steel.

This must include as a minimum:

- nips,
- hammers,
- tapes,
- disc cutters,
- grinders,
- hand/power benders,
- torque wrenches

LO 3: Be able to select the required quantity and quality of materials, components, fixings and resource for the method of work to fix insitu reinforcing steel.

AC 3.1: Interpret the reinforced concrete detail drawings, specification and manufacturers' information to identify the correct types of materials, components and fixings for the fixing of typical in situ reinforcement elements

This must include the following:

- beams

- bases
- columns
- slabs
- walls

AC 3.2: Demonstrate the correct selection of common types of materials, components and fixings in accordance with the drawing, specification and manufacturer's information for the fixing of typical insitu reinforcement elements including beams, bases, columns, slabs and walls

This must include:

- Pre-cut and bent components
- Reinforcement grades
- Tying wire
- Spacer blocks
- Chairs
- Reinforcement couplers – threaded & MBT
- Continuity strips
- Expanded Metal stop ends
- Lifting eyes/points
- Clamps
- Cast-in items / embedment

When selecting the common types of materials, components and fixings listed, the learner must be able to correctly identify and select the items required for the type of work being carried out and demonstrate the ability to inspect all of the items selected to ensure that they are of good condition, safe to use and fit for purpose. They must also be able to demonstrate the correct inspection care, maintenance and storage of the items required for fixing insitu reinforcing steel.

AC 3.4: State the typical hazards associated with the materials, components, fixings and resources being used to fix insitu reinforcing steel explaining how these can be mitigated by applying appropriate risk control measures and safe methods of work.

The learner must understand the typical risks associated with steelfixing. The risks that must be covered as a minimum as part of the assessment criteria include but are not limited to the following;

- Safe means of access
- Manual handling
- Lifting
- Working at height
- Fire hazards and Hot Works
- Spillages and COSHH incidents
- Confined spaces
- Severing of limbs

- Collapse of structures
- Working below ground
- Service strike/damage
- Moving plant and vehicles
- Repetitive strain injury (RSI)
- Manual handling injuries, e.g. back injuries
- Vibration white finger (VWF)
- Slips, trips and falls
- Cuts and abrasions
- Weils disease (Leptospirosis)
- Animal faeces
- Cold and heat injuries (Exposure, sunstroke, dehydration)
- Ground contamination
- Collapse of excavations
- Temporary works

LO 4: Be able to comply with the given contract information to fix insitu reinforcing steel efficiently to given working instructions, agreed quality criteria and tolerances in accordance with the drawings, schedules and specification.

AC 4.1: Demonstrate the work skills to sort, measure, mark out, fit, position and secure reinforcing steel insitu in accordance with the drawings, schedules and specifications

The learner must be able to demonstrate all of the following work skills when sorting, measuring, marking out, fitting, positioning and securing reinforcing steel insitu:

Sort:

- Interpret bending schedules and delivery tickets.
- Safe lifting, moving and handling of reinforcement.
- Identify different bar marks.
- Identify grades and types of steel.
- Identify types of couplers.
- Inspect reinforcement and associated materials and ancillary items for damage and quality defects.
- Sort reinforcement in to work packages to suit the installation sequence.
- Identify missing bar marks or elements.
- Ensure that the required quality and testing documentation has been obtained.
- Ensure that reinforcement is stored correctly.

Measure:

- The quantity and number of bars.
- Diameter.
- Length.
- Weight (Tonnage).

- Bending dimensions and radii.
- Tolerances of cut and bent reinforcement are in accordance with BS8666.
- Sizes and types of coupler that have been delivered.

Mark out:

- Interpret setting out marks provided by others.
- Position and levels of reinforcement.
- Bar centres and spacings.
- Setting out tolerances for position and level of reinforcement.
- Bar mark start and finish points (Location).
- Spacer blocks positions.
- Cover requirements.
- Starter bars.
- Lap lengths and positions of staggered laps.
- Line and level of embedded items.
- Line and level of openings, boxouts and voids.
- Position and level of couplers.

Fit, Position and Secure:

- Using the correct and most efficient installation sequence.
- The correct bar marks and shape codes.
- The correct quantity and number of bars.
- In the correct location and within tolerance
- The correct number and type of ties
- Any temporary reinforcement required for stability during installation
- Suitable spacer blocks to provide the correct cover.
- Suitable chairs to adequately support the reinforcement.
- Any temporary support and bracing for reinforcement and embedded items
- Any temporary works items required for reinforcement or follow-on operations.

AC 4.2: Install reinforcement steel or prefabricated sections of reinforcement steel insitu to given working instructions, agreed quality criteria and tolerances in accordance with the given working instructions and the specification to form all of the following concrete structures:

- Beams
- Bases
- Columns
- Slabs
- Staircases
- Walls.

The learners must also be able to demonstrate a knowledge and understanding of how to prepare for and safely and correctly install insitu reinforcement including the following:

Relate shaped steel to bending schedules:

- Interpret standard formats of bending schedules including identifying and interpreting, member, bar marks, type and diameter, numbers of, shape codes, bar grade, lengths, coupler types, shear/blast link details, chairs, trimming steel to determine the correct installation of the reinforcement on site.

Identify the correct sequence of fixing reinforcement in situ:

- Interpret reinforcement and installation sequence drawings to determine the correct installation sequence of reinforcement on site.

Identify integration and interface with embedded items:

- Identify and interpret the type, size, grade, material, location, level, orientation/angle and tolerance of any cast-in items or embedments to be incorporated within the insitu reinforcement.
- Identify the interface between the embedded items and the reinforcement and the most efficient point at which to install them within the insitu reinforcement.

Prepare mesh for insitu installation:

- Identify and install different types, grades and sizes of mesh
- Inspection of mesh to identify quality issues
- Lifting, storage and handling of mesh including manual handling
- Cutting and trimming mesh to shape
- Typical support arrangements for mesh in slabs and walls using the correct types of spacer.
- Laying, lapping and tying adjacent sheets of mesh particularly at joints between four sheets of mesh.

Prepare prefabricated steel sections for insitu installation:

- Setting up temporary fabrication jigs, support frames and stands for the prefabrication of typical prefabricated elements such as beams, bases, columns, slabs and walls.
- Ensure that methods of tying, securing and bracing the main reinforcement and loose tie-in items within the prefabricated element are agreed in advance.
- Ensure that lifting arrangements, methods, devices and cast-in items are agreed in advance.
- Ensure that the methods for providing stability of the prefabricated element when lifting from the horizontal to the vertical position and during transportation and installation are agreed in advance.
- Ensure that the methods of providing temporary support and stability of the prefabricated elements during installation are agreed in advance.
- An appreciation of prefabrication using welding and the inspection of welded prefabricated elements.
- An appreciation of rollmat, its uses, inspection and installation.

Install mesh, steel bar, spacers, cover blocks and ties insitu

Position chairs, cover blocks and spacers on site:

- Identify, select and position the correct number of chairs, cover blocks and spacers on site to allow the correct insitu installation of the prefabricated element within the works.

Secure reinforcement steel insitu:

- Using the correct and most efficient installation sequence.
- The correct bar marks and shape codes.
- The correct quantity and number of bars.
- In the correct location and within tolerance.
- The correct number and type of ties.
- Any temporary reinforcement required for stability during installation.
- Suitable spacer blocks to provide the correct cover.
- Suitable chairs to adequately support the reinforcement.
- Any temporary support and bracing for reinforcement and embedded items.
- Any temporary works items required for reinforcement or follow-on operations.

Secure prefabricated sections of reinforcement steel insitu:

- Establishing the correct and most efficient Installation sequence to suit prefabrication.
- The correct number and type of ties including specific load bearing ties required for lifting, moving and installation.
- Assess the requirement for and provide any temporary reinforcement required for stability during and installation of the element such as longitudinal diagonal bracing bars and cross bracing to prevent racking and additional links or chairs to provide support during manufacture.
- Provide suitable spacer blocks to provide the correct cover.
- Provide suitable chairs to adequately support the reinforcement during installation
- Assess the requirement for and provide any temporary fixings, support and bracing required for the installation of embedded items to ensure that they are in the correct location, level, orientation/angle and within tolerance.
- Assess the requirement for and provide any temporary works items required for the installation on site.
- Assess the requirement for and provide any additional lifting points or specific load bearing ties for lifting the prefabricated elements from the horizontal to the vertical position, placing and orientation of element off delivery trailers and lifting the elements in to their final position on site.

Incorporate reinforcement coupler and continuity systems:

- Identify and interpret the correct type, size, grade, material, location, level, orientation/angle and tolerance of any reinforcement couplers or continuity systems to be incorporated in to the prefabricated element.
- Identify the interface between these items and the reinforcement and the most efficient point at which to install them within the prefabricated element installation sequence.

LO 5: Be able to avoid risk and operate safe working practices when fixing insitu reinforcing steel.

AC 5.2: Demonstrate safe working practices, when installing insitu reinforcing steel:

The following list of safe working practices must be included:

- Manual handling of reinforcement, materials, components, fixings and embedments.
- Identifying and following installation sequences for insitu reinforcement.
- Incorporating embedded items in to prefabricated reinforcement sections.
- Preparing mesh and steel bar for insitu installation.
- Carrying out hot works including procedures, permits, precautions and emergencies.
- Preparing prefabricated steel sections for insitu installation.
- Incorporating embedded items in to insitu reinforcement sections.
- Installing mesh, steel bar, spacers, cover block and ties in situ.
- Positioning chairs, cover blocks and spacers.
- Securing reinforcement steel insitu.
- Securing prefabricated sections of reinforcement steel insitu.
- Incorporating reinforcement coupler and continuity systems.
- Lifting, moving and positioning steel.
- Sorting, storing and protecting steel, components and fixings.
- Using hand tools, power tools and equipment.
- Working at height.
- Safe means of access and safe use of access equipment.

LO7: Be able to minimise the risk of damage to the work and surrounding area when fixing insitu reinforcing steel

AC 7.1: Explain the common causes and types of damage that can occur to the work and surrounding areas when fixing insitu reinforcing steel

The learner must be able to demonstrate a knowledge and understanding of all of the items listed below when explaining the common causes and types of damage that can occur to the work and surrounding areas. They must also know how to minimise damage and maintain their workspace and the surrounding area in a clean condition when fixing insitu reinforcing steel.

Workspace:

Reinforcement and Ancillary Items:

- Protection from deformation and impact
- Protection from contamination from oil, paint, retarders, concrete spillage etc.
- Protection from hot works or cutting.

Couplers:

- Protection from deformation and impact.
- Protection of threads (male and female ends)
- Ensure protection caps are in place.
- Taping and greasing if required.

Embedded Items:

- Protection from deformation and impact.
- Protection of fixings/connections.
- Taping and greasing if required.
- Protection of templates and end plates.

Temporary Supports:

- Protection from deformation and impact
- Protection of fixings/connections.
- Protection from hot works or cutting.

Surrounding Area:

- Temporary works.
- Access routes
- Plant, tools and equipment
- Previously completed works
- Other contractors works

Minimise damage and maintain a clean work space:

- Reasons for maintaining a clean work space.
- What a good clean work space looks like.
- Maintaining safe, adequate and clear access and egress routes including trip hazards.
- Safe storage of materials.
- Safe storage and use of tools and equipment.
- Adequate task lighting.
- Regular work space inspections e.g. LOR Take 5 initiative.
- Materials ordering and management within the work space.
- Storage of COSHH

AC 7.3: Explain the standards of preparation required by other trades on the site prior to commencing steel-fixing insitu

The learner must be able to describe the basic roles and responsibilities of the other trades listed below and how they interface with them during normal steelfixing activities.

The other trades are to include, but are not limited to:

- Engineers
- Ground Workers & General Labourers
- Carpenters

- Concreters
- Steel erectors
- Crane operators and Slinger Signaller
- Plant operators
- Delivery Drivers

LO 8: Be able to dispose of waste associated with fixing insitu reinforcing steel in accordance with current environmental legislation, organisational procedures, manufacturers information and official guidance.

AC 8.1: Explain how environmental legislation and COSHH legislation relates to the disposal of waste on site

Compliance with the following current environmental and COSHH statutory regulations and official guidance relating to the disposal of waste on site must be covered as a minimum as part of the assessment criteria:

Statutory regulations:

- Current environmental, waste disposal & COSHH Legislation

Official guidance:

- British Standards
- Codes of Practice
- HSE Guidance Notes
- Environment Agency Guidance
- Other agencies such as Natural England, etc.

Organisational procedures:

- Environmental Policy, Procedures & Plans
- Site Waste Management Plans
- Site environmental inspections and audits.
- Typical site environmental controls including, waste segregation, COSHH bins, recycling, hazardous waste disposal.

Manufacturer's information:

- COSHH Data sheets.
- Plant, tools and equipment user manuals
- General construction materials associated with fixing in situ reinforcement
- Construction Industry Guidance

AC 8.2: Explain the correct disposal procedures for common waste associated with fixing insitu and prefabricated reinforcing steel

The learner must be able to demonstrate the correct disposal procedures for common waste associated with steelfixing must include as a minimum but are not limited to the following materials:

- Off-cuts of reinforcing bars.
- Tying wire.
- Concrete spacer blocks.
- Timber.
- Plastic.
- COSHH items such as spray cans, oil/paint tins,
- Oils and lubricants.

LO 9: Be able to comply with the organisation's security procedures for protecting the site, workplace, company, sensitive information and the operative when fixing insitu and prefabricated reinforcing steel.

AC 9.1: Explain the organisation's security procedures for protecting the site, workplace, company, sensitive information and the operative including how the procedures are implemented for partially complete or completed work, plant, tools and equipment when fixing insitu and prefabricated reinforcing steel.

The learner must be able to demonstrate a knowledge and understanding of an organisation's procedure for protecting personal security and security of the site, workplace, partially completed or completed work, plant, tools and equipment, sensitive information and how to report breaches of security to the relevant authorities. This should also include the following:

- How the security procedures affect them personally, their responsibilities under those procedures, the disciplinary procedures and on-going commitments to security after leaving the project.
- The typical threats to personal and project security such as terrorist, activists, the press, blackmail, bribery, etc.

LO 10: Be able to complete work to agreed quality criteria in accordance with the requirements of the specification

AC 10.1: Demonstrate compliance with agreed quality criteria as stated in the specification for fixing insitu reinforcing steel.

The learner must be able to demonstrate compliance with the following specification requirements as a minimum:

- Length of bars is within tolerance
- Bar centres and spacings.
- Bar size and diameter
- Steel grade
- Position and levels of reinforcement.
- Cover requirements
- Quantity and number of bars
- Bending dimensions and radii
- Sizes, types, positions and levels of couplers
- Setting out tolerances for position and level of reinforcement
- Starter bars
- Lap lengths and positions of staggered laps.
- Embedded items.
- Required quality and testing documentation and as-built information
- Tolerances of cut and bent reinforcement are in accordance with BS8666.

AC 10.3: Identify types and grades of steel and other materials associated with fixing reinforcing steel insitu.

The learner must be able to identify the following grades of steel as a minimum:

- Mild steel
- High yield steel Types H, A, B, C, material properties/differences, different rib patterns
- Reinforcing Mesh
- Galvanised Reinforcement
- Stainless Steel Reinforcement (S type)
- Epoxy coated reinforcement
- Cryo reinforcement (X-type)
- Identifying CARES Approved Reinforcement – CARES marking system, country of origin and mill
- Specialist types of bar, Dywidag, GEWI and Macalloy bars etc.

AC 10.4: Work to given tolerances when fixing reinforcing steel insitu.

The learner must be able to demonstrate a knowledge, understanding and ability to work to given tolerances for the following;

- Length
- Bar spacings
- Bar size/diameter
- Cover
- Bending dimensions / radii
- Sizes, types, positions and levels of couplers

- Position and level of reinforcement
- Starter bar positions and levels
- Lap lengths and positions of staggered laps.
- Embedded items
- Openings, boxouts and voids

LO 11: Understand the importance of working with other occupations when fixing in situ reinforcing steel

AC 11.1: Explain the needs of other occupations in relation to fixing reinforcing steel in situ

The learner must be able to describe the basic needs of the other trades listed below and how they interface with them during normal steelfixing activities. The other trades are to include, but are not limited to:

- Engineers
- Ground Workers & General Labourers
- Carpenters
- Concreters
- Steel erectors
- Crane operators and Slinger Signallers
- Plant operators
- Delivery Drivers

3.4. Unit 5 - Interpretation of Construction Drawings, Specifications and other Relevant Information Required for Prefabricating Reinforcement Steel Sections

Unit Title	Interpretation of Construction Drawings, Specifications and other Relevant Information Required for Prefabricating Reinforcement Steel Sections
Ofqual unit reference number (code)	J/505/8162
Unit Level	Two
Unit Credit Value	5
GLH	35
Assessment Guidance	<p>This unit must be delivered and assessed in accordance with the NOCN Level 2 Diploma in Steelfixing Occupations (Construction) qualification specification. Specific attention must be paid to the following criteria:</p> <ul style="list-style-type: none"> • Delivery partners must have the training facilities and resources to support the creation of a comprehensive simulated civil engineering site. • Additional Knowledge, skills and experience requirements of Tutor/Assessors and Internal Verifiers, to ensure the delivery of the qualification to the required standards. • Mandatory practical exercise specifications. These exercises have been designed to simulate typical steelfixing activities that are likely to be carried out in the workplace. This unit must be assessed using simulated workplace evidence generated as the learner is interpreting construction drawings, specifications and other relevant information required for prefabricating reinforcement steel sections whilst carrying out the practical exercises.

This unit has 12 learning outcomes.

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	The learner can:
1. Understand the role of drawings, schedules, specifications and other types of key construction documentation and information in relation to prefabricating reinforcement steel sections on site.	1.1. Identify drawings, schedules, specifications and other types of key construction documentation and information in terms of their function and application in relation to prefabricating reinforcement steel sections on site. 1.2. Explain the key information given by drawings, schedules, specifications and other types of key construction documentation and information in relation to prefabricating reinforcement steel sections on site.

