



Australian Government

Department of Education, Employment and Workplace Relations

CPCCSF3003A Carry out multistrand post-tensioning

Release: 1

CPCCSF3003A Carry out multistrand post-tensioning

Modification History

Not Applicable

Unit Descriptor

Unit descriptor

This unit of competency specifies the outcomes required to carry out multistrand post-tensioning in accordance with specifications.

It includes planning and preparation for the work, laying and fixing anchorages and cables, defining the work area, stressing tendons, finishing tensioning, and completing clean-up activities.

Application of the Unit

Application of the unit

This unit supports the attainment of skills and knowledge to tension multistrand posts for a construction project, which includes working with others and as a member of a team.

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units

CPCCOHS2001A

Apply OHS requirements, policies and procedures in the construction industry

Employability Skills Information

Employability skills This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan and prepare.	1.1. Work instructions, including plans, specifications, quality requirements and operational details are obtained from relevant information, confirmed and applied to the scope of work performed. 1.2. Safety (OHS) requirements are followed in accordance with safety plans and policies. 1.3. Signage and barricade requirements are identified and implemented. 1.4. Tools and equipment are selected to carry out tasks are consistent with the requirements of the job, checked for serviceability and any faults are rectified or reported prior to commencement. 1.5. Materials quantity requirements are calculated in accordance with plans, specifications and quality requirements. 1.6. Materials appropriate to the work application are identified, obtained, prepared, safely handled and located ready for use. 1.7. Environmental requirements are identified for the project in accordance with environmental plans and statutory and legislative authority obligations and applied.
2. Lay and fix anchorages and cables.	2.1. Tendons and recess formers are fixed in location according to job plans and drawings. 2.2. Ducting profile is laid and specified number of strands pushed through and verified according to job drawings. 2.3. Profile anchorages are positioned to specifications. 2.4. Form head and anchorages are positioned in accordance with specifications. 2.5. Installed cables are inspected in accordance with specifications and relevant standards. 2.6. Grout tubes are fixed in accordance with manufacturer and engineer's specifications. 2.7. Grout tubes are monitored during concrete pour.
3. Define the work area.	3.1. Safe working area is defined according to safe work practices and OHS regulations. 3.2. Barricades and signage are erected where required to isolate safe work areas.
4. Stress tendons.	4.1. Recess formers are removed.

ELEMENT	PERFORMANCE CRITERIA
	4.2. Anchor blocks and wedges are set up to manufacturers' design. 4.3. Stressing operations are carried out to nominated loads and to engineer standards using authorised calibrated stressing equipment. 4.4. Extensions are measured and recorded on standard forms for approval by the engineer.
5. Finish the tensioning.	5.1. Protruding strands are cut and sealed according to manufacturer specifications. 5.2. Cement grout is mixed and pumped in accordance with the specifications and relevant standards.
6. Clean up.	6.1. Work area is cleared and materials disposed of, reused or recycled in accordance with legislation, regulations, codes of practice and job specification. 6.2. Tools and equipment are cleaned, checked, maintained and stored in accordance with manufacturer recommendations and standard work practices.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills for this unit are:

- communication skills to:
 - determine requirements
 - follow instructions
 - read and interpret:
 - documentation from a variety of sources
 - drawings and specifications
 - report faults
 - use language and concepts appropriate to cultural differences
 - use and interpret non-verbal communication, such as hand signals
 - written skills to record extensions
- identifying and accurately reporting to appropriate personnel any faults in tools,

REQUIRED SKILLS AND KNOWLEDGE

equipment or materials

- mathematical and numeracy skills to apply measurements and calculations
- organisational skills, including the ability to plan and set out work
- teamwork skills to work with others to action tasks and relate to people from a range of cultural and ethnic backgrounds and with varying physical and mental abilities
- technological skills to:
 - use a range of mobile technology, such as two-way radio and mobile phones
 - voice and hand signals to access and understand site-specific instructions.

Required knowledge

Required knowledge for this unit is:

- basic theory related to cable stressing as a reinforcement technology
- calibration procedures related to stressing techniques and equipment
- construction and steelfixing tensioning terminology
- factors affecting the concrete bonding, curing and strength
- grouting equipment and procedures
- job safety analysis (JSA) and safe work method statements
- material safety data sheets (MSDS)
- materials storage and environmentally friendly waste management
- plans, drawings and specifications
- processes for the calculation of material requirements
- quality requirements
- requirements and processes for recording stressing operations
- safe stressing procedures and multistrand techniques
- workplace and equipment safety requirements.

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment

This unit of competency could be assessed in the workplace or a close simulation of the workplace environment, provided that simulated or project-based assessment techniques fully replicate construction workplace conditions, materials, activities, responsibilities and procedures.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

A person who demonstrates competency in this unit must be able to provide evidence of the ability to:

- locate, interpret and apply of relevant information, standards and specifications
- comply with site safety plan and OHS legislation, regulations and codes of practice applicable to workplace operations
- comply with organisational policies and procedures, including quality requirements
- safely and effectively use tools and equipment
- communicate and work effectively and safely with others
- carry out the full multistrand post-tensioning cycle to specification covering:
 - a multistrand cable of at least fifteen strands
 - a minimum of thirty metres
 - standard tensioning
 - completion of site tensioning documentation.

