



Australian Government

CPCCCM3006 Carry out levelling operations

Release: 1

CPCCCM3006 Carry out levelling operations

Modification History

Release 1.

This version first released with CPC Construction, Plumbing and Services Training Package Version 2.

Revised unit of competency. Replaces superseded equivalent unit CPCCCA3023A Carry out levelling operations.

Application

This unit of competency specifies the outcomes required to carry out levelling operations, using the rise and fall method and the height of collimation method, to establish correct and accurate set-out of buildings and components. It includes the set-up, testing and use of levelling devices and undertaking closed and open traverses using a range of levelling equipment. It also includes calculating distances using stadia lines.

The unit supports workers in the construction industry who use a variety of commonly used levelling devices when working with others and as a member of a team to establish accurate set-out data for a range of construction projects. It applies to levelling operations on residential and commercial work sites in new construction, renovation or refurbishment, and maintenance projects.

No licensing, legislative, regulatory, or certification requirements apply to this unit of competency at the time of endorsement.

Pre-requisite Unit

Nil

Competency Field

Carpentry

Unit Sector

Construction

Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the range of conditions.

1. Plan and prepare.
 - 1.1. **Job requirements** are obtained, confirmed with relevant personnel, and applied to planning.
 - 1.2. Work site is inspected, and conditions and hazards are identified and reported as required.
 - 1.3. **Health and safety requirements** for levelling operations at the work site are confirmed and applied to planning.
 - 1.4. **Levelling tools and equipment** required for job are selected and checked for serviceability, and faults are rectified or reported before starting work.
 - 1.5. Team roles and verbal and non-verbal communication signals are confirmed, as required.
2. Carry out levelling procedures using rise and fall method.
 - 2.1. Instrument is accurately set up and tested for operation before commencing **levelling activities**.
 - 2.2. Datum point is set up or located.
 - 2.3. **Readings** are taken from the datum and at nominated or selected stations according to project specifications.
 - 2.4. Backsights, intermediate sights and foresights are identified and levels are booked.
 - 2.5. Instrument is transferred to another location, process is repeated, and change station is recorded in field book.
 - 2.6. Reduced levels for all stations are calculated using rise and fall method of calculation, and accuracy of field book recordings is checked using the three check method.
3. Carry out levelling procedures using height of collimation method.
 - 3.1. Instrument is accurately set up and **operation and tolerances are checked**.
 - 3.2. Datum point is set up or located.
 - 3.3. **Level readings** are taken to datum, and the height of collimation is established.
 - 3.4. Readings are taken at nominated or selected stations according to project specifications.

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| | 3.5. | Instrument is transferred to another location, new height of collimation is established, and change station is recorded in field book. |
| | 3.6. | Reduced levels are calculated using height of instrument method. |
| | 3.7. | Reduced levels for all stations are identified from calculations and heights and levels are recorded. |
| | 3.8. | Accuracy of readings is established using height of collimation method of calculation and three check method. |
| 4. | Calculate distances using stadia lines. | |
| | 4.1. | Distances are calculated from instrument to stations using staff, stadia lines, and identified factor of levelling instrument. |
| | 4.2. | Readings and distances are recorded. |
| 5. | Clean up. | |
| | 5.1. | Tools and equipment are cleaned, checked and stored. |
| | 5.2. | Levelling devices are maintained and stored according to manufacturer recommendations and standard work practices. |

Foundation Skills

This section describes the language, literacy, numeracy and employment skills essential to performance in this unit but not explicit in the performance criteria.

Skill	Performance feature
Numeracy skills to:	use addition and subtraction to establish whether there is a rise or fall in levels.
Oral communication skills to:	- enable clear and direct communication and sharing of information - report equipment faults verbally - use listening and questioning to identify and confirm requirements.

- Reading skills to:
- interpret job requirements
 - read and interpret plans, specifications and drawings.
- Writing skills to:
- record levelling readings
 - report equipment faults in writing.
- Planning and organising skills to:
- plan and schedule work in a logical sequence.
- Teamwork skills to:
- work with others to action tasks.

Range of Conditions

This section specifies work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included. Bold italicised wording, if used in the performance criteria, is detailed below.

- Job requirements*** must include:
- job specifications for levelling operations, including:
 - project design and specifications, including building and site plans
 - quality requirements for the completed work
 - timeframe for completion
 - work site procedures specified by project manager or client
 - safe work method statements (SWMS) for tasks
 - schedule for completing work
 - workplace procedures incorporating requirements of relevant legislation, regulations, codes and Australian standards
 - workplace and work site environmental and sustainability requirements.