LEARNING OUTCOMES	ASSESSMENT CRITERIA
<p>The learner will:</p>	<p>The learner can:</p>
	<p>1.3. Identify the key users of the drawings, schedules, specifications and other types of key construction documentation and information in terms of work responsibility when prefabricating reinforcement steel sections on site.</p> <p>1.4. Describe the pros and cons of the different mediums that are used to display site construction documentation and information for prefabricating reinforcement steel sections on site.</p> <p>1.5. Explain the procedures for receiving, issuing and communicating key construction information and documentation including drawings, schedules, specifications, method statements and ITPs for prefabricating reinforcement steel sections on site.</p> <p>1.6. Explain the organisation’s documentation updating and revisions procedure in relation to drawings, schedules and other types of key construction documentation and information including how to ensure that the correct revision is being used for prefabricating reinforcement steel sections on site.</p> <p>1.7. Describe the organisation’s procedures for reporting errors, discrepancies and omissions on the drawings, schedules and other types of key construction documentation and information explaining how these can be rectified when prefabricating reinforcement steel sections on site.</p> <p>1.8. Explain the organisation’s procedures and the practical measures for ensuring that the security and confidentiality of construction documentation and information is maintained at all times when prefabricating reinforcement steel sections on site.</p>
<p>2. Be able to interpret drawings to identify the location of work areas in relation to project gridlines to establish the constraints on the use and installation of prefabricated reinforcement elements.</p>	<p>2.1. Identify the location of a specific drawing in relation to overall project grid system across a wide range of drawing types from the simple to the complex when prefabricating reinforcement steel sections on site.</p> <p>2.2. Identify the location of a number of different work areas of reinforcement in relation to the location plan and the overall site grid system across a wide range of drawing types from the simple to the complex when prefabricating reinforcement steel sections on site.</p> <p>2.3. Identify any restrictions placed on the use and installation of prefabricated elements that are dictated by the specific work area including access and logistics constraints, height and location of work area and lifting constraints and restrictions.</p>

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	The learner can:
<p>3. Be able to interpret the concrete general arrangement (GA) drawings.</p>	<p>3.1. Explain the scale used on a concrete GA drawing in relation to prefabricating reinforcement steel sections on site.</p> <p>3.2. Use the general arrangement drawings to interpret the element dimensions for manufacturing typical prefabricated reinforcement steel sections, including beams, bases, columns, slabs, walls and staircases specifically:</p> <ul style="list-style-type: none"> a) Plan dimensions b) Lengths c) Depth d) Width e) Heights f) Thicknesses g) Voids and box-outs h) Complex shapes.
<p>4. Be able to interpret the reinforced concrete detail drawings and standard formats of bending schedules.</p>	<p>4.1. Use the reinforced concrete drawings and bending schedules to interpret the following information for fixing prefabrication reinforcement elements:</p> <ul style="list-style-type: none"> a) Member b) Bar marks c) Bar grade d) Bar diameters e) Shape codes f) Number of bars g) Lengths h) Spacing i) Cover j) Splice lengths k) Coupler location and types l) Shear/blast link requirements m) Chairs n) Trimming steel.
<p>5. Be able to interpret the reinforced concrete detail drawings to identify suitable elements for prefabrication, the interfaces between elements and the installation sequence.</p>	<p>5.1. Use the drawings to identify prefabricated elements of suitable size and weight to suit the site access, logistics and lifting constraints.</p> <p>5.2. Identify the interfaces between prefabricated elements and the installation sequence of those elements including how they are connected together to maintain continuity between columns and beams and slabs and walls.</p> <p>5.3. Identify suitable loose bars to be fixed insitu to connect prefabricated elements together.</p> <p>5.4. Identify suitable sizes, numbers, types and positions of reinforcement couplers to connect prefabricated elements together.</p>

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	The learner can:
<p>6. Be able to interpret cast-in item and embedment drawings and schedules, using them to identify the interface between embedded items and the prefabricated reinforcement elements.</p>	<p>6.1. Use the cast-in item and embedment drawings to interpret the following information for individual embedments:</p> <ul style="list-style-type: none"> a) Type b) Size c) Grade d) Material e) Location f) Level g) Orientation/angle h) Tolerance i) Interface with reinforcement. <p>6.2. Identify the most suitable and efficient point at which the cast-in item and embedments need to be installed within the element to suit the prefabrication process.</p> <p>6.3. Identify specific components required for lifting, handling and moving prefabricated elements.</p> <p>6.4. Explain the procedures for identifying and reporting clashes between embedded items and the prefabricated element to allow them to be resolved.</p>
<p>7. Be able to interpret manufacturers' information relating to other components used to prefabricate reinforcement on site.</p>	<p>7.1. Interpret the manufacturers' information to explain the correct use and installation of common components used to prefabricate reinforcement steel sections on site.</p>
<p>8. Be able to interpret installation sequence drawings for the installation of prefabricated elements on site.</p>	<p>8.1. Explain why the correct installation sequence is important when installing prefabricated reinforcement steel sections on site.</p> <p>8.2. Use the installation sequence drawings to interpret the order of prefabricated element, loose fix bar and coupler installation from the sequence.</p>
<p>9. Understand temporary works drawings and equipment specifically relating to prefabrication and lifting of prefabricated steel sections.</p>	<p>9.1. Explain what temporary works are and when temporary works drawings and equipment would be used in relation to prefabrication and lifting of prefabricated reinforcement steel sections.</p> <p>9.2. Explain the importance of temporary works and the implications of interference when used in relation to the prefabrication and lifting of reinforcement steel sections.</p> <p>9.3. Explain the functions, installation and inspection of standard temporary works components relating to the prefabrication and lifting of reinforcement steel sections in accordance with the temporary works drawings including:</p> <ul style="list-style-type: none"> a) Ties b) Clamps

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	The learner can:
	<ul style="list-style-type: none"> c) Bolts d) Lifting devices. <p>9.4. Explain the types of interface between reinforcement and items of temporary works specifically relating to prefabrication and lifting of prefabricated steel section on site including:</p> <ul style="list-style-type: none"> a) Temporary assembly support frames b) Installation support frames c) Ties d) Props e) Lifting devices f) Temporary bracing g) Temporary supports for embedded items h) Specific access requirements.
<p>10. Be able to use the specification to access information relevant to minimum standards for the prefabrication of reinforcement.</p>	<p>10.1. Interpret the standard forms of specifications relevant to the prefabrication and lifting of reinforcement steel sections.</p> <p>10.2. State why compliance with the specifications is important when prefabricating and lifting reinforcement steel sections.</p> <p>10.3. Identify the key users of the specifications in terms of work responsibility in relation to the prefabrication and lifting of reinforcement steel sections.</p> <p>10.4. Describe how the specification relates to drawings and other key construction information to support the build when prefabricating and lifting reinforcement steel sections.</p> <p>10.5. Use specifications to identify information relevant to prefabricating and lifting reinforcement steel sections including:</p> <ul style="list-style-type: none"> a) Concrete grade b) Cover c) Steel grades d) Splice lengths e) Testing requirements f) Tolerances g) Inspection requirements.
<p>11. Be able to use the ICT equipment and software likely to be encountered by operatives on site to access information relevant to the prefabrication of reinforcement elements on site.</p>	<p>11.1. Demonstrate how common ICT equipment is used for sharing and viewing information on site relating to the prefabrication or reinforcement steel sections.</p> <p>11.2. Explain how this ICT equipment is currently used to aid the prefabrication and installation of reinforcement elements on site.</p>

LEARNING OUTCOMES	ASSESSMENT CRITERIA
<p>The learner will:</p>	<p>The learner can:</p>
<p>12. Be able to use Building Information Modelling (BIM) viewing software and the information produced from the model to interpret details for the prefabrication of reinforcement.</p>	<p>12.1. Describe what BIM is and how a BIM model is produced for use in manufacturing and installing prefabricated reinforcement steel sections on site.</p> <p>12.2. Describe the benefits of using a BIM software viewer as an aid to manufacturing and installing prefabricated reinforcement on site.</p> <p>12.3. Describe the types of 2D and 3D reinforcement drawing information that can be produced from the BIM model to support the manufacture and installation of prefabricated reinforcement on site.</p> <p>12.4. Use a 3D model and BIM viewing software to identify and interpret the following:</p> <ul style="list-style-type: none"> a) Suitable prefabricated elements b) Loose fix bars c) Coupler sizes, types, numbers and positions d) Installation sequences e) Avoiding and overcoming clashes between elements and embedded items. <p>12.5. Interpret 2D and 3D construction information, construction sequences, visual method statements and drawings produced from a 3D BIM model for the manufacture and installation of prefabricated reinforcement on site.</p> <p>12.6. Describe how a steelfixer can input into the production and use of a 3D BIM model to support the manufacture and installation of prefabricated reinforcement steel sections on site.</p>

Unit 5: Interpretation of Construction Drawings, Specifications and other relevant information required for prefabricating reinforcement steel sections

Unit summary

Interpretation of construction drawings, specifications and other relevant information required for prefabricating reinforcement steel sections is one of the underpinning knowledge units that has been designed to ensure the learner can interpret all of the information that a steelfixer needs to obtain, collate and interpret to inform and guide the work practices on site and achieve the successful execution of the task on time and to the required standards. This unit should be assessed through a mixture of theoretical exercises and demonstration during the mandatory practical exercises.

Assessment and evidence

Learners must provide evidence against all of the assessment criteria; the evidence for this unit will come from **two** main sources; direct evidence produced by the learner demonstrating knowledge and skills when completing the manufacture and installation of prefabrication reinforcement steel sections practical exercises, whilst the underpinning knowledge and understanding can be demonstrated through a variety of assessment methods.

The direct evidence includes naturally occurring documentary evidence (hard copy and electronic), and direct observation of activities that can be evidenced through either digital recordings, assessor observation reports, witness statements, etc.

Underpinning knowledge and understanding can be evidenced through a variety of assessment methods including; multiple choice testing and question and answer exercises (electronic or paper-based).

Additional evidence requirements

To complete this unit, the learner will not only need to demonstrate that they have met the main learning outcomes and assessment criteria but will also need to provide evidence that they have gained a knowledge and understanding of all of the additional specifications stated under the specific learning outcomes (LO) and assessment criteria (AC) listed below:

LO 1: Understand the role of drawings, schedules, specifications and other types of key construction documentation and information in relation to prefabricating reinforcement steel sections on site.

AC1.1: Identify drawings, schedules, specifications and other types of key construction documentation and information in terms of their function and application in relation to prefabricating reinforcement steel sections on site.

The typical drawings, schedules, specifications and other types of key construction documentation that must be covered as a minimum part of the assessment criteria include but are not limited to the following:

Drawings

- General arrangement drawings (Plans, Sections and Elevations etc.)
- Reinforced concrete drawings
- Specific prefabrication drawings
- Cast-in item and embedment drawings
- Installation sequence drawings
- Temporary Works drawings

Specifications

- Standard forms of project specification
- National building specifications relevant to steel fixing

Schedules

- Bending schedules
- Component and embedded items schedules
- Programme schedules

Other Documentation

- Work plans
- Written Work Instructions
- Confirmations of Verbal Instructions (CVI's)
- Risk assessments, method statements and task sheets
- Manufacturers information
- Organisations policies and procedures

AC 1.2: Explain the key information given by drawings, schedules, specifications and other types of key construction documentation and information in relation to prefabricating reinforcement steel sections on site.

The learner should be able to identify, explain and interpret typical key items of construction information that can be obtained from drawings, schedules, specifications and other types of key construction documentation listed in AC 1.1 above and as specified in the unit itself.

AC 1.3: Identify the key users of the drawings, schedules, specifications and other types of key construction documentation and information in terms of work responsibility when prefabricating reinforcement steel sections on site.

The learner should know who are the key users of drawings, schedules, specifications and other types of key construction documentation listed in AC 1.1 above on a construction site. These might include but are not limited to the following:

- The Client
- The Designer
- Project Manager
- Construction Manager
- Engineers
- Quality Managers / Inspectors
- Planners
- Commercial Manager
- Logistics Manager
- General and Trade Foreman
- Gangers /Supervisors
- Steelfixing Operatives

As listed in AC 1.1 Above

LO2: Be able to interpret drawings to identify the location of work areas on site in relation to project gridlines to establish the constraints on the use and installation of prefabricated reinforcement elements

AC 2.1: Identify the location of a specific drawing in relation to the overall project grid system across a wide range of drawings types from the simple to the complex when prefabricating reinforcement steel sections on site.

The learner must be able access information relevant to fixing insitu reinforcement steel on site by interpreting traditional hard copy, paper based drawing systems as well as being able to view common electronic drawing formats using common types of electronic viewing devices and software likely to be encountered by operatives on a construction site. This will include the use of hand-held and robust site tablets and standard ICT equipment along with typical CAD and Building Information Modelling (BIM) viewer software to interpret both 2D and 3D drawing information, as well as to support evidence collection for this unit.

As part of the assessment criteria, the learner must be able to identify the location of a specific work area on site in relation to the overall project grid system for different types of drawings from the simple to the complex.

AC 2.2: Identify the location of a number of different work areas of reinforcement in relation to the location drawing and the overall site grid system across a wide range of drawing types from the simple to the complex when prefabricating reinforcement steel sections on site.

The learner must be able access information relevant to fixing insitu reinforcement steel in a particular location on site by interpreting traditional hard copy, paper based drawing systems as well as being able to view common electronic drawing formats using common types of electronic viewing devices and software likely to be encountered by operatives on a construction site. This will include the use of hand-held and robust site tablets and standard ICT equipment along with typical CAD and Building Information Modelling (BIM) viewer software to interpret both 2D and 3D drawing information, as well as to support evidence collection for this unit.

As for AC 2.1 above, the learner must be able to identify the location of a specific area of reinforcement on site in relation to the General Arrangement drawings for a particular area of the project and the overall project grid system for different types of drawings from the simple to the complex.

AC 2.3: Identify any restrictions placed on the use and installation of prefabricated elements that are dictated by the specific work area including access and logistics constraints, height and location of work area and lifting constraints and restrictions.

The learner must be able to interpret the General Arrangement and Reinforced Concrete Detail drawings to clearly identify any restrictions placed on the use of prefabricated elements dictated by the specific work area, including the size and weight of the individual units making up the overall area of reinforcement to be fixed. (E.g. access & logistics constraints, height/location of work area, lifting constraints/restrictions)

LO 5: Interpret the reinforced concrete detail drawings to identify suitable elements for prefabrication, the interfaces between elements and the installation sequence.

AC 5.1: Use the drawings to identify prefabricated elements of suitable size and weight to suit the site access, logistics and lifting constraints

The learner must be able to interpret the General Arrangement and Reinforced Concrete detail drawings to clearly identify prefabricated elements of a suitable size and weight to suit the site access, logistics and lifting constraints for a number of typical reinforcement fixing scenarios as covered by the mandatory practical exercises. This needs to include identifying the interfaces between units, the installation sequence and the requirements for connecting the units together to maintain continuity of reinforcement such as splice lengths loose splice bars and the sizes, number, types and positions of couplers for joints between slabs and walls and columns and beams.

LO 7: Be able to interpret manufacturers' information relating to other components used to prefabricate reinforcement on site

AC 7.1: Interpret the manufacturers' information to explain the correct use and installation for common components used to prefabricate reinforcement steel sections on site.

The explanation of the use and installation of components must include the following:

- Reinforcement couplers – threaded & MBT
- Lifting eyes/points
- Cast-in items and embedments
- Spacer block, tying wire and chairs etc.
- Clamps, bolts, wire slings, tie rods etc.
- Hand tools, power tools and other equipment
- COSHH.

LO11: Be able to use the ICT equipment and software likely to be encountered by operatives on site to access information relevant to the prefabrication of reinforcement on site.

AC 11.1: Demonstrate how common ICT equipment is used for sharing and viewing information on site relating to the prefabrication or reinforcement steel sections.

The use of the following standard ICT equipment must be covered as a minimum as part of the assessment criteria:

- Standard laptop/desktop
- Typical tablet computer
- Rugged site tablets / handheld devices e.g. Trimble

3.5. Unit 6 - Manufacture and Installation of Prefabrication Reinforcement Steel Sections

Unit Title	Manufacture and Installation of Prefabrication Reinforcement Steel Sections
Ofqual unit reference number (code)	L/505/8163
Unit Level	Two
Unit Credit Value	32
GLH	200
Assessment Guidance	<p>This unit must be delivered and assessed in accordance with the NOCN Level 2 Diploma in Steelfixing Occupations (Construction) qualification specification. Specific attention must be paid to the following criteria:</p> <ul style="list-style-type: none"> • Delivery partners must have the training facilities and resources to support the creation of a comprehensive simulated civil engineering site. • Additional Knowledge, skills and experience requirements of Tutor/Assessors and Internal Verifiers, to ensure the delivery of the qualification to the required standards. • Mandatory practical exercise specifications. These exercises have been designed to simulate typical steelfixing activities that are likely to be carried out in the workplace. This unit must be assessed using simulated workplace evidence generated whilst carrying out the practical exercises for the manufacture and installation of prefabrication reinforcement steel sections.

This unit has 11 learning outcomes.

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	The learner can:
1. Know the requirements for the manufacture and installation of prefabricated reinforcement steel sections.	1.1. Interpret drawings, schedules, specifications and other key information such as risk assessments, method statements, quality documentation and manufacturer's information relative to the manufacture and installation of prefabricated reinforcement steel sections. 1.2. Identify any restrictions placed on the use on site of prefabricated elements dictated by the specific work area, including access and logistics constraints, height and location of work area, lifting constraints and restrictions. 1.3. Explain the organisation's procedures for clarifying information, errors or discrepancies where required for

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	The learner can:
	<p>the manufacture and installation of prefabricated reinforcement steel sections.</p> <p>1.4. Explain the current Health and Safety legislation, statutory regulations, official guidance, and organisational procedures for the identification and mitigation of hazards, producing safe methods of work and for dealing with accidents, emergencies and problems when manufacturing and installing prefabricated reinforcement steel sections.</p>
<p>2. Know how to prepare for the manufacture and installation of prefabricated reinforcement steel sections by selecting the correct tools and equipment for the type of work being carried out.</p>	<p>2.1. Select the correct Personal Protective Equipment (PPE) appropriate to the task being carried out in accordance with legislation, official guidance, the risk assessment, method statement and the specification when manufacturing and installing prefabricated reinforcement steel sections.</p> <p>2.2. Select the correct hand tools, bending tools, portable power tools and other equipment required for the type of work being carried out in accordance with the risk assessment, method statement and specification when manufacturing and installing prefabricated reinforcement steel sections.</p> <p>2.3. Describe the manufacturer's recommendations for use, inspection, care and maintenance of the tools and equipment relevant to the specific task being carried out when manufacturing and installing prefabricated reinforcement steel sections.</p> <p>2.4. Explain the organisation's procedure for reporting problems associated with the resources, tools and equipment and how these are applied when manufacturing and installing prefabricated reinforcement steel sections.</p>
<p>3. Be able to select the required quantity and quality of materials, components, fixings and resources for the method of work to prefabricate and install reinforcement steel sections.</p>	<p>3.1. Interpret the reinforced concrete detail drawings, specification and manufacturer's information to identify the correct types of materials, components, fixings and resources for the prefabrication of typical reinforcement sections.</p> <p>3.2. Demonstrate the correct selection of common types of materials, components and fixings in accordance with the drawing, specification and manufacturer's information for the prefabrication of typical reinforcement elements including beams, bases, columns, slabs and walls.</p> <p>3.3. Describe the characteristics, qualities, uses, limitations and common causes of damage or defects associated with the materials, components, fixings and resources</p>

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	The learner can:
	<p>being used to manufacture and install prefabricated reinforcement steel sections.</p> <p>3.4. State the typical hazards associated with the materials, components, fixings and resources being used to manufacture and install prefabricated reinforcement steel sections, identifying how these can be mitigated by applying appropriate risk control measures and safe methods of work.</p> <p>3.5. Demonstrate the safe use, storage and handling of materials, components and fixings for the manufacture and installation of prefabricated reinforcement elements.</p> <p>3.6. Demonstrate how to calculate quantity, length, area and wastage associated with the methods and procedures for installing reinforcing steel or prefabricated reinforcing steel insitu.</p> <p>3.7. Demonstrate the safe lifting, handling and moving of the materials, components, fixings and resources being used for the manufacture and installation of prefabricated reinforcement elements.</p>
<p>4. Be able to comply with the given contract information to manufacture and install prefabricated reinforcement steel sections efficiently to given working instructions, agreed quality criteria and tolerances.</p>	<p>4.1. Manufacture prefabricated elements of reinforcement of a suitable complexity from pre-cut and bent components including the work skills to sort, measure, mark out, fit, position and secure in accordance with the drawings, schedules and specifications to form all of the following concrete structures:</p> <ul style="list-style-type: none"> a) Beams b) Bases c) Columns d) Slabs e) Staircases f) Walls. <p>4.2. Install prefabricated sections of reinforcement steel insitu to given working instructions, agreed quality criteria and tolerances in accordance with the drawings, schedules and specification to form all of these concrete structures.</p> <p>4.3. Incorporate into prefabricated reinforcement steel sections:</p> <ul style="list-style-type: none"> a) Different type of ties including load bearing b) Temporary construction bars c) Additional bracing and strengthening steel d) Lifting eyes and points.
<p>5. Be able to avoid risk by operating safe working practices when manufacturing and installing</p>	<p>5.1. Demonstrate compliance with the appropriate risk assessment, method statement and task sheet for the specific prefabricated reinforcement manufacturing or installation activity being carried out.</p>