Context of and specific resources for assessment

This competency is to be assessed using standard and authorised work practices, safety requirements and environmental constraints.

Assessment of essential underpinning knowledge will usually be conducted in an off-site context.

Assessment is to comply with relevant regulatory or Australian standards' requirements.

Resource implications for assessment include:

EVIDENCE GUIDE

- an induction procedure and requirement
- realistic tasks or simulated tasks covering the mandatory task requirements
- relevant specifications and work instructions
- tools and equipment appropriate to applying safe work practices
- support materials appropriate to activity
- workplace instructions relating to safe work practices and addressing hazards and emergencies
- material safety data sheets
- research resources, including industry related systems information.

Reasonable adjustments for people with disabilities must be made to assessment processes where required. This could include access to modified equipment and other physical resources, and the provision of appropriate assessment support.

Method of assessment

Assessment methods must:

- satisfy the endorsed Assessment Guidelines of the Construction, Plumbing and Services Training Package
- include direct observation of tasks in real or simulated work conditions, with questioning to confirm the ability to consistently identify and correctly interpret the essential underpinning knowledge required for practical application
- reinforce the integration of employability skills with workplace tasks and job roles
- confirm that competency is verified and able to be transferred to other circumstances and environments.

Validity and sufficiency of evidence requires that:

- competency will need to be demonstrated over a period of time reflecting the scope of the role and the practical requirements of the workplace
- where the assessment is part of a structured learning experience the evidence collected must relate to a number of performances assessed at different points in time and

EVIDENCE GUIDE

separated by further learning and practice, with a decision on competency only taken at the point when the assessor has complete confidence in the person's demonstrated ability and applied knowledge

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence.

Assessment processes and techniques should as far as is practical take into account the language, literacy and numeracy capacity of the candidate in relation to the competency being assessed.

Supplementary evidence of competency may be obtained from relevant authenticated documentation from third parties, such as existing supervisors, team leaders or specialist training staff.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Information includes:

- diagrams or sketches
- instructions issued by authorised organisational or external personnel
- manufacturer specifications and instructions, where specified
- MSDS
- memos
- regulatory and legislative requirements pertaining to multistrand post-tensioning
- relevant Australian standards
- safe work procedures relating to multistrand

RANGE STATEMENT

Scope of work:

post-tensioning

- signage
- verbal, written and graphical instructions
- work bulletins
- work schedules, plans and specifications.
- multistrand post-tensioning is designed to replace standard reinforcement materials with cables and, through tensioning, provide required strength in a reduced thickness of concrete
- post-tensioning plans will contain position of cables, height of chairs, cable specifications, number of strands per cable, and the stressing loads
- multistrand cable contains at least fifteen wire strands with sizes ranging from 12.7mm to 15.2mm
- tensioning is stipulated in the job specifications but is not to exceed 85% of the ultimate tensile strength of the cable
- types of structural elements include slabs, beams, columns and ground anchors
- types of structures include buildings, bridges, towers, tanks, silos, stayed structures, offshore platforms and underground and submerged structures
- work is to conform to relevant Australian standard, unless this is replaced by superior specifications.
- emergency procedures, including extinguishing fires, organisational first aid requirements and evacuation
- handling activities that may require the assistance of others or the use of manual or mechanical lifting devices where size, weight or other issues, such as a disability are a factor
- hazard control
- hazardous materials and substances, including cement and curing agents
- organisational first aid
- PPE prescribed under legislation, regulations and workplace policies and practices
- safe operating procedures, including the

Safety (OHS) is to be in accordance with state and territory legislation and regulations and project safety plan and may include:

RANGE STATEMENT

conduct of operational risk assessment and treatments associated with:

- cutting and grinding equipment
- lighting
- power equipment
- power leads and sources
- trip hazards
- work site visitors and the public
- working in confined spaces
- working in proximity to others
- working with cables under stress
- use of firefighting equipment
- use of tools and equipment
- workplace environmental requirements and safety.

Tools and equipment include:

- angle grinders (power)
- grouting equipment
- hacksaws
- hammers
- hydraulic power packs
- measuring tapes and rules
- multistrand jacks
- nips
- spanners
- staple guns
- steelfixing reels.

Materials include:

- labelling
- specialist material handling gloves.

Quality requirements include relevant regulations, including:

- Australian standards
- internal company quality policy and standards
- manufacturer specifications
- workplace operations and procedures.

Environmental requirements include:

- clean-up management
- dust and noise
- waste management.

Statutory and regulatory authorities include:

- federal, state and local authorities administering the applicable Acts, regulations and codes of practice.

Unit Sector(s)

Unit sector Construction

Functional area

Functional area