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	The learner can:
<p>prefabricated reinforcement sections.</p>	<p>5.2. Demonstrate safe working practices when carrying out the manufacture and installation of prefabricated reinforcement sections.</p> <p>5.3. Demonstrate the safe use and storage of materials, hand tools, bending tools, portable power tools and ancillary equipment when manufacturing and installing prefabricated reinforcement steel sections.</p> <p>5.4. Explain the organisation's procedure for reporting problems associated with safe methods of work, establishing who has authority to rectify them when manufacturing and installing prefabricated reinforcement steel sections.</p>
<p>6. Be able to complete the work within the allocated time in accordance with the agreed programme of work to meet the needs of other occupations and the client when prefabricating and installing reinforcement steel sections.</p>	<p>6.1. Demonstrate completion of the work within the allocated time in accordance with the agreed programme of work to meet the needs of other occupations and the client when prefabricating and installing reinforcement steel sections.</p> <p>6.2. State the purpose of the work programme explaining why deadlines should be adhered to.</p> <p>6.3. Explain the types of programme, progress charts and timetables that are available and how these can be used to plan work on site when manufacturing and installing prefabricated steel reinforcement sections.</p> <p>6.4. Interpret programmes, progress charts, and timetables to obtain programme and progress information relative to the installation of prefabricated steel reinforcement sections.</p> <p>6.5. State the typical installation rates for fixing steel for standard bar sizes per ton per man per day.</p> <p>6.6. Explain the organisational procedures for reporting circumstances which will affect the work programme for the prefabrication of steel reinforcement sections.</p>
<p>7. Be able to minimise the risk of damage to the work and surrounding area when manufacturing and installing prefabricated reinforcement steel sections.</p>	<p>7.1. Explain the common causes and types of damage that can occur to the work and surrounding areas when manufacturing and installing prefabricated reinforcement steel sections.</p> <p>7.2. Explain what good practices should be put in place to avoid damage occurring to the work and surrounding areas as a result of general workplace activities, other occupations and adverse weather conditions when manufacturing and installing prefabricated reinforcement steel sections.</p> <p>7.3. Explain the standards of preparation required by other trades on the site prior to commencing the installation of prefabricated reinforcement elements.</p>

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	The learner can:
	7.4. Demonstrate how to minimise damage by applying good practice and maintaining a clean work space for the specific task being carried out.
8. Be able to dispose of waste from the manufacturing and installation of prefabricated reinforcement steel in accordance with current environmental legislation, organisational procedures, manufacturer's information and official guidance.	8.1. Explain how environmental legislation and COSHH legislation relates to the disposal of waste on site associated with the manufacturing and installation of prefabricated reinforcement steel sections. 8.2. Explain the correct disposal procedures for common waste materials associated with the manufacturing and installation of prefabricated reinforcement steel sections. 8.3. Explain why it is important to follow the correct disposal procedures for common waste associated with the manufacturing and installation of prefabricated reinforcement steel sections.
9. Be able to comply with the organisation's security procedures for protecting the site, workplace, company, sensitive information and the operative when manufacturing and installing prefabricated reinforcement steel sections.	9.1. Explain the organisation's security procedures for protecting the site, workplace, company, sensitive information and the operative including how the procedures are implemented for partially complete or completed work, plant, tools and equipment when manufacturing and installing prefabricated reinforcement steel sections. 9.2. Explain the organisation's procedures for reporting breaches of security to the relevant authorities when manufacturing and installing prefabricated reinforcement steel sections.
10. Be able to complete work to agreed quality criteria in accordance with the requirements of the specification.	10.1. Demonstrate compliance with agreed quality criteria as stated in the specification. 10.2. Extract quality criteria from the specification. 10.3. Identify types and grades of steel and other materials associated with the manufacture and installation of prefabrication reinforcement steel sections. 10.4. Work to given tolerances.
11. Understand the importance of working with other occupations when manufacturing and installing prefabricated reinforcement sections.	11.1. Explain the needs of other occupations in relation to manufacturing and installing prefabricated reinforcement sections. 11.2. Demonstrate effective communication with other occupations when manufacturing and installing prefabricated reinforcement sections. 11.3. Explain the importance of teamwork when manufacturing and installing prefabricated reinforcement sections. 11.4. Demonstrate effective teamwork when manufacturing and installing prefabricated reinforcement sections.

Unit 6: Manufacture and Installation of Prefabrication Reinforcement Steel Sections

Unit summary

The manufacture and installation of prefabrication reinforcement steel sections is one of the main practical skills required by steelfixers. Manufacture and installation of prefabrication reinforcement is a practical, “hands on” trade that cannot be taught through structured classroom learning alone and as such, this unit has been designed to be assessed through the learners spending a significant amount of time during the course completing practical exercises in accordance with the ‘manufacture and installation of prefabrication reinforcement steel sections’ practical exercise specification. The exercises are designed to be realistic representations of typical steelfixing situations that the learners are likely to encounter on most construction sites and they will be delivered in a realistic simulated environment that portrays the conditions that they are likely to encounter on a typical construction site.

The practical exercises combined with the structured learning of basic steel fixing skills at the start of the course will prepare the learner with demonstrable work skills, which combined with the realistic nature of the training environment, are easily transferred to carrying out typical fixing in situ reinforcing steel tasks on most construction sites.

Assessment and evidence

Learners must provide evidence against all of the assessment criteria; the evidence for this unit will come from **two** main sources; direct evidence produced by the learner demonstrating knowledge and skills when completing manufacture and installation of prefabrication reinforcement steel sections practical exercises, whilst the underpinning knowledge and understanding can be demonstrated through a variety of assessment methods.

The direct evidence includes naturally occurring documentary evidence (hard copy and electronic), and direct observation of activities that can be evidenced through either digital recordings, assessor observation reports, witness statements, etc.

Underpinning knowledge and understanding can be evidenced through a variety of assessment methods including; multiple choice testing and question and answer exercises (electronic or paper-based).

Additional evidence requirements

To complete this unit, the learner will not only need to demonstrate that they have met the main learning outcomes and assessment criteria but will also need to provide evidence that they have gained a knowledge and understanding of all of the additional

specifications stated under the specific learning outcomes (LO) and assessment criteria (AC) listed below:

LO 1: Know the requirements for the manufacture and installation of prefabricated reinforcement steel sections.

AC 1.1: Interpret drawings, schedules, specifications and other key information such as risk assessments, method statements, quality documentation and manufacturer's information relative to the manufacture and installation of prefabricated reinforcement steel sections.

The typical drawings, schedules, specifications and other types of key construction documentation that must be covered as a minimum part of the assessment criteria must include but are not limited to the following:

Drawings

- General arrangement drawings (Plans, Sections and Elevations etc.)
- Reinforced concrete drawings
- Cast-in item and embedment drawings
- Installation sequence drawings
- Temporary Works drawings

Specifications

- Standard forms of project specification
- National building specifications relevant to steel fixing

Schedules

- Bending schedules
- Component and embedded items schedules
- Programme schedules

Other Documentation

- Work plans
- Written Work Instructions
- Confirmations of Verbal Instructions (CVI's)
- Risk assessments, method statements and task sheets
- Manufacturers information
- Organisations policies and procedures

AC 1.2: Identify any restrictions placed on the use and installation of prefabricated elements that are dictated by the specific work area including access and logistics constraints, height and location of work area and lifting constraints and restrictions.

Interpret the drawing to identify any restrictions placed on the use of prefabricated elements dictated by the specific work area (e.g. access & logistics constraints, height/location of work area, lifting constraints/restrictions)

AC 1.4: State the current Health and Safety legislation, statutory regulations, official guidance, and organisational procedures for the identification and mitigation of hazards, producing safe methods of work and for dealing with accidents, emergencies and problems when manufacturing and installing prefabricated reinforcement steel sections.

Compliance with the following Health and Safety legislation, statutory regulations and official guidance must be covered as a minimum as part of the assessment criteria:

General workplace:

- HASAW Act 1974
- Construction (Health, Safety & Welfare) Regulations 1996
- PPE at Work Regulations 1992
- Control of Noise at Work Regulations 2005
- Control of Vibration at Work Regulations 2005
- Health and Safety First Aid Regulations 1981
- RIDDOR 1995
- HSE Guidance Notes
- Construction Industry Guidance Notes
- CIRIA and other Guides

Below ground

- CIRIA Report 97 – Trenching Practice

Confined spaces

- Confined Spaces Regulations 1997

Working at Height

- Working at Height Regulations 2005

With tools and equipment

- PUWER 1998

With materials and substances

- COSHH Regulations 2002
- Hazardous Materials Regulations

With movement / storage of materials by manual handling and mechanical lifting

- Manual Handling Operations Regulations 1992
- LOLER 1998

LO 2: Know how to prepare for the manufacture and installation of prefabricated reinforcement steel sections by selecting the correct tools and equipment for the type of work being carried out.

AC 2.1: Select the correct personal protective equipment (PPE) appropriate to the task being carried out in accordance with legislation, official guidance, the risk assessment and method statement and the specification when manufacturing and installing prefabricated reinforcement steel sections.

The use of the following standard personal protective equipment (PPE) must be covered as a minimum as part of the assessment criteria:

- Safety Helmet
- Hi-vis vests
- Protective footwear
- Eye protection
- Hand protection
- Ear protection
- Safety overalls

AC 2.2: Select the correct hand tools, bending tools, portable power tools and other equipment required for the type of work being carried out in accordance with the risk assessment, method statement and specification when manufacturing and installing prefabricated reinforcement steel sections.

When selecting the tools, in accordance with the criteria above, the learner must be able to correctly identify and select the required tools and equipment for the type of work being carried out and demonstrate the ability to inspect all of the tools selected to ensure that they are of good condition, safe to use and fit for purpose. They must also be able to demonstrate the correct inspection, care, maintenance and storage of the tools and equipment required for the manufacture and installation of prefabrication reinforcement steel sections.

AC 2.3: Describe the manufacturer's recommendations for use, inspection, care and maintenance of the tools and equipment relevant to the specific task being carried out when manufacturing and installing prefabricated reinforcement steel sections

Tool and equipment must cover as a minimum:

- nips,
- hammers,
- tapes,
- disc cutters,
- grinders,
- hand/power benders,
- torque wrenches

LO 3: Be able to select the required quantity and quality of materials, components, fixings and resources for the method of work to prefabricate and install reinforcement steel sections.

AC 3.1: Interpret the reinforced concrete detail drawings, specification and manufacturer's information to identify the correct types of materials, components, fixings and resources for the prefabrication of typical reinforcement sections

Typical reinforcement sections are:

- beams,
- bases,
- columns,
- slabs,
- walls.

Evidence must be provided to show understanding.

AC 3.2: Demonstrate the correct selection of common types of materials, components and fixings in accordance with the drawing, specification and manufacturers' information for the prefabrication of typical reinforcement elements including beams, bases, columns, slabs and walls.

Evidence produced must include:

- Pre-cut and bent components
- Reinforcement grades
- Tying wire
- Spacer blocks
- Chairs
- Reinforcement couplers – threaded & MBT
- Lifting eyes/points
- Clamps
- Cast-in items / embedments

When selecting the common types of materials, components and fixings listed, the learner must be able to correctly identify and select the items required for the type of work being carried out and demonstrate the ability to inspect all of the items selected to ensure that they are of good condition, safe to use and fit for purpose. They must also be able to demonstrate the correct inspection care, maintenance and storage of the items required for the manufacture and installation of prefabricated reinforcement steel sections.

AC 3.4: State the typical hazards associated with the materials, components, fixings and resources being used to manufacture and install prefabricated reinforcement steel sections, identifying how these can be mitigated by applying appropriate risk control measures and safe methods of work

The learner must understand the typical risks associated with steelfixing and those that are specific to the prefabrication of reinforcement. The risks that must be covered as a minimum as part of the assessment criteria include but are not limited to the following;

- Safe means of access
- Manual handling
- Lifting
- Working at height
- Fire hazards and Hot Works
- Spillages and COSHH incidents
- Confined spaces
- Severing of limbs
- Collapse of structures
- Working below ground
- Service strike/damage
- Moving plant and vehicles
- Repetitive strain injury (RSI)
- Manual handling injuries, e.g. back injuries
- Vibration white finger (VWF)
- Slips, trips and falls
- Cuts and abrasions
- Weils disease (Leptospirosis)
- Animal faeces
- Cold and heat injuries (Exposure, sunstroke, dehydration)
- Ground contamination
- Collapse of excavations
- Temporary works

AC 3.7: Demonstrate the safe lifting, handling and moving of the materials, components, fixings and resources being used for the manufacture and installation of prefabricated reinforcement elements

Evidence produced must include as a minimum:

- Pre-cut and bent components
- Reinforcement grades
- Tying wire
- Spacer blocks
- Chairs
- Reinforcement couplers – threaded & MBT
- Lifting eyes/points
- Clamps
- Cast-in items / embedments

LO 4: Be able to comply with the given contract information to manufacture and install prefabricated reinforcement steel sections efficiently to given working instructions, agreed quality criteria and tolerances in accordance with the drawings, schedules and specification.

AC 4.1: Manufacture prefabricated elements of reinforcement of a suitable complexity from pre-cut and bent components including the work skills to sort, measure, mark out, fit, position and secure in accordance with the drawings, schedules and specifications to form all of the following concrete structures:

- Beams
- Bases
- Columns
- Slabs
- Staircases
- Walls

The learner must be able to demonstrate a knowledge and understanding of the specific requirements for fixing and tying steel associated with the manufacture and installation of prefabricated reinforcement elements to allow them to be moved, lifted, handled and installed including being able to identify, select, install and inspect suitable types of normal and load bearing ties, clamps & bolts, the requirements for lifting points, the assessment of the centre of gravity and balance for lifting, requirement for additional bracing and strengthening, additional non-scheduled reinforcement and the securing of loose reinforcement within the prefabricated element.

The learner must be able to demonstrate all of the following work skills when sorting, measuring, marking out, fitting, positioning and securing reinforcing steel for the manufacture and installation of prefabrication reinforcement steel sections:

Sort:

- Interpret bending schedules and delivery tickets.
- Safe lifting, moving and handling of reinforcement.
- Identify different bar marks.
- Identify grades and types of steel.
- Identify types of couplers.
- Inspect reinforcement and associated materials and ancillary items for damage and quality defects.
- Sort reinforcement in to work packages specific to prefabrication to suit the installation sequence.
- Identify missing bar marks or elements.
- Ensure that the required quality and testing documentation has been obtained.
- Ensure that the prefabricated units are stored correctly

Measure:

- The quantity and number of bars.
- Diameter.

- Length.
- Weight (Tonnage).
- Bending dimensions and radii.
- Tolerances of cut and bent reinforcement are in accordance with BS8666.
- Sizes and types of coupler that have been delivered.
- Checking the overall dimensions of the prefabricated unit.

Mark out:

- Mark out position and levels specific to the installation of prefabricated elements on site
- Interpret setting out marks provided by others for the installation of the prefabricated elements on site.
- Relative positions of bars within the prefabricated element
- Bar centres and spacings
- Setting out tolerances for relative positions of bars within the prefabricated element.
- Bar mark start and finish points (Location).
- Spacer blocks positions
- Cover requirements.
- Starter bars including loose bars contained within the prefabricated element that are required for installation.
- Lap lengths, positions of staggered laps and laps required for the installation of the prefabricated element including “flying end”, “Butt” and “Male/Female” laps between units
- Interfaces with Embedded items
- Positions of openings, boxouts and voids
- Positions and spacings of couplers
- Marking out position and levels specific to the installation of prefabricated elements on site.

Fit, Position and Secure:

- Establishing the correct and most efficient Installation sequence to suit prefabrication.
- The correct bar marks and shape codes
- The correct quantity and number of bars.
- Reinforcement In the correct position and within tolerance within the prefabricated element
- The correct number and type of ties including specific load bearing ties required for lifting, moving and installation.
- Any temporary reinforcement required for stability during prefabrication and installation of the element such as longitudinal diagonal bracing bars and cross bracing to prevent racking and additional links or chairs to provide support during manufacture.
- Suitable spacer blocks to provide the correct cover.
- Suitable chairs to adequately support the reinforcement during prefabrication

- Temporary fixings, support and bracing required for prefabrication and installation of embedded items to ensure that they are in the correct location, level, orientation/angle and within tolerance.
- Any temporary works items required for prefabrication or follow-on installation operations.
- Lifting points or specific load bearing ties for lifting the prefabricated elements from the horizontal to the vertical position, placing and orientation of element on to delivery trailers, lifting element off delivery trailers and lifting the elements in to their final position on site.

AC 4.2: Install prefabricated sections of reinforcement steel insitu to given working instructions, agreed quality criteria and tolerances in accordance with the drawings, schedules and specification to form all of these concrete structures.

In addition to demonstrating the safe and correct installation of prefabricated reinforcement elements on site, the learners must also be able to demonstrate a knowledge and understanding of how to prepare prefabricated steel sections for insitu installation including the following:

Select and form associated wire ties required for prefabrication:

- Identify and install the different types of standard and load bearing ties required for the prefabricated elements and select the correct type of tying wire and when each type of tie and wire should be used including:
 - Different gauges of tying wire, (16, 17 and 18 Gauge)
 - Different types of wire, black annealed and stainless steel
 - Different types of ties including Slash, Hairpin, Crown, Ring Slash, Ring Hairpin and Splice.
- Identify and assess the requirements for and install specific loads bearing ties required for the prefabricated elements depending on the type, size, weight of element and how it is to be lifted, moved and installed including type, number, positions, spacings, frequency and combination of types of ties as shown on the temporary works drawings for the specific element.

Identify and select other types of fixings, clamps, U-bolts required for prefabrication:

- Identify and install different types of fixings, clamps and U-bolts required for the prefabricated elements and when each type should be used including:
 - ROMTECH or other types of proprietary clamp systems
 - U-bolts.
 - Wire rope grips
- Identify and assess the requirements for and install load bearing fixings, clamps and U-bolts required for the prefabricated elements depending on the type, size and weight of element and how it is to be lifted, moved and installed.
- To include the selection of type, number, positions, spacings, frequency and combination of types of fixings, clamps and U-bolts as shown on the temporary works drawings for the specific element.

Fix, secure and remove temporary construction bars required for prefabrication:

- Identify and assess the requirements for the installation and removal of temporary construction bars such as additional support links or chairs where required for the prefabricated elements depending on the type, size and weight of element and how it is to be lifted, moved and installed.
- To include the selection of type, number, positions, spacings, frequency and combination of temporary construction bars as shown on the temporary works drawings for the specific element or additional bars as deemed necessary by on-site assessment.

Fix and secure additional temporary bracing for section movement:

- Identify and assess the requirements for the installation and removal of temporary bracing for section movement and to prevent racking such as additional longitudinal Z-bars, cross-bracing and additional support links or chairs where required for the prefabricated elements depending on the type, size, weight of element and how it is to be lifted, moved and installed.
- To include the selection of type, number, positions, spacings, frequency and combination of bracing as shown on the temporary works drawings for the specific element or additional bracing bars as deemed necessary by on-site assessment.

Fix and secure lifting points for section movement:

- Identify and assess the requirements for lifting points for section movement for the lifting operations below depending on the type, size, weight of element, centre of gravity of the prefabricated elements and how it is to be lifted, moved and installed on site.
 - Lifting of elements horizontally within the prefabrication yard.
 - Orientating and placing elements on to delivery trailers
 - Lifting elements off delivery trailers
 - Turning elements from the horizontal to the vertical position
 - Lifting elements in to position
- To include the selection and installation of the correct type, number, positions, spacings, frequency and combination of lifting points and the methods of fixing as shown on the temporary works drawings for the specific element or additional lifting points as deemed necessary by on-site assessment

Incorporate embedments in to prefabricated steel sections:

- Identify and interpret the type, size, grade, material, location, level, orientation/angle and tolerance of any cast-in items or embedments to be incorporated in to the prefabricated element.
- Identify the interface between the embedded items and the reinforcement and the most efficient point at which to install them within the prefabricated element installation sequence.

Prepare prefabricated steel elements for in situ installation on site:

- Setting up temporary fabrication jigs, support frames and stands for the prefabrication of typical prefabricated elements such as beams, bases, columns, slabs and walls.

- Ensure that methods of tying, securing and bracing the main reinforcement and loose tie-in items within the prefabricated element are agreed in advance.
- Ensure that lifting arrangements, methods, devices and cast-in items are agreed in advance.
- Ensure that the methods for providing stability of the prefabricated element when lifting from the horizontal to the vertical position and during transportation and installation are agreed in advance.
- Ensure that the methods of providing temporary support and stability of the prefabricated elements during installation are agreed in advance.
- An appreciation of prefabrication using welding and the inspection of welded prefabricated elements.
- An appreciation of rollmat, its uses, inspection and installation.

Position chairs, cover blocks and spacers on site:

- Identify, select and position the correct number of chairs, cover blocks and spacers on site to allow the correct insitu installation of the prefabricated element within the works.

Incorporate reinforcement coupler and continuity systems:

- Identify and interpret the correct type, size, grade, material, location, level, orientation/angle and tolerance of any reinforcement couplers or continuity systems to be incorporated in to the prefabricated element.
- Identify the interface between these items and the reinforcement and the most efficient point at which to install them within the prefabricated element installation sequence

LO 5: Be able to avoid risk and by operating safe working practices when manufacturing and installing prefabricated reinforcement sections.

AC 5.2: Demonstrate safe working practices when carrying out the manufacture and installation of prefabricated reinforcement sections.

This must include as a minimum:

- Manual handling of reinforcement, materials, components, fixings and embedments.
- Manufacturing prefabricated reinforcement sections including forming associated wire ties, other fixings, temporary construction bars, bracing and lifting points etc.
- Carrying out hot works including procedures, permits, precautions and emergencies.
- Identifying and following installation sequences for prefabricated reinforcement sections.
- Incorporating embedded items in to prefabricated reinforcement sections.
- Preparing prefabricated reinforcement steel sections for insitu installation.
- Positioning chairs, cover blocks and spacers.
- Securing prefabricated sections of reinforcement steel insitu.
- Incorporating reinforcement coupler and continuity systems.

- Lifting, moving, and positioning of loose bars and prefabricated reinforcement sections.
- Sorting, storing and protecting steel, fixings and prefabricated sections.
- Using hand tools, power tools and equipment.
- Working at height.
- Safe means of access and safe use of access equipment.

LO 7: Be able to minimise the risk of damage to the work and surrounding area when manufacturing and installing prefabricated reinforcement steel sections.

AC 7.1: Explain the common causes and types of damage that can occur to the work and surrounding areas when manufacturing and installing prefabricated reinforcement steel sections.

The learner must be able to demonstrate a knowledge and understanding of all of the items listed below when explaining the common causes and types of damage that can occur to the work and surrounding areas. They must also know how to minimise damage and maintain their workspace and the surrounding area in a clean condition when manufacturing and installing prefabricated reinforcement steel sections:

Workspace:

Reinforcement and Ancillary Items:

- Protection from deformation and impact
- Protection from contamination from oil, paint, retarders concrete spillage etc.
- Protection from hot works or cutting.

Couplers:

- Protection from deformation and impact.
- Protection of threads (male and female ends)
- Ensure protection caps are in place.
- Taping and greasing if required.

Embedded Items:

- Protection from deformation and impact.
- Protection of fixings/connections.
- Taping and greasing if required.
- Protection of templates and end plates.

Temporary Supports:

- Protection from deformation and impact
- Protection of fixings/connections.
- Protection from hot works or cutting

Surrounding Area:

- Temporary works.
- Access routes
- Plant, tools and equipment
- Previously completed works
- Other contractors works

Minimise damage and maintain a clean work space:

- Reasons for maintaining a clean work space.
- What a good clean work space looks like.
- Maintaining safe, adequate and clear access and egress routes including trip hazards.
- Safe storage of materials.
- Safe storage and use of tools and equipment.
- Adequate task lighting.
- Regular work space inspections e.g. LOR Take 5 initiatives.
- Materials ordering and management within the work space.
- Storage of COSHH

AC 7.3: Explain the standards of preparation required by other trades on the site prior to commencing the installation of prefabricated reinforcement elements

The learner must be able to describe the basic roles and responsibilities of the other trades listed below and how they interface with them during the manufacture and installation of prefabricated reinforcement steel sections. The other trades are to include, but are not limited to:

- Engineers
- Ground Workers & General Labourers
- Carpenters
- Concreters
- Steel erectors
- Crane operators and Slinger Signallers
- Plant operators
- Delivery Drivers

LO 8: Be able to dispose of waste associated with the manufacturing and installation of prefabricated reinforcement steel in accordance with current environmental legislation, organisational procedures, manufacturer’s information and official guidance.

AC 8.1: Explain how environmental legislation and COSHH legislation relates to the disposal of waste on site when manufacturing and installing prefabricated steel reinforcement sections.

Compliance with the following current environmental and COSHH statutory regulations and official guidance relating to the disposal of waste on site must be covered as a minimum as part of the assessment criteria:

Statutory regulations:

- Current environmental, waste disposal & COSHH Legislation

Official guidance:

- British Standards
- Codes of Practice
- HSE Guidance Notes
- Environment Agency Guidance
- Other agencies such as Natural England, etc.

Organisational procedures:

- Environmental Policy, Procedures & Plans
- Site Waste Management Plans
- Site environmental inspections and audits.
- Typical site environmental controls including waste segregation, COSHH bins, recycling, hazardous waste disposal.

Manufacturers' information:

- COSHH Data sheets.
- Plant, tools and equipment user manuals
- General construction materials associated with prefabrication of reinforcement
- Construction Industry Guidance

AC 8.2: Explain the correct disposal procedures for common waste associated with the manufacturing and installation of prefabricated reinforcement steel sections

The learner must be able to demonstrate the correct disposal procedures for common waste associated with the manufacture and installation of prefabricated reinforcement steel sections must include as a minimum but are not limited to the following;

- Off-cuts of reinforcing bars
- Tying wire
- Concrete spacer blocks
- Timber
- Plastic
- COSHH items such as spray cans, oil/paint tins
- Oils and lubricants

LO 9: Be able to comply with the organisation's security procedures for protecting the site, workplace, company, sensitive information and the operative when manufacturing and installing prefabricated reinforcement steel sections.

AC 9.1: Explain the organisation’s security procedures for protecting the site, workplace, company, sensitive information and the operative including partially complete or completed work, plant, tools and equipment and how the procedures are implemented when manufacturing and installing prefabricated reinforcement steel sections.

The learner must be able to demonstrate a knowledge and understanding of the organisation’s procedures for protecting personal security and security of the site, workplace, partially completed or completed work, plant, tools and equipment, sensitive information and how to report breaches of security to the relevant authorities. This should also include the following:

- How the security procedures affect them personally, their responsibilities under those procedures, the disciplinary procedures and on-going commitments to security after leaving the project.
- The typical threats to personal and project security such as terrorist, activists, the press, blackmail, bribery, etc.

LO 10: Be able to complete work to agreed quality criteria in accordance with the requirements of the specification

AC 10.1: Demonstrate compliance with agreed quality criteria as stated in the specification.

The learner must be able to demonstrate compliance with the following specification requirements as a minimum:

- Length of bars is within tolerance
- Bar centres and spacings.
- Bar size and diameter.
- Steel grade.
- Cover requirements & spacer blocks.
- Quantity and number of bars.
- Bending dimensions and radii.
- Sizes, types, positions and levels of couplers.
- Setting out tolerances for relative positions of bars within the prefabricated element.
- Checking overall prefabricated unit dimensions.
- Weight of prefabricated elements (Tonnage).
- Interpret setting out marks provided by others for the installation of the prefabricated element on site.
- Marking out position and levels specific to the installation of prefabricated elements on site.
- Starter bars including loose bars contained within the prefabricated element for installation on site.
- Lap lengths, positions of staggered laps and laps required for the installation of the prefabricated element including “flying end”, “Butt” and “Male/Female” laps between units.
- Embedded items.

- Positions of openings, boxouts, and voids within the prefabricated element.
- Required quality and testing documentation and as-built information.
- Tolerances of cut and bent reinforcement are in accordance with BS8666.

AC 10.3: Identify types and grades of steel and other materials associated with manufacture and installation of prefabrication reinforcement steel sections

The learner must be able to identify the following grades of steel as a minimum:

- Mild steel
- High yield steel Types H, A, B, C, material properties/differences, different rib patterns
- Reinforcing Mesh
- Galvanised Reinforcement
- Stainless Steel Reinforcement (S type)
- Epoxy coated reinforcement
- Cryo reinforcement (X-type)
- Identifying CARES Approved Reinforcement – CARES marking system, country of origin and mill
- Specialist types of bar, Dywidag, GEWI and Macalloy bars etc.

AC 10.4: Work to given tolerances

The learner must be able to demonstrate a knowledge, understanding and ability to work to given tolerances for the following;

- Length
- Bar spacings
- Bar size and diameter
- Cover requirements
- Bending dimensions / radii tolerances in accordance with BS8666.
- Sizes, types, positions and levels of couplers within the prefabricated element.
- Relative positions of reinforcement bars within the prefabricated element.
- Starter bar positions, including loose bars contained within the prefabricated element that are required for installation on site.
- Lap lengths, positions of staggered laps and laps required for the installation of the prefabricated element including “flying end”, “Butt” and “Male/Female” laps between units.
- Embedded items
- Positions of openings, boxouts, and voids within the prefabricated element.
- Checking the overall prefabricated element dimensions.

LO 11: Understand the importance of working with other occupations when manufacturing and installing prefabricated reinforcement sections.

AC 11.1: Explain the needs of other occupations in relation to manufacturing and installing prefabricated reinforcement sections.

The learner must be able to describe the basic needs of the other trades listed below and how they interface with them when manufacturing and installing prefabricated reinforcement sections. The other trades are to include, but are not limited to:

- Engineers
- Ground Workers & General Labourers
- Carpenters
- Concreters
- Steel erectors
- Crane operators and Slinger Signallers
- Plant operators
- Delivery Drivers

3.6. Unit 7 - Interpretation of Construction Drawings, Specifications and other Relevant Information Required for Cutting and Bending Reinforcing Steel to Shape

Unit Title	Interpretation of Construction Drawings, Specifications and other Relevant Information Required for Cutting and Bending Reinforcing Steel to Shape
Ofqual unit reference number (code)	Y/505/8165
Unit Level	Two
Unit Credit Value	5
GLH	35
Assessment Guidance	<p>This unit must be delivered and assessed in accordance with the NOCN Level 2 Diploma in Steelfixing Occupations (Construction) qualification specification.</p> <ul style="list-style-type: none"> • Delivery partners must have the training facilities and resources to support the creation of a comprehensive simulated civil engineering site. • Additional Knowledge, skills and experience are required of Tutor/Assessors and Internal Verifiers. • Mandatory practical exercise specifications. These have been designed to simulate typical steelfixing activities that are likely to be carried out in the workplace. This unit must be assessed using simulated workplace evidence generated while interpreting construction drawings, specifications and other relevant information required for cutting and bending reinforcing steel to shape activities.

This unit has 10 learning outcomes.

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	The learner can:
1. Understand the role of drawings, schedules, specifications and other types of key construction documentation and information in relation to cutting and bending operations.	1.1. Identify drawings, schedules, specifications and other types of key construction documentation and information in terms of type, function and application in relation to cutting and bending operations. 1.2. Explain the key information given by drawings, schedules, specifications and other types of key construction documentation and information in relation to cutting and bending operations. 1.3. Identify the key users of the drawings, schedules, specifications and other types of key construction documentation and information in terms of work responsibility when undertaking cutting and bending operations.

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	The learner can:
	<p>1.4. Describe the pros and cons of the different mediums that are used to display site construction documentation and information in relation to cutting and bending operations.</p> <p>1.5. Explain the procedures for receiving, issuing and communicating key construction information and documentation, including drawings, schedules, specifications, method statements and ITPs for cutting and bending operations.</p> <p>1.6. Explain the organisation’s documentation updating and revisions procedure in relation to drawings, schedules and other types of key construction documentation and information including how to ensure that the correct revision is being used on site.</p> <p>1.7. Describe the organisation’s procedures for reporting errors, discrepancies and omissions on the drawings, schedules and other types of key construction documentation and information including how these can be rectified in relation to cutting and bending operations.</p> <p>1.8. Explain the organisation’s procedures and the practical measures for ensuring that the security and confidentiality of construction documentation and information is maintained at all times in relation to cutting and bending operations.</p>
<p>2. Be able to interpret drawings to identify the installation location on site for loose bars and prefabricated elements that are being manufactured within the cutting and bending facility.</p>	<p>2.1. Identify the exact location on the site where cut and bent loose bars and prefabricated elements are to be placed by reference to the location drawings and the overall project grid system across a wide range of drawings from the simple to the complex.</p> <p>2.2. Identify any restrictions placed on the use on site of cut and bent loose bar and prefabricated elements being manufactured within the facility that are dictated by the specific work area into which it is to be delivered and placed including access and logistics constraints, height and location of work area and lifting constraints and restrictions.</p>
<p>3. Be able to interpret the concrete general arrangement (GA) drawings in relation to cutting and bending operations.</p>	<p>3.1. Explain the scale used on a concrete GA drawing in relation to cutting and bending operations.</p> <p>3.2. Use the general arrangement drawings to interpret the dimensions of loose bars and prefabricated steel sections including beams, bases, columns, slabs, walls and staircases being manufactured within the cutting and bending facility specifically:</p> <ul style="list-style-type: none"> a) Plan dimensions b) Lengths c) Depth d) Width

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	The learner can:
	<ul style="list-style-type: none"> e) Heights f) Thicknesses g) Voids/box-outs h) Complex shapes.
4. Be able to interpret the reinforced concrete detail drawings and standard formats of bending schedules.	4.1. Use the reinforced concrete drawings and bending schedules to interpret the following information for cutting and bending reinforcement: <ul style="list-style-type: none"> a) Member b) Bar marks c) Bar grade d) Bar diameters e) Shape codes f) Number of bars g) Lengths h) Spacing i) Cover j) Splice lengths k) Coupler location and types l) Shear/blast link requirements m) Chairs n) Trimming steel.
5. Be able to interpret cast-in item and embedment drawings and schedules and use them to identify the interface between embedded items and the prefabricated reinforcement elements being manufactured within the cutting and bending facility.	5.1. Use the cast-in item and embedment drawings to interpret information for individual embedments that are to be incorporated within a prefabricated element being manufactured within the cutting and bending facility including: <ul style="list-style-type: none"> a) Type b) Size c) Grade d) Material e) Location f) Level g) Orientation/angle h) Tolerance i) Interface with reinforcement. 5.2. Identify specific components required for lifting, handling and moving prefabricated elements being manufactured within the cutting and bending facility. 5.3. Explain the procedures for identifying and reporting clashes between embedded items and the prefabricated element to allow them to be resolved.
6. Be able to interpret manufacturer's information relating to other components	6.1. Use the manufacturer's information to explain the correct use and installation of common components and equipment used to cut and bend and prefabricate

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	The learner can:
used to cut and bend, thread swage and prefabricated reinforcement within the cutting and bending facility.	reinforcement steel sections within the cutting and bending facility.
7. Understand temporary works drawings and equipment relating to the manufacture and lifting of prefabricated elements within the cutting and bending facility.	7.1. Explain what temporary works are in relation to cutting and bending operations. 7.2. Explain the importance of temporary works and the implications of interference for cutting and bending operations. 7.3. Explain the role of temporary works specifically relating to prefabrication and lifting of prefabricated elements being manufactured within the cut and bend facility including; <ul style="list-style-type: none"> a) Temporary assembly support frames b) Installation support frames c) Ties d) Lifting devices e) Temporary bracing f) Temporary supports for embedded items g) Specific access requirements. 7.4. Identify standard temporary works components and their function, specifically relating to manufacture and lifting of prefabricated elements within the cutting and bending facility.
8. Be able to use British Standard BS8666:2005 to access key information relevant to cutting and bending steel reinforcement.	8.1. Explain the importance of compliance with British Standard BS8666:2005 when cutting and bending steel reinforcement. 8.2. Identify the key users of the specifications in terms of work responsibility when cutting and bending steel reinforcement. 8.3. Identify the key information contained within the British Standard BS8666:2005 for cutting and bending steel reinforcement. Including: <ul style="list-style-type: none"> a) Notation and grading of steel b) Forms of bar schedules c) Mesh schedules d) Standard shape codes e) Scheduling radii, former diameters and bending allowances f) Standard fabric types and sizes g) Tolerances h) Radius of bending i) Bending of fabric reinforcement. 8.4. Explain the key information and processes used to ensure the traceability of steel reinforcement materials throughout all stages of the cutting and bending process, stating why this is important.

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	The learner can:
<p>9. Be able to use the ICT equipment and software likely to be encountered by operatives within facility to access information to support cutting and bending operations.</p>	<p>9.1. Demonstrate how common ICT equipment is used for sharing and viewing information relating to the cutting and bending operations within the facility.</p> <p>9.2. Explain how common ICT equipment is currently used to aid cutting and bending of reinforcement within the facility.</p>
<p>10. Be able to use Building Information Modelling (BIM) viewing software and information produced from the model to aid cutting and bending of reinforcement within the facility.</p>	<p>10.1. Describe what BIM is and how a BIM model is produced for use within the cutting and bending facility.</p> <p>10.2. Describe the benefits of using a BIM software viewer as an aid to cutting and bending of reinforcement within the facility.</p> <p>10.3. Describe the types of 2D and 3D reinforcement drawing information that can be produced from the BIM model to support cutting and bending operations within the facility.</p> <p>10.4. Use BIM to interpret information required for the production of cut and bent loose bar and the manufacture of prefabricated elements within the cutting and bending facility itself.</p> <p>10.5. Interpret 2D drawing information taken from a 3D model as an aid to the cutting and bending of reinforcement and the manufacture of prefabricated elements within the facility.</p> <p>10.6. Describe how a steelfixer can input into the production and use of a 3D BIM model to support cutting and bending operations within the facility.</p>

Unit 7: Interpretation of Construction Drawings, Specifications and other relevant information required for Cutting and Bending Reinforcing Steel to Shape

Unit summary

Interpretation of Construction Drawings, Specifications and other relevant information required for cutting and bending reinforcing steel to shape is one of the underpinning knowledge units that has been designed to ensure the learner can interpret all of the information that a steel fixer needs to obtain, collate and interpret to inform and guide the work practices on site and achieve the successful execution of the task on time and to the required standards. This unit should be assessed through a mixture of theoretical exercises and demonstration during the mandatory practical exercises.

Assessment and evidence

Learners must provide evidence against all of the assessment criteria; the evidence for this unit will come from **two** main sources; direct evidence produced by the learner demonstrating knowledge and skills when completing the cutting and bending reinforcing steel to shape practical exercises, whilst the underpinning knowledge and understanding can be demonstrated through a variety of assessment methods.

The direct evidence includes naturally occurring documentary evidence (hard copy and electronic), and direct observation of activities that can be evidenced through either digital recordings, assessor observation reports, witness statements, etc.

Underpinning knowledge and understanding can be evidenced through a variety of assessment methods including; multiple choices testing and question and answer exercises (electronic or paper-based).

Additional evidence requirements

To complete this unit, the learner will not **only** need to demonstrate that they have met the learning outcomes and assessment criteria but will also need to provide evidence that they have gained a knowledge and understanding of the all of the additional specifications stated under the specific learning outcomes (LO) and assessment criteria (AC) listed below:

LO 1: Understand the role of drawings, schedules, specifications and other types of key construction documentation and information in relation to cutting and bending operations.

AC 1.1: Identify drawings, schedules, specifications and other types of key construction documentation and information in terms of type their function and application in relation to cutting and bending operations.

The typical drawings, schedules, specifications and other types of key construction documentation that must be covered as a minimum part of the assessment criteria include but are not limited to the following:

Drawings:

- General arrangement drawings
- Reinforced concrete drawings
- Cast-in item/embedment drawings
- Installation sequence drawings
- Temporary Works drawings

Specifications:

- British Standard BS 8666

Schedules:

- Schedules required specifically for the manufacture of prefabricated elements within the cutting and bending facility itself.
- Component / Embedded items schedules
- Programme schedules – In particular typical targets in terms of production hours and rates (kg/man hour) for standard bar diameters.

Bending Schedule:

- Standard formats of bending schedules
- Standard Shape Codes in accordance with BS 8666:2005

Other Documentation:

- Work plans
- Written Work Instructions
- Risk assessments, method statements and task sheets
- Manufacturers information
- Organisations policies and procedures

AC 1.2: Explain the key information given by drawings, schedules, specifications and other types of key construction documentation and information in relation to cutting and bending operations.

The learner should be able to identify, explain and interpret typical key items of construction information that can be obtained from drawings, schedules, specifications and other types of key construction documentation listed in AC 1.1 above and as specified in the unit itself.

AC 1.3: Identify the key users of the drawings, schedules, specifications and other types of key construction documentation and information in terms of work responsibility when undertaking cutting and bending operations.

The learner should know who are the key users of drawings, schedules, specifications and other types of key construction documentation listed in AC 1.1 above in the cutting and bending facility. These might include but are not limited to the following:

- The Client
- The Designer
- Project Manager
- Construction Manager
- Engineers
- Quality Managers / Inspectors

LO 2: Be able to interpret drawings to identify the installation location on site for loose bars and prefabricated elements that are being manufactured within the cutting and bending facility.

AC 2.1: Identify the exact location on the site where cut and bent loose bars and prefabricated elements are to be placed by reference to the location drawings and the overall project grid system across a wide range of drawings from the simple to the complex.

The learner must be able access information relevant to cutting and bending reinforcement steel by interpreting traditional hard copy, paper based drawing systems as well as being able to view common electronic drawing formats using common types of electronic viewing devices and software likely to be encountered by operatives within a cutting and bending facility. This will include the use of hand-held and robust site tablets and standard ICT equipment along with typical CAD and Building Information Modelling (BIM) viewer software to interpret both 2D and 3D drawing information, as well as to support evidence collection for this unit.

As part of the assessment criteria, the learner must be able to identify the location of a specific work area on site in relation to the overall project grid system for different types of drawings from the simple to the complex.

AC 2.2: Identify any restrictions placed on the use, on site of cut and bent loose bar and prefabricated elements being manufactured within the facility that are dictated by the specific work area in to which it is to be delivered and placed including access and logistics constraints, height and location of work area and lifting constraints and restrictions

The learner must be able to interpret the General Arrangement and Reinforced Concrete Detail drawings to clearly identify any restrictions placed on the use of prefabricated elements dictated by the specific work area, including the size and weight of the individual units making up the overall area of reinforcement to be fixed. (E.g. access & logistics constraints, height/location of work area, lifting constraints/restrictions)

LO 6: Be able to interpret manufacturer’s information relating to other components used to cut and bend, thread swage and prefabricated reinforcement within the cutting and bending facility

AC 6.1: Use the manufacturer’s information to explain the correct use and installation of common components and equipment used to cut and bend and prefabricate reinforcement steel sections within the cutting and bending facility

Components and equipment must include, but are not limited to the following:

- Reinforcement couplers – threaded & MBT
- Continuity strips
- Lifting eyes/points
- Cast-in items and embedments
- Spacer block, tying wire and chairs etc
- Clamps, bolts, wire slings, tie rods etc.
- Hand tools, power tools and other equipment
- COSHH.

LO 8: Be able to use British Standard BS8666:2005 to access key information relevant to cutting and bending steel reinforcement.

AC 8.3: Identify the key information contained within the British Standard BS8666: 2005 for cutting and bending steel reinforcement. Including:

The learner must have a knowledge and understanding of the following key areas of this British Standard as part of the assessment criteria:

Table 1 - Notation of steel reinforcement

- Learners would be expected to know the difference between the grades of steel reinforcement by visual inspection.
- Learners should be able to understand what grades of steel reinforcement can be used depending on what is called up within the Project Specifications, e.g. Specification requires B grade – B or C grade steel can be used. Specification requires C grade - Only C grade steel can be used.

Figure 1 – Form of Bar Schedule

- Learners need to be able to interpret written bar schedules in order to cut or bend steel reinforcement. They must also be able to cut and bend steel using the bar schedules only and without reference to a reinforcement drawing.
- Learners need to know the standard format of the bar bending schedule as in Fig 1 and what the information contained within each column in the schedule means.

Figures 2 & 3 – Mesh schedules

- These figures are for the manufacture of mesh reinforcement. Learners need to be able to interpret written mesh schedules in order to manufacture mesh reinforcement using the schedule only and without reference to a reinforcement drawing.

Figures 4, 5, 6 and Table 3 – Standard shape codes

- Learners need to have a detailed understanding of the standard reinforcement shape codes in Table 3 and how to calculate the dimensions shown in the figures and where the specific measurement start and finish on the bent bar depending on the specific shape code and radii/angles.
- Learners also needs to know how to work out the overall bar length manually based on the specific shape code, individual dimensions and the radii/angles.

Table 2 – Minimum scheduling radii, former diameters and bending allowances

- Learners need to understand the minimum diameter of bending former that can be used for each diameter of steel reinforcement bar. Need to understand that they can use a bigger bending former but NOT smaller.
- If the learner believes that they need to use a smaller bending former to bend the bar to the correct shape code then the learner needs to know inform their line manager who would then contact the site for confirmation in writing that the non-standard bending former is acceptable.
- The learner must know the simple formula that can be used to work out the minimum bending former that can be used:
(8mm to 16mm bars = 4x diameter, 20mm to 50mm bars = 7x diameter).

Table 4 – Standard fabric types and sizes

- Learners must know where to find this information within the British Standard and have a general understanding of what it is and how to interpret it.

Table 5 – Tolerances

- Learners must have a detailed knowledge of the standard cutting and bending tolerances stated in this table.
- As an example Express Reinforcement Ltd operate to +/-5mm on all bending and if this not achievable then the learner will need to know to check what is acceptable. In the case that a relaxation cannot be agreed, then the learner must contact the project via the facility Production Manager to agree what is acceptable.
- Experience shows that generally projects/customers will not accept over +/-10mm on bending.

Table 6 – Radius of bending

- Learners will need to have a detailed knowledge and understanding of what BS8666 states in this table and what is acceptable in terms of maximum limits for preformed radii.
- If the radius exceeds these limits, then the bar can be sent as straight but the learner needs to know that they must always check with the project via the facility Production Manager to agree what is acceptable.

Figures 7 & 8 – Bending of fabric reinforcement

- Learners must know where to find this information within the British Standard and have a general understanding of what it is and how to interpret it.

Machine ergonomics

- When cutting and bending reinforcement, learners will need to know how to set up the machinery and where to position themselves and their hands for particular shape codes when operating cutting and bending machinery.
- The above is taught through induction, RA's, SOP's, SSOW and on job training via a buddy system with an experienced operator.

Traceability – This is VERY IMPORTANT

- Learners need to understand the critical importance of the complete traceability of all steel reinforcement materials throughout all stages of the cutting and bending process. If there is no traceability of the product then the steel is effectively scrap and will be rejected.
Learners need to be able to understand and interpret steel mill “Cast” tickets/numbers and extract the relevant materials testing information so that they can complete traceability sheets.

LO 9: Be able to use the ICT equipment and software likely to be encountered by operatives within facility to access information to support cutting and bending operations.

AC 9.1: Demonstrate how common ICT equipment is used for sharing and viewing information relating to the cutting and bending operations within the facility.

AC 9.2: Explain how common ICT equipment is currently used to aid cutting and bending of reinforcement within the facility.

The use of the following standard ICT equipment must be covered as a minimum as part of these assessment criteria:

- Standard laptop/desktop
- Typical tablet computer
- Rugged site tablets / handheld devices e.g. Trimble

3.7. Unit 8 - Cutting and Bending Reinforcing Steel to Shape

Unit Title	Cutting and Bending Reinforcing Steel to Shape
Ofqual unit reference number (code)	D/505/8166
Unit Level	Two
Unit Credit Value	20
GLH	160
Assessment Guidance	<p>This unit must be delivered and assessed in accordance with the NOCN Level 2 Diploma in Steelfixing Occupations (Construction) qualification specification. Specific attention must be paid to the following criteria:</p> <ul style="list-style-type: none"> • Delivery partners must have the training facilities and resources to support the creation of a comprehensive simulated civil engineering site. • Additional Knowledge, skills and experience requirements of Tutor/Assessors and Internal Verifiers, to ensure the delivery of the qualification to the required standards. • Mandatory practical exercise specifications. These exercises have been designed to simulate typical steelfixing activities that are likely to be carried out in the workplace. This unit must be assessed using simulated workplace evidence generated as the learner is carrying out the cutting and bending reinforcing steel to shape practical exercises.

This unit has 9 learning outcomes.

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	The learner can:
1. Know the requirements for cutting and bending reinforcing steel.	1.1. Interpret drawings, schedules, specifications and other key information such as risk assessments, method statements, quality documentation and manufacturer's information relative to the task when cutting and bending reinforcing steel to shape. 1.2. Identify any restrictions placed on the use on site of a prefabricated element being manufactured within the facility that is dictated by the specific work area in which it is to be delivered and placed, including access and logistics constraints, height and location of work area, lifting constraints and restrictions. 1.3. Explain the organisation's procedures for clarifying information, errors and/ or discrepancies where required when cutting and bending reinforcing steel to shape.

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	The learner can:
	<p>1.4. Explain the current Health and Safety legislation, statutory regulations, official guidance and organisational procedures for the identification and mitigation of hazards, producing safe methods of work and for dealing with accidents, emergencies and problems when cutting and bending reinforcing steel to shape.</p>
<p>2. Know how to prepare for cutting and bending reinforcing steel by selecting the correct tools and equipment for the type of work being carried out.</p>	<p>2.1. Select the correct Personal Protective Equipment (PPE) appropriate to the task being carried out in accordance with legislation, official guidance, the risk assessment, method statement and specification when cutting and bending reinforcing steel to shape.</p> <p>2.2. Select the correct cutting and bending equipment and hand tools required for the type of cutting and bending operation being carried out, in accordance with the risk assessment, method statement and specification when cutting and bending reinforcing steel to shape.</p> <p>2.3. Describe the equipment manufacturer's safety precautions and safe systems of work contained within the specific operation manual for the use, inspection, care and maintenance of cutting and bending machinery including:</p> <ul style="list-style-type: none"> a) Pre start checks on machinery b) Work area safety & report procedure c) Selection of bending pins and rollers d) Setting of back stops and safety limit switches e) Emergency stops f) Start up after emergency stop procedure. <p>2.4. Explain the organisation's procedure for reporting problems associated with the resources, tools and equipment for cutting and bending reinforcing steel to shape including how these are applied.</p>
<p>3. Be able to select the required quantity and quality of materials, components, fixings and resources for cutting and bending reinforcing steel.</p>	<p>3.1. Interpret specifications including BS8666:2005, bar bending schedules and delivery tickets to identify the materials required for cutting and bending reinforcing steel to shape.</p> <p>3.2. Demonstrate the correct selection and use of common types of materials, components and fixings in accordance with BS8666:2005 and manufacturer's information for all cutting and bending operations including:</p> <ul style="list-style-type: none"> a) Reinforcement grades b) Tying wire (3.25 wire) used for bundling stock or cut and bent rebar c) Shape codes d) Reinforcement couplers – threaded and MBT e) Lifting eyes/points.

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	The learner can:
	<p>3.3. Describe the characteristics, qualities, uses, limitations and common causes of damage or defects associated with the materials, components, fixings and resources being used for cutting and bending reinforcing steel to shape.</p> <p>3.4. State the typical hazards associated with the materials, components, fixings and resources being used for cutting and bending reinforcing steel to shape explaining how these can be mitigated by applying appropriate risk control measures and safe methods of work.</p> <p>3.5. Demonstrate the safe use, storage and handling of materials, components and fixings for cutting and bending reinforcing steel to shape.</p> <p>3.6. Demonstrate how to calculate quantity, length, area and wastage of reinforcement associated with the methods and procedures used for specific cutting and bending tasks.</p> <p>3.7. Demonstrate the safe lifting, handling and moving of loose bars, bundles, stock cut and bend reinforcement and prefabricated elements manufactured within the cutting and bending facility.</p>
<p>4. Be able to comply with the given specification, bending schedules and safe systems of work to cut and bend reinforcing steel efficiently to given working instructions, agreed quality criteria and tolerances.</p>	<p>4.1. Demonstrate the work skills to sort, measure, mark out, cut and bend reinforcing steel to shape in accordance with the drawings, bending schedules and BS 8666:2005.</p> <p>4.2. Demonstrate the correct use of cutting and bending machinery by completing the following:</p> <ul style="list-style-type: none"> a) Applying safety precautions associated with using cutting and bending machinery b) Starting the cutting or bending machine c) Material selection and loading d) Preparing to cut and/or bend e) Carrying out the bending operation f) Carrying out the correct maintenance procedures g) Shutting down the machine. <p>4.3. Demonstrate the correct positioning of hands and body relative to the type of cutting and bending machine being used and the type of bar and shape code being bent, to avoid injury.</p>
<p>5. Be able to avoid risk by operating safe working practices when cutting and bending reinforcing steel.</p>	<p>5.1. Demonstrate compliance with the appropriate risk assessment, method statement and task sheet for the specific cutting and bending activity being carried out.</p> <p>5.2. Demonstrate the ability to carry out manual handling assessments for a number of different types of cutting and bending operations.</p>

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	The learner can:
	<p>5.3. Demonstrate safe working practices when cutting and bending reinforcing steel to shape.</p> <p>5.4. Demonstrate the safe use and storage of materials, hand tools, bending tools, portable power tools and ancillary equipment used when cutting and bending reinforcing steel to shape.</p> <p>5.5. Explain the organisation's procedure for reporting problems associated with safe methods of work for cutting and bending reinforcing steel, establishing who has authority to rectify them.</p>
<p>6. Be able to complete the work within the allocated time in accordance with the agreed programme of work to meet the needs of other occupations and the client when cutting and bending reinforcing steel.</p>	<p>6.1. Demonstrate completion of the work within the allocated time in accordance with the agreed programme of work to meet the needs of other occupations and the client when cutting and bending reinforcing steel to shape.</p> <p>6.2. State the purpose of the work programme and explain why deadlines should be adhered to when cutting and bending reinforcing steel to shape.</p> <p>6.3. Explain the types of programme, progress charts and timetables that are available and how these can be used to obtain programme and progress information relating to cutting and bending operations.</p> <p>6.4. Interpret programmes, progress charts, and timetables to obtain programme and progress information relative to the cutting and bending of reinforcing steel to shape.</p> <p>6.5. State the typical output rates (kg/man hour) for the production of standard shape codes for standard diameter bars.</p> <p>6.6. Explain the organisational procedures for reporting circumstances which will affect the work programme for the production of cut and bent reinforcing steel.</p>
<p>7. Be able to minimise the risk of damage to the work and surrounding area when cutting and bending reinforcing steel.</p>	<p>7.1. Explain the common causes and types of damage that can occur to the work and surrounding areas when cutting and bending reinforcing steel.</p> <p>7.2. Explain what good practices should be put in place to avoid damage occurring to the work and surrounding areas as a result of general workplace activities, other occupations and adverse weather conditions when cutting and bending reinforcing steel.</p> <p>7.3. Demonstrate how to minimise damage by applying good practice and maintaining a clean work space for the specific task being carried out including:</p> <ul style="list-style-type: none"> a) Reinforcement/Ancillary Items b) Couplers c) Machine Tooling. <p>7.4. Explain how general environmental legislation and COSHH legislation relates to waste disposal on site</p>

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	The learner can:
	<p>when cutting and bending reinforcing steel.</p> <p>7.5. Explain the correct disposal procedures for common waste materials associated with cutting and bending operations.</p> <p>7.6. Explain why it is important to follow the correct disposal procedures for common waste associated with cutting and bending operations.</p> <p>7.7. Explain the organisation's security procedures for protecting the site, workplace, company, sensitive information and the operative, including partially complete or completed work, plant, tools and equipment and how the procedures are implemented when cutting and bending reinforcing steel to shape.</p> <p>7.8. Explain the organisation's procedures for reporting breaches of security to the relevant authorities when cutting and bending reinforcing steel to shape.</p>
<p>8. Be able to complete work to agreed quality criteria in accordance with the requirements set out in drawings, bending schedules, labels and BS 8666:2005 when cutting and bending reinforcing steel to shape.</p>	<p>8.1. Demonstrate compliance with agreed quality criteria as stated in the drawings, bending schedules, labels and BS 8666:2005 when cutting and bending reinforcing steel to shape.</p> <p>8.2. Extract quality criteria from BS 8666:2005 when cutting and bending reinforcing steel to shape.</p> <p>8.3. Identify types and grades of steel for cutting and bending operations.</p> <p>8.4. Work to given tolerances when cutting and bending steel reinforcement to shape.</p>
<p>9. Understand the importance of working with other occupations when cutting and bending reinforcing steel to shape.</p>	<p>9.1. Explain the needs of other occupations in relation to cutting and bending reinforcing steel to shape.</p> <p>9.2. Demonstrate effective communication with other occupations when cutting and bending reinforcing steel to shape.</p> <p>9.3. Explain the importance of teamwork when cutting and bending reinforcing steel to shape.</p> <p>9.4. Demonstrate effective teamwork when cutting and bending reinforcing steel to shape.</p>

Unit 8: Cutting and Bending Reinforcing Steel to Shape

Unit summary

Cutting and bending reinforcing steel to shape is one of the main practical skills required by steel fixers. Cutting and bending reinforcing steel to shape is a practical, “hands on” trade that cannot be taught through structured classroom learning alone and as such, this unit has been designed to be assessed through the learners spending a significant amount of time during the course completing practical exercises in accordance with the ‘cutting and bending reinforcing steel to shape’ practical exercise specification. The exercises are designed to be realistic representations of typical cutting and bending situations that the learners are likely to encounter on most construction sites and they will be delivered in a realistic simulated environment that portrays the conditions that they are likely to encounter on a typical construction site. The practical exercises combined with the structured learning of basic steel fixing skills at the start of the course will prepare the learner with demonstrable work skills, which combined with the realistic nature of the training environment, are easily transferred to carrying out typical cutting and bending reinforcing steel to shape tasks on most construction sites.

Assessment and evidence

Learners must provide evidence against all of the assessment criteria; the evidence for this unit will come from **two** main sources; direct evidence produced by the learner demonstrating knowledge and skills when completing cutting and bending reinforcing steel to shape exercises, whilst the underpinning knowledge and understanding can be demonstrated through a variety of assessment methods.

The direct evidence includes naturally occurring documentary evidence (hard copy and electronic), and direct observation of activities that can be evidenced through either digital recordings, assessor observation reports, witness statements, etc.

Underpinning knowledge and understanding can be evidenced through a variety of assessment methods including; multiple choice testing and question and answer exercises (electronic or paper-based).

Additional evidence requirements

To complete this unit, the learner will not **only** need to demonstrate that they have met the main learning outcomes and assessment criteria but will also need to provide evidence that they have gained a knowledge and understanding of all of the additional specifications stated under the specific learning outcomes (LO) and assessment criteria (AC) listed below:

LO 1: Know the requirements for cutting and bending reinforcing steel.

AC 1.1: Interpret drawings, schedules, specifications and other key information such as risk assessments, method statements, quality documentation and manufacturers' information relative to the task when cutting and bending reinforcing steel to shape

The typical drawings, schedules, specifications and other types of key construction documentation that must be covered as a minimum part of the assessment criteria must include but are not limited to the following:

Drawings

- General arrangement drawings (Plans, Sections and Elevations etc) where relevant to the cutting and bending of reinforcement or the manufacture of a prefabricated element within the cutting and bending facility
- Reinforced concrete drawings
- Cast-in item and embedment drawings where relevant to the cutting and bending of reinforcement or the manufacture of a prefabricated element within the cutting and bending facility
- Installation sequence drawings where relevant to the cutting and bending of reinforcement or the manufacture of a prefabricated element within the cutting and bending facility
- Temporary Works drawings where relevant to the cutting and bending of reinforcement or the manufacture of a prefabricated element within the cutting and bending facility

Specifications

- British Standard BS8666:2005 - Scheduling, dimensioning, bending and cutting of steel reinforcement for concrete

Schedules

- Schedules required specifically for the manufacture of prefabricated elements within the cutting and bending facility itself.
- Component / Embedded items schedules
- Programme schedules – In particular typical targets in terms of production hours and rates (kg/man hour) for standard bar diameters.

Bending Schedule

- Standard formats of bending schedules
- Standard Shape Codes in accordance with BS 8666:2005

Other Documentation

- Work plans
- Written Work Instructions
- Risk assessments, method statements and task sheets
- Manufacturer's information

AC 1.2: Identify any restrictions placed on the use, on site, of loose bar and prefabricated elements being manufactured within the facility that are dictated by the specific work area in to which it is to be delivered and placed including access and logistics constraints, height and location of work area, lifting constraints and restrictions

Interpret the drawing to identify any restrictions placed on the use of prefabricated elements dictated by the specific work area (e.g. access & logistics constraints, height/location of work area, lifting constraints/restrictions)

AC 1.4: State the current Health and Safety legislation, statutory regulations, official guidance, and organisational procedures for the identification and mitigation of hazards, producing safe methods of work and for dealing with accidents, emergencies and problems when cutting and bending reinforcing steel to shape.

Compliance with the following Health and Safety legislation, statutory regulations and official guidance must be covered as a minimum as part of the assessment criteria:

General workplace:

- HASAW Act 1974
- Construction (Health, Safety & Welfare) Regulations 1996
- PPE at Work Regulations 1992
- Control of Noise at Work Regulations 2005
- Control of Vibration at Work Regulations 2005
- Health and Safety First Aid Regulations 1981
- RIDDOR 1995
- HSE Guidance Notes
- Construction Industry Guidance Notes
- CIRIA and other Guides

Below ground:

- CIRIA Report 97 – Trenching Practice

Confined Spaces:

- Confined Spaces Regulations 1997

Working at Height:

- Working at Height Regulations 2005

With tools and equipment:

- PUWER 1998

With materials and substances:

- COSHH Regulations 2002
- Hazardous Materials Regulations

With movement / storage of materials by manual handling and mechanical lifting:

- Manual Handling Operations Regulations 1992
- LOLER 1998

LO 2: Know how to prepare for cutting and bending reinforcing steel by selecting the correct tools and equipment for the type of work being carried out.

AC 2.1: Select the correct personal protective equipment (PPE) appropriate to the task being carried out in accordance with legislation, official guidance, the risk assessment and method statement and the specification when cutting and bending reinforcing steel to shape.

The use of the following standard personal protective equipment (PPE) must be covered as a minimum as part of the assessment criteria:

- Safety Helmet
- Hi-vis vests
- Protective footwear
- Eye protection
- Hand protection
- Ear protection
- Safety overalls

AC 2.2: Select the correct hand tools, bending tools, portable power tools and other equipment required for the type of work being carried out in accordance with the risk assessment, method statement and specification when cutting and bending reinforcing steel to shape.

When selecting the tools and equipment in accordance with the criteria above, the learner must be able to correctly identify and select the required tools and equipment for the type of cutting and bending work being carried out and demonstrate the ability to inspect all of the tools selected to ensure that they are of good condition, safe to use and fit for purpose. They must also be able to demonstrate the correct inspection, care, maintenance and storage of the tools and equipment required for the cutting and bending of reinforcement steel to shape.

LO 3: Be able to select the required quantity and quality of materials, components, fixings and resources for cutting and bending reinforcing steel

AC 3.1: Interpret specifications including BS8666:2005, bar bending schedules and delivery tickets to identify the materials required for cutting and bending reinforcing steel to shape.

As part of this assessment, the learners will need to demonstrate a detailed knowledge and understanding of British Standard BS 8666:2005 for the scheduling, dimensioning, bending and cutting of steel reinforcement for concrete. In particular, the learners will need to demonstrate compliance with the following key sections from British Standard BS 8666:2005.

Table 1 - Notation of steel reinforcement

- Learners would be expected to know the difference between the grades of steel reinforcement by visual inspection.
- Learners should be able to understand what grades of steel reinforcement can be used depending on what is called up within the Project Specifications, e.g. Specification requires B grade – B or C grade steel can be used. Specification requires C grade - Only C grade steel can be used.

Figure 1 – Form of Bar Schedule

- Learners need to be able to interpret written bar schedules in order to cut or bend steel reinforcement. They must also be able to cut and bend steel using the bar schedules only and without reference to a reinforcement drawing.
- Learners need to know the standard format of the bar bending schedule as in Fig 1 and what the information contained within each column in the schedule means.

Figures 2 & 3

- These figures are for the manufacture of mesh reinforcement. Learners need to be able to interpret written mesh schedules in order to manufacture mesh reinforcement using the schedule only and without reference to a reinforcement drawing.

Figures 4,5,6 and Table 3 – Standard shape codes

- Learners need to have a detailed understanding of the standard reinforcement shape codes in Table 3 and how to calculate the dimensions shown in the figures and where the specific measurement start and finish on the bent bar depending on the specific shape code and radii/angles.
- Learners also needs to know how to work out the overall bar length manually based on the specific shape code, individual dimensions and the radii/angles.

Table 2 – Minimum scheduling radii, former diameters and bending allowances

- Learners need to understand the minimum diameter of bending former that can be used for each diameter of steel reinforcement bar. Need to understand that they can use a bigger bending former but **NOT** smaller.
- If the learner believes that they need to use a smaller bending former to bend the bar to the correct shape code then the learner needs to know inform their line manager who would then contact the site for confirmation in writing that the non-standard bending former is acceptable.
- The learner must know the simple formula that can be used to work out the minimum bending former that can be used:
(8mm to 16mm bars = 4x diameter, 20mm to 50mm bars = 7x diameter).

Table 4 – Standard fabric types and sizes

- Learners must know where to find this information within the British Standard and have a general understanding of what it is and how to interpret it.

Table 5 – Tolerances

- Learners must have a detailed knowledge of the standard cutting and bending tolerances stated in this table.
- As an example Express Reinforcement Ltd operate to +/-5mm on all bending and if this not achievable then the learner will need to know to check what is acceptable. In the case that a relaxation cannot be agreed, then the learner must contact the project via the facility Production Manager to agree what is acceptable.
- Experience shows that generally projects/customers will not accept over +/-10mm on bending.

Table 6 – Radius of bending

- Learners will need to have a detailed knowledge and understanding of what BS8666 states in this table and what is acceptable in terms of maximum limits for preformed radii.
- If the radius exceeds these limits, then the bar can be sent as straight but the learner needs to know that they must always check with the project via the facility Production Manager to agree what is acceptable.

Figures 7 & 8 – Bending of fabric reinforcement

- Learners must know where to find this information within the British Standard and have a general understanding of what it is and how to interpret it.

Machine ergonomics

- When cutting and bending reinforcement, learners will need to know how to set up the machinery and where to position themselves and their hands for particular shape codes when operating cutting and bending machinery.
- The above is taught through induction, RA's, SOP's, SSOW and on job training via a buddy system with an experienced operator.

Traceability – This is VERY IMPORTANT

- Learners need to understand the critical importance of the complete traceability of all steel reinforcement materials throughout all stages of the cutting and bending process. If there is no traceability of the product then the steel is effectively scrap and will be rejected.
- Learners need to be able to understand and interpret steel mill "Cast" tickets/numbers and extract the relevant materials testing information so that they can complete traceability sheets.

AC 3.2: Demonstrate the correct selection and use of common types of materials, components and fixings in accordance with BS8666:2005 and manufacturer's information for all cutting and bending operations including:

- Reinforcement grades

- Tying wire (3.25 wire) used for bundling stock or cut and bent rebar
- Shape codes
- Reinforcement couplers – threaded and MBT
- Lifting eyes/points

When selecting the common types of materials, components and fixings listed, the learner must be able to correctly identify and select the items required for the type of work being carried out and demonstrate the ability to inspect all of the items selected to ensure that they are of good condition, safe to use and fit for purpose. They must also be able to demonstrate the correct inspection care, maintenance and storage of the items required for the manufacture and installation of prefabricated reinforcement steel sections.

This will include compliance with the following table from British Standard BS 8666:2005:

Table 1 - Notation of steel reinforcement

- Learners would be expected to know the difference between the grades of steel reinforcement by visual inspection.
- Learners should be able to understand what grades of steel reinforcement can be used depending on what is called up within the Project Specifications, e.g. Specification requires B grade – B or C grade steel can be used. Specification requires C grade - Only C grade steel can be used.

AC 3.4: State the typical hazards associated with using the materials, components, fixings and resources being used for cutting and bending reinforcing steel to shape explaining how these can be mitigated by applying appropriate risk control measures and safe methods of work.

The learner must understand the typical risks associated with cutting and bending steel reinforcement. The risks that must be covered as a minimum as part of the assessment criteria include but are not limited to the following;

- Fire Hazards
- Lifting and handling
- Spillages and COSHH incidents
- Falls from Height
- Severing of Limbs
- Moving plant and vehicles
- Repetitive Strain Injury (RSI)
- Manual handling injuries, e.g. back injuries
- Vibration White Finger (VWF)
- Slips, trips and falls
- Cuts and abrasions
- Weils Disease (Leptospirosis)
- Animal faeces
- Cold and Heat Injuries (Exposure, sunstroke, dehydration)

AC 3.6: Demonstrate how to calculate quantity, length, area and wastage of reinforcement associated with the methods and procedures used for specific cutting and bending tasks.

Learners must have a detailed understanding of the methods for calculating quantity, length, area and wastage of reinforcement when carrying out cutting and bending tasks in accordance with British Standard BS 8666:2005. This will include a knowledge of the following specific sections and tables from BS 8666:2005:

- Section 7: Dimensions.
- Section 8: Scheduling
- Table 2 - Minimum scheduling radii, former diameters and bend allowances
- Table 3 - Standard shapes, their method of measurement and calculation of length.
- Section 9: Tolerances on cutting and bending dimensions

LO 4: Be able to comply with the given specification, bending schedules and safe systems of work to cut and bend reinforcing steel efficiently to given working instructions, agreed quality criteria and tolerances in accordance with drawings, bending schedules and BS 8666:2005

AC 4.1: Demonstrate the work skills to sort, measure, mark out, cut and bend reinforcing steel to shape in accordance with the drawings, bending schedules and BS 8666:2005.

The learner must be able to demonstrate a knowledge and understanding of the specific requirements for cutting and bending steel reinforcement in accordance with the drawings, schedules and BS 8666:2005.

The learner must be able to demonstrate all of the following work skills when sorting, measuring, marking out and cutting and bending reinforcement.

Sort:

- Interpret bending schedules and delivery tickets.
- Safe lifting, moving and handling of reinforcement.
- Identify different bar marks.
- Identify grades and types of steel.
- Identify types of couplers.
- Inspect reinforcement and associated materials and ancillary items for damage and quality defects.
- Sort reinforcement in to work packages, sequence of cutting and bending and priority
- Identification of missing bar marks/elements
- Ensure that the required quality, traceability and testing documentation is in place.
- Understand why CARES approval and traceability are important, including the use of Cast No's and materials testing certificates.
- Ensure that stock and cut and bent reinforcement is stored correctly.

Measure & Mark out:

- The quantity and number of bars
- Diameter
- Length
- Sizes of bundles
- Weight (Tonnage) and limits for lifting (Max 1.5t)
- Bending dimensions and radii.
- Tolerances of cut and bent reinforcement are in accordance with BS8666.
- Sizes and types of coupler that have been delivered.

Cut and Bend:

- Have a detailed knowledge and demonstrate safe techniques for cutting and bending of steel to the required quality standards via the practical cutting and bending exercises described in AC 4.2 below

a. Safety precautions associated with using cutting and bending machinery including:

- PPE to be worn
- Pre start checks on machinery
- Work area safety/report procedure
- Emergency stops
- Safe system of work
- Operation manual
- Start up after emergency stop procedure

b. Starting the cutting or bending machine including.

- Isolation switch
- On/Off buttons
- Operation of foot pedals
- Safety limit switches
- Directional controls
- Reporting procedure

c. Material selection and loading including:

- Loading of bars onto machine
- Manual handling precautions
- Label identification
- Bar diameter identification
- Shape code identification
- Measurement of bar
- Floor/baton preparation

d. Preparing to cut and bend including:

- Selection of bending pins and rollers
- Selection/manual handing of bending former to BS8666; 2005
- Setting of back stops and safety limit switches

e. The bending operation including:

- Setting of the bending angle
- Select table position
- Directional controls
- The measurement of bar and checking procedure to BS8666; 2005 tolerances
- Hand positions and manual handling whilst bending
- Movement and direction of the bar being bent
- Bend bar and checking of dimensions and correction procedure
- Removal of bent bar from the machine
- Safe stacking, bundling and labelling of bent bars
- Preparation for transportation

f. Maintenance procedures including:

- Daily maintenance
- Weekly maintenance
- Fault reporting procedure

g. Shutting down the machine including:

- On/off switch
 - Isolation switch
- Positioning of hands and body relative to the type of cutting and bending machine being used and the type of bar and shape code being bent. **THIS IS A CRITICAL SAFETY ASPECT!**

AC 4.2: Demonstrate the correct use of cutting and bending machinery by completing the following:

- Applying safety precautions associate with using cutting and bending machinery.
- Starting the cutting or bending machine
- Material selection and loading.
- Preparing to cut and/or bend.
- Carrying out the bending operation.
- Carrying out the correct maintenance procedures.
- Shutting down the machine.

The learner must be able to demonstrate an adequate knowledge and understanding of the safe operation of basic cutting and bending equipment and produce examples of cut and bent reinforcement of a suitable complexity, in accordance with the drawings, schedules and BS 8666:2005 and to the required quality standards, by completing the following practical cutting and bending exercises:

Exercise 1 – Manual handing training and practical exercises specific to the practical cutting and bending exercises below and specifically for lifting, twisting etc.

Exercise 2 – Identify the correct type, grade, diameter etc. of reinforcement bars including Interpretation of delivery and production tickets and checking and producing the required materials traceability information.

Exercise 3 – Calculate the A, B and C dimensions, radius and overall lengths of bars for the following standard shaped bars including L-bars, U-Bars, Links, Chairs, Hooks (i.e. Shape codes– 11, 12, 13, 21, 22, 26, 33, 51, 63, 98), for a range of standard bar diameters including 8, 10, 12, 16, 20, 25, 32 and 40mm.

Exercise 4 – Calculate the efficient use of materials by selecting appropriate combinations of bar length and shape code that can be cut from a standard 12m stock length of steel reinforcing bar to minimise wastage to an acceptable percentage (Approx. 2% overall wastage).

Exercise 5 – Carry out prestart checks on hand tools and machines to be used for the practical cutting and bending operations in Exercises 6 & 7 below including the following

Safety Precautions:

- PPE to be worn
- Pre start checks on machinery
- Work area safety/report procedure
- Emergency stops
- Safe system of work
- Operation manual
- Start up after emergency stop procedure

Exercise 6 – Set up typical basic cutting and bending machines for the cutting and bending of reinforcement bar for the following standard shaped bars including L-bars, U-Bars, Links, Chairs, Hooks (i.e. Shape codes– 11, 12, 13, 21, 22, 26, 33, 51, 63, 98), for a range of standard bar diameters including 8, 10, 12, 16, 20, 25, 32 and 40mm. This exercise needs to include

Preparing to Bend by:

- Selecting the correct bending pins and rollers
- Selection and manual handing of bending former to BS 8666;2005
- Setting of back stops and safety limit switches

Exercise 7 – Use of a standard shear line machine to cut bars to the correct length for bending the following standard shaped bars including L-bars, U-Bars, Links, Chairs, Hooks (i.e. Shape codes– 11, 12, 13, 21, 22, 26, 33, 51, 63, 98), for a range of standard bar diameters including 8, 10, 12, 16, 20, 25, 32 and 40mm.

Exercise 8 – Produce and check conformance of standard shaped bars including L-bars, U-Bars, Links, Chairs, Hooks (i.e. Shape codes – 11, 12, 13, 21, 22, 26, 33, 51, 63, 98) on a basic power bender for a range of standard bar diameters including 8, 10,

12, 16, 20, 25, 32 and 40mm and measure to check compliance. Including the logging of bars which have been produced to ensure traceability and the following:

a. Starting the cutting or bending machine including.

- Isolation switch
- On/Off buttons
- Operation of foot pedals
- Safety limit switches
- Directional controls
- Reporting procedure

b. Material selection and loading including:

- Loading of bars onto machine
- Manual handling precautions
- Label identification
- Bar diameter identification
- Shape code identification
- Measurement of bar
- Floor/baton preparation

c. Preparing to cut and bend including:

- Selection of bending pins and rollers
- Selection/manual handing of bending former to BS8666; 2005
- Setting of back stops and safety limit switches

d. The bending operation including:

- Setting of the bending angle
- Select table position
- Directional controls
- The measurement of bar and checking procedure to BS8666; 2005 tolerances
- Hand positions and manual handling whilst bending
- Movement and direction of the bar being bent
- Bend bar and checking of dimensions and correction procedure
- Removal of bent bar from the machine
- Safe stacking, bundling and labelling of bent bars
- Preparation for transportation

e. Maintenance procedures including:

- Daily maintenance
- Weekly maintenance
- Fault reporting procedure

f. Shutting down the machine including:

- On/off switch
- Isolation switch

Positioning of hands and body relative to the type of cutting and bending machine being used and the type of bar and shape code being bent. **THIS IS A CRITICAL SAFETY ASPECT!**

Exercise 9 – Application of the correct techniques for the lifting, moving, storing and handling of standard bundles of reinforcement bar including straight bar, L-bars, U-Bars, Links, Chairs, Hooks.

Exercise 10 – Safe loading and stacking of reinforcement bundles on to trailers for delivery to projects.

Exercise 11 – Coupler training including:

- Identification of types of coupler
- Use of threading and swaging machines for different types of coupler such as ERICO Lenton, DEXTRA Griptec, BARTEC etc. for both tapered and parallel threaded types of coupler.

LO 5: Be able to avoid risk by operating safe working practices when cutting and bending reinforcing steel

AC 5.3: Demonstrate safe working practices when cutting and bending reinforcing steel to shape.

Portfolios must provide evidence that safe working practices have been demonstrated for these activities:

- Lifting and moving loose bundles of stock steel cut and bent steel or prefabricated elements.
- Measuring, marking out, cutting and bending reinforcement steel to standard shapes using recognised codes.
- Using hand tools, power tools, hand bending machines and power bending machines.
- Carrying out hot works including procedures, permits, precautions and emergencies.
- Incorporating reinforcement coupler and continuity systems.
- Fixing/tying steel.
- Sorting, storing, handling and protecting steel and fixings.
- Working at height.
- Safe access and safe use of access equipment.

LO 7: Be able to minimise the risk of damage to the work and surrounding area when cutting and bending reinforcing steel.

AC 7.1: Explain the common causes and types of damage that can occur to the work and surrounding areas when cutting and bending reinforcing steel.

The learner must be able to demonstrate a knowledge and understanding of all of the items listed below when explaining the common causes and types of damage that can occur to the work and surrounding areas when cutting and bending reinforcing steel. They must also know how to minimise damage and maintain their workspace and the surrounding area in a clean condition when cutting and bending reinforcing steel.

Workspace:

Reinforcement/Ancillary Items:

- Protection from deformation and impact
- Protection from contamination from oil, paint etc.
- Protection from cutting.

Couplers:

- Protection from deformation and impact
- Protection of threads (male and female ends)
- Ensure protection caps are in place.
- Taping and greasing if required.
- Removal of excess oil from cutting/threading

Machine Tooling:

- Pre-start checks and inspections
- General wear and tear
- Cleaning
- Recording inspections
- Recognition of common faults
- Fault reporting procedures and rectification

Bending Formers:

- Storage and protection
- Inspection

Surrounding Area:

- Access routes
- Plant, tools and equipment
- Previously completed works
- General cleanliness

Minimise damage and maintain a clean work space:

- Reasons for maintaining a clean work space.
- What a good clean work space looks like.
- Maintaining safe, adequate and clear access and egress routes including trip hazards.
- Safe storage of materials.
- Safe storage and use of tools and equipment.
- Adequate task lighting.

- Regular work space inspections e.g. LOR Take 5 initiatives.
- Materials ordering and management within the work space.
- Storage of COSHH

AC 7.3: Demonstrate how to minimise damage by applying good practice and maintaining a clean work space for the specific task being carried out including:

- Reinforcement/Ancillary items,
- couplers,
- machine toilers

Evidence must include:

a. Reinforcement/Ancillary Items:

- Protection from deformation/impact
- Contamination from oil, paint etc.
- Protection from cutting

b. Couplers:

- Protection from deformation and impact
- Protecting threads (male and female ends)
- Ensuring protection caps are in place
- Taping/Greasing if required
- Removal of excess oil from cutting/threading operations

c. Machine Tooling:

- Pre-start checks and inspections
- General wear and tear
- Cleaning
- Recording inspections
- Recognition of common faults.
- Fault reporting procedures and rectification
- Storage and protection of tools and equipment
- Inspection of bending formers

AC 7.4: Explain how environmental legislation and COSHH legislation relates to the disposal of waste on site when cutting and bending reinforcing steel

Compliance with the following current environmental and COSHH statutory regulations and official guidance relating to the disposal of waste on site must be covered as a minimum as part of this assessment criterion:

Statutory regulations:

- Current environmental, waste disposal & COSHH Legislation

Official guidance:

- British Standards
- Codes of Practice
- HSE Guidance Notes
- Environment Agency Guidance
- Other agencies such as Natural England, etc.

Organisational procedures:

- Environmental Policy, Procedures & Plans
- Site Waste Management Plans
- Site environmental inspections and audits.
- Typical site environmental controls including, waste segregation, COSHH bins, recycling and hazardous waste disposal.

Manufacturer's information:

- COSHH Data sheets.
- Plant, tools and equipment user manuals
- General construction materials associated with prefabrication of reinforcement
- Construction Industry Guidance

AC 7.5: Explain the correct disposal procedures for common waste associated with fixing in situ and prefabricated reinforcing steel

The learner must be able to demonstrate the correct disposal procedures for common waste associated with the manufacture and installation of prefabricated reinforcement steel sections must include as a minimum but are not limited to the following;

- Off-cuts of reinforcing bars
- Tying wire
- Concrete spacer blocks
- Timber
- Plastic
- COSHH items such as spray cans, oil/paint tins
- Oils and lubricants

AC 7.7: Explain the organisation's security procedures for protecting the site, workplace, company, sensitive information and the operative including partially complete or completed work, plant, tools and equipment and how the procedures are implemented when cutting and bending reinforcing steel to shape

The learner must be able to demonstrate a knowledge and understanding of organisations procedures for protecting personal security and security of the site, workplace, partially completed or completed work, plant, tools and equipment, sensitive information and how to report breaches of security to the relevant authorities. This should also include the following:

- How the security procedures affect them personally, their responsibilities under those procedures, the disciplinary procedures and on-going commitments to security after leaving the project.
- The typical threats to personal and project security such as terrorist, activists, the press, blackmail, bribery, etc.

LO 8: Be able to complete work to the agreed quality criteria in accordance with the requirements set out in drawings, bending schedules, labels and BS 8666:2005 when cutting and bending reinforcing steel to shape.

AC 8.1: Demonstrate compliance with agreed quality criteria as stated in the drawings, bending schedules, labels and BS 8666:2005 when cutting and bending reinforcing steel to shape.

The learner must be able to demonstrate compliance with the following specification requirements as a minimum:

- Length of bars is within tolerance
- Bar size and diameter
- Steel grade
- Bar marks
- Quantity and number of bars.
- Bending dimensions and radii.
- Sizes, types, positions and levels of couplers.
- Required quality and testing documentation and as-built information
- Tolerances of cut and bent reinforcement are in accordance with BS8666.

AC 8.3: Identify types and grades of steel for cutting and bending operations

The learner must be able to identify the following grades of steel as a minimum:

- Mild steel
- High yield steel Types H, A, B, C, material properties/differences, different rib patterns
- Reinforcing Mesh
- Galvanised Reinforcement
- Stainless Steel Reinforcement (S type)
- Epoxy coated reinforcement
- Cryo reinforcement (X-type)
- Identifying CARES Approved Reinforcement – CARES marking system, country of origin and mill
- Specialist types of bar, Dywidag, GEWI and Macalloy bars etc.

LO 9: Understand the importance of working with other occupations when cutting and bending reinforcing steel to shape

AC 9.1: Explain the needs of other occupations in relation to cutting and bending reinforcing steel to shape

The learner must be able to describe the basic needs of the other trades listed below and how they interface with them when manufacturing and installing prefabricated reinforcement sections. The other trades are to include, but are not limited to:

- Crane operators and Slinger Signallers
- Plant operators
- Delivery Drivers
- Maintenance Staff
- Quality Assurance
- Health and Safety

3.8. Unit 9 - Appreciation of ICT and 3D Building Information Modelling for Civil Engineering Operatives

Unit Title	Appreciation of ICT and 3D Building Information Modelling for Civil Engineering Operatives
Ofqual unit reference number (code)	H/505/8167
Unit Level	Two
Unit Credit Value	3
GLH	24
Assessment Guidance	<p>This unit must be delivered and assessed in accordance with the NOCN Level 2 Diploma in Steelfixing Occupations (Construction) qualification specification. Specific attention must be paid to the following criteria:</p> <ul style="list-style-type: none"> • Delivery partners must have the training facilities and resources to support the creation of a comprehensive simulated civil engineering site. • Additional Knowledge, skills and experience requirements of Tutor/Assessors and Internal Verifiers, to ensure the delivery of the qualification to the required standards. • Mandatory practical exercise specifications. These exercises have been designed to simulate typical steelfixing activities that are likely to be carried out in the workplace. This unit must be assessed using simulated workplace evidence generated as the learner uses the ICT equipment and software when carrying out the practical exercises.

This unit has 3 learning outcomes.

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	The learner can:
1. Know how to use the ICT equipment and software likely to be encountered by Civil Engineering Operatives on site.	1.1. State the common ICT equipment used for sharing and viewing information on site. 1.2. Open and access documents in basic software applications using the common ICT equipment used on site. 1.3. Identify types of key construction information and documentation that can be accessed electronically in relation to the work being carried out on site. 1.4. Use common types of ICT equipment and software to access construction information and drawings relevant to their trade for use on site.

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	The learner can:
	1.5. Explain the procedures for receiving, issuing and communicating key construction information and documentation electronically. 1.6. Explain the organisation's electronic documentation updating and version control procedures in relation to electronic drawings, schedules and other types of key electronic construction documentation. 1.7. Explain the importance of ensuring that they are using the correct version of any electronic information or the 3D BIM model including how to ensure that the correct version is being used on site. 1.8. Describe the organisation's procedures for reporting errors, discrepancies and omissions on the drawings, schedules and other types of key electronic construction documentation, including how these can be rectified. 1.9. Explain the organisation's procedures and the practical measures for ensuring that the security and confidentiality of electronic construction documentation and information is maintained at all times. 1.10. Explain the pros and cons of using ICT equipment to display site construction documentation and information. 1.11. Demonstrate the care and correct storage of ICT equipment being used on site.
2. Know the risks to health and safety resulting from the use of ICT equipment on site.	2.1. Identify the hazards associated with the use of ICT equipment and peripheral devices on site. 2.2. Demonstrate the safe use of ICT equipment and peripheral devices on site.
3. Know how 3D Building Information Modelling (BIM) can be used to support construction operations on site.	3.1. Describe what BIM is and how a BIM Model is produced. 3.2. Describe the benefits of using BIM viewing software as a means to support construction operations on site. 3.3. Open a basic BIM viewer software application using appropriate procedures. 3.4. Locate and load a basic 3D BIM model within the BIM viewer software on common ICT devices found on site. 3.5. Describe the types of 2D and 3D construction information and drawings that can be produced from the BIM model to support civil engineering operations on site. 3.6. Interpret 2D and 3D construction information, construction sequences, visual method statements and drawings produced from a 3D BIM model for civil engineering operations. 3.7. Describe how a construction operative can provide input in to the production and use of a 3D model including the procedure for doing this.

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	The learner can:
	<p>3.8. Use a 3D model and the BIM viewing software to identify and interpret information relevant to their trade to support construction operations on site including installation sequences and visual method statements etc.</p> <p>3.9. Explain how the 3D model can be used to avoid and overcome clashes between elements relevant to their trade.</p> <p>3.10. Close down the BIM viewing software correctly and safely.</p>

Unit 9: Appreciation of ICT and 3D Building Information Modelling (BIM) for Civil Engineering Operatives

Unit summary

All construction projects have a vast array of drawings, schedules, specifications and other information that informs and guides the work practices on site and the successful execution of the task on time and to the required standards. The introduction of digital technologies has allowed for effective management, control and access of the information using electronic devices, offering operatives easy access to up to date drawings and information at the touch of a button.

A Building Information Model (BIM) is a rich information model, consisting of potentially multiple data sources, elements of which can be shared across all operatives and can be maintained across the life of a project from inception to completion. This integrated format offers significant benefits, such as cost reductions, entire carbon impact analysis, early clash identification, compliance checking and improved project management.

The main aim and emphasis of this unit is to provide the learner with a basic appreciation of what BIM is, the technology involved and its benefits. It will also give them the knowledge and skills to access and use basic BIM models by using the common types of viewing devices and software available on a construction site to assist them with their daily work activities. This unit should be assessed through a mixture of theoretical exercises and demonstration during the mandatory practical exercises

Assessment and evidence requirements

Learners must provide evidence against all of the assessment criteria; the evidence for this unit will come from **two** main sources; direct evidence produced by the learner demonstrating correct use of the electronic devices and software when completing the practical exercises, whilst the underpinning knowledge and understanding can be demonstrated through a variety of assessment methods.

The direct evidence includes naturally occurring documentary evidence (hard copy and electronic), and direct observation of activities that can be evidenced through either digital recordings, assessor observation reports, witness statements, etc.

Underpinning knowledge and understanding can be evidenced through a variety of assessment methods including; multiple choices testing and question and answer exercises (electronic or paper-based).

Additional evidence requirements

To complete this unit, the learner will not **only** need to demonstrate that they have met the learning outcomes and assessment criteria but will also need to provide evidence that they have gained a knowledge and understanding of the all of the additional specifications stated under the specific learning outcomes (LO) and assessment criteria (AC) listed below:

Additional requirements for this unit

LO 1: Know how to use the ICT equipment and software likely to be encountered by Civil Engineering Operatives on site.

AC 1.1: State the common ICT equipment used for sharing and viewing information on site

Common ICT equipment used on site includes:

- Standard laptop/desktop
- Typical tablet
- Rugged site tablets / handheld devices e.g. Trimble.

AC 1.2: Open and access documents in basic software applications using the common ICT equipment used on site

Evidence of opening and accessing documents in basic software packages used on site must include:

- Word processing package, such as MS Word, to view documents and access and complete inspection forms.
- Spread sheet package, such as MS Excel.
- Adobe Acrobat and Reader
- BIM Viewing software package such as Trimble Tekla BIMSight, Bentley View V8i or similar.
- Internet Explorer for access to document management systems such as A-site.
- Windows Media Player or similar to view installation sequence movies.
- Typical CAD Viewing software such as Autodesk DWG TrueView, Bentley RedLine or similar to view drawings.

3.9. Unit 10 - Team Working in Construction

Unit Title	Team Working in Construction
Ofqual unit reference number (code)	K/505/8168
Unit Level	Two
Unit Credit Value	3
GLH	24
Assessment Guidance	<p>This unit must be delivered and assessed in accordance with the NOCN Level 2 Diploma in Steelfixing Occupations (Construction) qualification specification. Specific attention must be paid to the following criteria:</p> <ul style="list-style-type: none"> • Delivery partners must have the training facilities and resources to support the creation of a comprehensive simulated civil engineering site. • Additional Knowledge, skills and experience requirements of Tutor/Assessors and Internal Verifiers, to ensure the delivery of the qualification to the required standards. • Mandatory practical exercise specifications. These exercises have been designed to simulate typical steelfixing activities that are likely to be carried out in the workplace. This unit must be assessed using simulated workplace evidence generated as the learner demonstrates their teamworking skills whilst carrying out the practical exercises.

This unit has 5 learning outcomes.

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	The learner can:
<p>1. Understand own role and responsibilities and the responsibilities of others when working as an individual or as part of a team.</p>	<p>1.1. Give examples of typical teams that operate on a construction site and their roles and responsibilities. 1.2. Identify own responsibilities and the responsibilities of others within the team in which they are working. 1.3. Identify appropriate tasks that can be undertaken by self and others to support the team in which they are working. 1.4. Explain how own responsibilities and way of working relate to those of other team members and the team leader. 1.5. Take responsibility for their own work and safety and the safety of others with whom they are working. 1.6. Identify new responsibilities as the need arises and show flexibility when priorities change.</p>

<p>2. Be able to maintain good working relationships with others when conforming to safe and productive working practices.</p>	<p>2.1. Arrive on site on time, at the correct location, wearing the correct clothing, equipment and PPE ready for work.</p> <p>2.2. Carry out work productively and to the agreed standards, in conjunction with line management, colleagues, customers and/or other relevant people involved in the work to maintain good working relationships.</p> <p>2.3. Apply the principles of equality and diversity and respect the needs of individuals when communicating and working with others.</p> <p>2.4. Explain how to manage own emotions and adapt behaviour to help build and maintain good working relationships between:</p> <ul style="list-style-type: none"> a) Individuals b) Customer and operative c) Operative and line management d) Own and other occupations. <p>2.5. Explain why it is important to communicate and work effectively with line management, colleagues and customers.</p> <p>2.6. Explain how working relationships can have positive and negative effects on safe and productive working practices and agreed standards.</p> <p>2.7. Respond positively to change, seeking advice and support when needed.</p>
<p>3. Be able to communicate effectively with others to resolve problems and ensure safe and productive work practices.</p>	<p>3.1. Explain the different methods of communicating with tutor, line management, colleagues and customers.</p> <p>3.2. Explain how to use different methods of communication to resolve problems ensuring that work is carried out safely, productively and to the required standards.</p> <p>3.3. Communicate in an appropriate manner with tutor, line management, colleagues and customers to resolve problems, ensuring that work is carried out safely, productively and to the required standards.</p> <p>3.4. Describe several situations where they have been given constructive feedback by other people, describing how they have responded.</p> <p>3.5. Describe several situations where they have offered a colleague constructive feedback and how this was received.</p>
<p>4. Be able to participate in meetings and discussions both on site and in the office.</p>	<p>4.1. Identify 3 different types of meetings that they could be involved in on site.</p> <p>4.2. Explain the importance of having a defined meeting agenda with an appropriate amount of time allocated against each item.</p> <p>4.3. Explain the importance of having clearly defined aims and outcomes for a meeting.</p> <p>4.4. Participate appropriately and constructively in meetings and discussions on site, including listening to others and making positive contributions to influence others and reach workable solutions.</p>

	<ul style="list-style-type: none"> 4.5. Raise any issues and problems emerging from discussions and propose possible solutions. 4.6. Acknowledge and constructively discuss information and opinions provided by other people, providing support where they may differ from their own but will benefit the team as a whole. 4.7. Identify any action points for self from the meeting and ensure that they are completed as required. 4.8. Adapt their behaviours to suit different roles and situations, including leadership roles.
<p>5. Be able to accurately reflect on personal and team performance during reviews.</p>	<ul style="list-style-type: none"> 5.1. Explain how work and personal learning objectives are set, monitored and reviewed. 5.2. Explain how work and personal learning objectives can inform future learning and career development. 5.3. Assess personal and team performance against work and personal learning objectives. 5.4. Devise an action plan to support areas requiring development for self.

Unit 10: Team working in construction

Unit summary

Construction is a collaborative activity that includes many people with different specialisms, skills and abilities working together effectively to ensure the successful completion of the overall project. Operatives need to know how to be an effective team member as well as an appreciation of all the other occupations working on the site and how the other occupations interact with their own team.

The main aim and emphasis of this unit is to provide the learner with the knowledge and skills to assist them to become an effective team member. Providing the learner with insights into their own personal responsibilities, qualities and performance and the various factors that apply when working with others on site the learner will gain a knowledge and skills toolkit to support them to work collaboratively and efficiently with others on site. This unit should be assessed through a mixture of theoretical exercises and demonstration during the practical exercises

Assessment and evidence requirements

Learners must provide evidence against all of the assessment criteria; the evidence for this unit will come from **two** main sources; direct evidence produced by the learner demonstrating correct use of the electronic devices and software when completing the practical exercises, whilst the underpinning knowledge and understanding can be demonstrated through a variety of assessment methods.

The direct evidence includes naturally occurring documentary evidence (hard copy and electronic), and direct observation of activities that can be evidenced through either digital recordings, assessor observation reports, witness statements, etc.

Underpinning knowledge and understanding can be evidenced through a variety of assessment methods including; multiple choice testing and question and answer exercises (electronic or paper-based).

Additional evidence requirements

To complete this unit, the learner will not **only** need to demonstrate that they have met the learning outcomes and assessment criteria but will also need to provide evidence that they have gained a knowledge and understanding of all of the additional specifications stated under the specific learning outcomes (LO) and assessment criteria (AC) listed below:

There are no additional requirements for this unit

3.10. **Unit 11 - Self Management in Construction**

Unit Title	Self Management in Construction
Ofqual unit reference number (code)	H/505/8170
Unit Level	Two
Unit Credit Value	3
GLH	24
Assessment Guidance	<p>This unit must be delivered and assessed in accordance with the NOCN Level 2 Diploma in Steelfixing Occupations (Construction) qualification specification. Specific attention must be paid to the following criteria:</p> <ul style="list-style-type: none"> • Delivery partners must have the training facilities and resources to support the creation of a comprehensive simulated civil engineering site. • Additional Knowledge, skills and experience requirements of Tutor/Assessors and Internal Verifiers, to ensure the delivery of the qualification to the required standards. • Mandatory practical exercise specifications. These exercises have been designed to simulate typical steelfixing activities that are likely to be carried out in the workplace. This unit must be assessed using simulated workplace evidence generated as the learner demonstrates their self management skills both during the training and whilst carrying out the practical exercises.

This unit has 3 learning outcomes.

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	The learner can:
<p>1. Know how to manage own time and plan own work to deliver tasks safely and efficiently.</p>	<p>1.1. Explain the importance of good time keeping. 1.2. Arrive on site on time, at the correct location, wearing the correct clothing, equipment and PPE ready for work. 1.3. Explain how organisational procedures are applied to ensure work is planned and carried out safely and productively in relation to: a) Using resources for own and other's work requirements b) Allocating appropriate work to staff c) Organising and delivering the work schedule. 1.4. Interpret relevant information from organisational procedures and work plans in order to: • Plan and prioritise work • Identify resources required</p>

LEARNING OUTCOMES	ASSESSMENT CRITERIA
<p>The learner will:</p>	<p>The learner can:</p>
	<ul style="list-style-type: none"> • Set deadlines • Achieve deadlines. <p>1.5. Identify own tasks requiring completion, the order of priority and how to complete them safely and efficiently.</p> <p>1.6. Work towards common goals to achieve the plan and meet deadlines showing initiative, commitment and perseverance.</p> <p>1.7. Explain the organisation’s procedures for reporting issues and problems that may affect their own work or the project work schedule.</p>
<p>2. Understand the various techniques that can be used to identify problems and establish possible solutions.</p>	<p>2.1. Explain the organisation’s procedures for reporting problems and the process for resolving them including establishing the restrictions placed on their own authority to rectify.</p> <p>2.2. Describe a range of typical problems which may be encountered in the workplace and the reasons why they might have occurred.</p> <p>2.3. Identify the causes of a problem and suggest possible solutions including identifying the factors which might influence or limit the solutions to it.</p> <p>2.4. Discuss problems with others to identify and assess possible solutions including listening to other points of view to inform decision making.</p> <p>2.5. Use information from other sources including research and discussions with others to identify and evaluate new and creative ways of solving problems.</p> <p>2.6. Assess potential solutions to problems questioning their relevance and value, the assumptions made and possible consequences making recommendations as to the preferred solution in discussion with others.</p> <p>2.7. Select and implement an agreed solution to a problem in conjunction with others including anticipating and managing the risks associated with it.</p> <p>2.8. Adapt a solution to a problem to meet changing circumstances and events.</p> <p>2.9. Assess to what extent the proposed solution addressed the problem, identifying what worked well and what could have been done differently to adapt and improve the solution.</p>
<p>3. Know how to manage own personal development by identifying strengths and limitations and by setting realistic goals and monitoring performance.</p>	<p>3.1. Establish work role goals and success criteria requirements with line manager.</p> <p>3.2. Identify ways that progress will be measured against own work goals and monitor achievement on a regular basis.</p>

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	The learner can:
	<ul style="list-style-type: none"> 3.3. Identify opportunities and resources available for personal development. 3.4. Produce a development plan to address own needs and agree with line manager. 3.5. Plan activities in own development plan that address identified needs. 3.6. Review progress against own development plan on a regular basis and act on outcomes as the need arises. 3.7. Collect feedback from colleagues on own performance and the results of development activities on performance and deal positively with setbacks and criticism. 3.8. Assess the success of activities carried out as part of own development plan and adjust plan to inform future progress.

Unit 11: Self-management in construction

Unit summary

Self-management skills in construction unit, identifies the wider skills that can support the learner to become an effective operative when working on site, covering; time management, communication with others, problem solving, responding to emergency situations and managing their own personal development.

The main aim and emphasis of this unit is to provide the learner with an appreciation of the personal skills and responsibilities that they will need to adopt to develop a successful career in construction.

Assessment and evidence requirements

Learners must provide evidence against all of the assessment criteria; the evidence for this unit will come from **two** main sources; direct evidence produced by the learner demonstrating correct use of the electronic devices and software when completing the practical exercises, whilst the underpinning knowledge and understanding can be demonstrated through a variety of assessment methods.

The direct evidence includes naturally occurring documentary evidence (hard copy and electronic), and direct observation of activities that can be evidenced through either digital recordings, assessor observation reports, witness statements, etc.

Underpinning knowledge and understanding can be evidenced through a variety of assessment methods including; multiple choices testing and question and answer exercises (electronic or paper-based).

Additional evidence requirements

To complete this unit, the learner will not **only** need to demonstrate that they have met the learning outcomes and assessment criteria but will also need to provide evidence that they have gained a knowledge and understanding of the all of the additional specifications stated under the specific learning outcomes (LO) and assessment criteria (AC) listed below:

There are no additional requirements for this unit

5. Assessment and Evidence

The NOCN Level 2 Diploma in Steelfixing Occupations is an internally assessed qualification. Learners must provide evidence of learning and achievement against all of the assessment criteria specified within each unit.

The NOCN Level 2 Diploma in Steelfixing Occupations is a vocationally based qualification and as such, the units offer the opportunity for learners to achieve a balance of practical skill and knowledge.

Centres must ensure that knowledge based learning fully adheres with the specifications set out in the specification with the learner completing all of the mandatory practical exercises in accordance with the mandatory practical exercise specifications.

The centre must ensure that the assessment activities are:

Valid The assessment activity **must** be fit for purpose which means that the assessment tasks measure the intended outcomes of the unit. They should afford the learner an opportunity to provide sufficient evidence of learning to meet the assessment criteria at the appropriate level.

Sufficient The assessment activities afford the learner an opportunity to provide sufficient evidence of learning to meet the assessment criteria.

Reliable Assessment activities must generate clear and consistent outcomes across all assessors.

Although the activities may be applied to differing scenarios and in different contexts, with different learners, the evidence sought by the activity must be assessed with a universal standard to ensure that the resulting assessment decisions are consistent across all assessors and centres offering the qualification.

Authentic Evidence presented must be the learner's own work.

4.1. Fair and Equitable Assessment

Assessment within the NOCN Level 2 Diploma in Steelfixing Occupations is designed to be accessible and inclusive.

The assessment methodology is appropriate for individual assessment or for groups of learners.

4.2. Learners with Particular Requirements

If you are a NOCN Recognised Centre and have learners with particular requirements, please see the **NOCN Reasonable Adjustments Policy and Procedure** found on the NOCN website at www.nocn.org.uk

This policy gives clear guidance on the reasonable adjustments and arrangements that can be made to take account of disability or learning difficulty without compromising the assessment criteria.

The NOCN Centre Recognition process requires the centre to hold policy statements on Equal Opportunities, Diversity and Disability Discrimination which will be reviewed by NOCN. Please contact assurance@nocn.org.uk for further details.

4.3. Recognised Prior Learning

Recognition of prior learning is an assessment method leading to the award of credit. The process involves considering if a learner can meet the specified assessment requirements for a unit through knowledge, understanding or skills that they possess already, as a consequence, they do not need to undertake a course of learning.

Centres are encouraged to recognise previous achievements and experience, both formal, for example through accredited units or qualifications and informal, for example through continuous learning. This involves the recognition of achievement from a range of activities that will have been assessed through any valid method of assessment.

When using the process of the recognition of prior learning, it is essential that the assessment requirements of a specific unit or, more exceptionally, a qualification have been met. The evidence of learning provided must be sufficient, reliable, authentic and valid.

4.4. Functional Skills

This qualification could contribute towards the learning for Functional Skills in the following areas:

English

- Speaking, listening and communication – could be demonstrated whilst completing the mandatory practical exercises.

- Reading – demonstrate knowledge and understanding when adhering to the drawings, schedules, risk assessment, method statements and task sheets.
- Writing – could be demonstrated through completion of work sheets.

ICT

- Development of ICT skills can be demonstrated when completing unit 9 'Appreciation of ICT and 3D Building Information Modelling (BIM) for Civil Engineering Operatives'

Mathematics

- Development of mathematics skills can be demonstrated for example through measurement and calculation of reinforcement bars.

For more information see the Functional Skills criteria for English, ICT and/or maths on the NOCN website: www.nocn.org.uk

4.5. Assessment and Evidence for the units

Centres can use a variety of assessment activities to capture evidence of learners' understanding. Activities may include:

- Digital recording both film and audio
- Oral Question and Answer
- Role Play/Simulation
- Report
- Practice file; electronic or hardcopy
- Reflective Log or Diary
- Practical Demonstration
- Written Question and Answer/Test/Exam; electronic or hardcopy

Bridgwater College has provided a guidance paper that outlines their assessment strategy for assessment and evidence collection. Please see Appendix 1.

Forms and guidance for gathering learner evidence against the individual assessment criteria are available for download in Word format on the NOCN website: http://www.nocn.org.uk/qualifications_and_units/additional_qualification_documents.

Alternatively, centres can use their own paperwork provided they ensure that the learners' work is ordered and portfolio references provided as required.

6. Appendix 1

Bridgwater College Guidance Paper on Assessment and Evidence Collection for the NOCN Level 2 Diploma in Steelfixing Occupations (Construction)

Knowledge evidence can be collected in the traditional ways such as written question and answer, test and assignment. Practical tasks can be observed and confirmed with a checklist and statement. A paper portfolio can be created to collect all the evidence.

The innovative and industrially focused development of this qualification has led to it being not only comprehensive but also fully homogenised with knowledge and practical tasks blended. To enable the course to be delivered with optimised effect on the learner, formats for teaching and learning are likely to be similar in all but name to a live site, hence preventing the collection of evidence using traditional methods.

An always be methodology for teaching, learning assessing and evidencing will enable the delivery of the course to fit the demands of industry – ‘site like’ and will allow the rapid acquisition of skills and knowledge by immersion.

The capturing of evidence, assessment and feedback hence requires a live, non- intrusive or disruptive medium.

The use of digital video, audio and pictures, taken from cameras mounted on helmets, (instructors and learners,) and on tripods enables the ethos of live site delivery to be maintained.

A virtual learning environment with interactive resources permits a self-study mentality and is recommended to support the delivery. Innovative strategies such as touch screen tests with camera identification to authenticate the learner will allow underpinning knowledge evidence capture that is not ‘timetabled,’ offering flexibility to the learner and opportunity to maximise teaching and learning.

The synthesis of the evidence, if these media are chosen, then lends itself to an e-portfolio. The administration of this should be collaborative with the learner and assessors contributing the maintenance and upkeep of the files via an appropriate permission structure. It is recommended that each learner has access to a laptop for the duration of the course to ensure there are no barriers to these responsibilities.

Remote access to the VLE is recommended to allow learners to access learning materials and self-tests out of attendance hours.

It is likely that assessment and verification will be done, on occasion, remotely. To enable this, a ‘portal’ approach to access is recommended, allowing authorised inspection of confirmation of evidence via the internet.

Identification of the learners, assessors and verifiers will be by visual recognition, unique PIN or digital signature and these authenticators will be used for the appropriate media channels.

7. Appendix 2 NOCN STEELFIXING UNITS PLTS MAPPING

Focus	Outcome statement	Steelfixing Unit Number and Assessment Criteria Reference								
Independent enquirers: Learners can process and evaluate information in their investigations, planning what to do and how to go about it. They take informed and well-reasoned decisions, recognising that others have different beliefs and attitudes.	Identify questions to answer and problems to resolve	U3 1.7	U3 3.9	U3 5.2	U11 3.1	U11 3.3	U11 3.4			
	Plan and carry out research, appreciating the consequences of decisions	U1 1.3	U1 1.6	U9 3.2	U11 3.4					
	Explore issues, events or problems from different perspectives	U3 1.4	U3 1.7	U10 4.4	U11 3.5	U11 3.6				
	Analyse and evaluate information, judging its relevance and value	U3 1.1	U3 1.2	U8 6.4	U9 3.8	U11 3.6				
	Consider the influence of circumstances, beliefs and feelings on decisions and events	U10 2.3	U10 2.4	U11 2.4						
	Support conclusions, using reasoned arguments and evidence	U1 1.3	U1 1.6	U3 1.4	U9 1.10	U9 3.2	U11 3.7			
Creative thinkers: Learners think creatively by generating and exploring ideas, making original connections. They try different ways to tackle a problem, working with others to find imaginative solutions and outcomes that are of value.	Generate ideas and explore possibilities	U11 2.2	U11 2.3	U11 3.2						
	Ask questions to extend their thinking	U11 2.2	U11 2.3	U11 3.2	U11 3.5					
	Connect their own and others' ideas and experiences in inventive ways	U11 3.4	U11 3.5	U11 3.5						
	Question their own and others' assumptions	U11 3.3	U11 3.4	U11 3.6						
	Try out alternatives or new solutions and follow ideas through	U11 2.2	U11 2.3	U11 3.7						

Focus	Outcome statement	Steelfixing Unit Number and Assessment Criteria Reference								
	Adapt ideas as circumstances change	U10 2.7	U11 2.7	U11 3.8						
Reflective Learners: Learners evaluate their strengths and limitations, setting themselves realistic goals with criteria for success. They monitor their own performance and progress, inviting feedback from others and making changes to further their learning.	Assess themselves and others, identifying opportunities and achievements	U10 3.5	U10 5.3	U11 2.6	U11 3.9	U11 5.3				
	Set goals with success criteria for their development and work	U10 4.7	U10 5.1	U10 5.4	U11 5.2	U11 5.4				
	Review progress, acting on the outcomes	U10 5.1	U10 5.2	U11 3.9	U11 5.2	U11 5.6				
	Invite feedback and deal positively with praise, setbacks and criticism	U10 3.4	U11 2.5	U11 5.7						
	Evaluate experiences and learning to inform future progress	U2 2.8	U11 2.5	U11 3.9	U11 5.8					
	Communicate their learning in relevant ways for different audiences	U11 2.6								
Team Working: Learners work confidently with others, adapting to different contexts and taking responsibility for their own part. They listen to and take account of different views. They form collaborative relationships, resolving issues to reach agreed outcomes.	Collaborate with others to work towards common goals	U3 1.3	U8 6.1	U8 6.2	U8 9.1	U8 9.4	U10 1.1	U10 1.2		
	Reach agreements, managing discussions to achieve results	U8 9.2	U8 9.3	U8 9.4	U10 4.4	U10 4.6	U11 2.5	U11 2.6		
	Adapt behaviour to suit different roles and situations, including leadership roles	U8 9.2	U8 9.4	U10 2.5	U10 3.1	U10 4.8				
	Show fairness and consideration to others	U1 2.2	U1 2.3	U1 2.4	U10 1.4	U10 2.3	U10 2.4	U11 1.2		
	Take responsibility, showing confidence in themselves and their contribution	U1 2.1	U1 2.2	U10 1.5	U10 2.1	U11 1.2	U11 3.1			
	Provide constructive support and feedback to others.	U10 1.3	U10 3.5	U11 2.6						

Focus	Outcome statement	Steelfixing Unit Number and Assessment Criteria Reference								
Effective participants: Learners actively engage with issues that affect them and those around them. They play a full part in the life of their school, college, workplace or wider community by taking responsible action to bring improvements for others as well as themselves.	Discuss issues of concern, seeking resolution where needed	U1 1.4	U1 2.6	U3 1.7	U3 5.2	U10 3.2	U10 3.3	U10 4.5	U11 1.7	U11 3.4
	Present a persuasive case for action	U1 1.6	U3 1.6	U11 3.6						
	Propose practical ways forward, breaking these down into manageable steps	U1 1.6	U3 1.7	U10 4.5						
	Identify improvements that would benefit others as well as themselves	U1 1.6	U3 5.2	U10 3.5	U11 2.5	U11 2.6				
	Try to influence others, negotiating and balancing diverse views to reach workable solutions	U10 2.3	U10 4.4	U11 3.5	U11 3.6					
	Act as an advocate for views and beliefs that may differ from their own.	U10 4.6								
Self-Managers: Learners organise themselves, showing personal responsibility, initiative, creativity and enterprise with a commitment to learning and self-improvement. They actively embrace change, responding positively to new priorities, coping with challenges and looking for opportunities.	Seek out challenges or new responsibilities and show flexibility when priorities change	U9 1.8	U10 1.6	U10 2.7	U11 2.7					
	Work towards goals, showing initiative, commitment and perseverance	U8 6.1	U8 6.2	U10 2.2	U11 1.6	U11 1.7				
	Organise time and resources, prioritising actions	U8 6.1	U8 6.2	U10 2.1	U10 2.2	U11 1.2	U11 1.3	U11 1.4	U11 1.5	
	Anticipate, take and manage risks	U1 1.6	U1 7.1	U8 7.2	U10 2.6	U10 3.3	U11 3.7			
	Deal with competing pressures, including personal and work-related demands	U8 6.1	U8 6.2	U11 1.7						

Focus	Outcome statement	Steelfixing Unit Number and Assessment Criteria Reference								
	Respond positively to change, seeking advice and support when needed	U8 6.6	U10 2.7	U11 2.7						
	Manage their emotions, and build and maintain relationships.	U10 2.3	U10 2.4	U11 2.2	U11 2.3					

Reference Key Example - Unit 11 Assessment Criteria 5.2 = U11 5.2



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