- Health and safety requirements*** must include:
- emergency procedures, including:
 - evacuation
 - first aid
 - location and use of firefighting equipment
 - hazard identification and risk control procedures, including for handling hazardous materials and dangerous goods

- safe operating procedures for levelling, including:
 - manufacturer specifications
 - SWMS
 - safety data sheets (SDS)
- selection, correct fitting, and use of personal protective equipment (PPE) prescribed under legislation, regulations and workplace policies and practices
- selection and use of tools and equipment.

Levelling tools and equipment must include:

- each of the following:
 - laser levels and targets
 - levelling staff
 - marking equipment
 - measuring tapes and rules
 - spirit levels and straight edges
- two of the following:
 - automatic/optical levels
 - plumb bobs
 - water levels.

Readings must include:

- change stations
- negative readings.

Levelling activities must include three or more of the following:

- establishing approximate distances and transfer of reduced levels
- locating power, water, gas and telecommunications services
- measuring and recording ground levels at respective critical set-out points
- measuring and recording heights or levels for installing joinery
- measuring and recording heights or levels of ceilings and floors
- measuring and recording or checking levels in drainage
- measuring and recording slab or pad levels for placement of steel columns or masonry piers
- positioning offsets and recovery pegs for construction projects or for use in determining quantity from calculations
- shooting levels for concrete slabs
- shooting levels for excavation or footings
- transferring levels or heights for formwork
- calculating rise and fall and height from collimation.

Checking operation and tolerances must include:

- two peg test for automatic level
- reverse readings for spirit level.

Level readings must include:

- one negative reading
- datum
- backsight
- foresight
- intermediate sight
- plumb.

Heights and levels must be recorded by:

- completing field book for rise and fall and height of collimation
- chalk or nail mark
- datum or survey peg
- drawing or sketch
- mark on vertical surface.

Maintenance of levelling devices must include:

- authorised operator servicing and minor replacements
- cleaning
- monitoring, recording and reporting faults.

Unit Mapping Information

CPCCCA3023A Carry out levelling operations

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=7e15fa6a-68b8-4097-b099-030a5569b1ad>

Assessment Requirements for CPCCCM3006 Carry out levelling operations

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Performance Evidence

A person demonstrating competency in this unit must satisfy all of the elements, performance criteria and foundation skills of this unit. The person must also transfer levels and record differences in height, undertaking at least one open traverse and one closed traverse using both the rise and fall method and the height of collimation method, on three of the following types of levelling operations:

- establishing approximate distances and transfer of reduced levels
- locating power, water, gas and telecommunications services
- measuring and recording ground levels at respective critical set-out points
- measuring and recording heights or levels for installing joinery
- measuring and recording heights or levels of ceilings and floors
- measuring and recording or checking levels in drainage
- measuring and recording slab or pad levels for placement of steel columns or masonry piers
- positioning offsets and recovery pegs for construction projects or for use in determining quantity from calculations.
- shooting levels for concrete slabs
- shooting levels for excavation or footings
- transferring levels or heights for formwork.
- calculating rise and fall and height from collimation.

In doing the above work, the person must:

- locate, interpret and apply information, including standards and specifications that apply to specific levelling tasks
- comply with site safety plan, health and safety regulations, and state and territory legislation 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, including using agreed communication signals

- set up and test levelling equipment
- confirm accuracy of the readings taken
- accurately record results of each levelling procedure according to organisational requirements
- calculate distances using an optical levelling instrument and levelling staff.

Knowledge Evidence

A person demonstrating competency in this unit must demonstrate knowledge of:

- reasons for making measurements of line, level and plumb in construction projects
- basic construction and levelling processes relevant to levelling tasks specified in the performance evidence
- construction plans, symbols and construction terminology relevant to levelling procedures
- contents of and terms used in job safety analyses (JSA) and safe work method statements (SWMS) for tasks
- characteristics, technical capabilities and limitations of different types of levelling devices
- levelling techniques commonly used in construction work
- processes for interpreting engineering drawings and sketches
- processes for setting out construction tasks relating to levelling operations
- project quality requirements relevant to levelling work
- site and equipment safety requirements relevant to levelling work
- site isolation and traffic control responsibilities and authorities.

Assessment Conditions

Suitable assessment of performance requires:

- equipment and tools:
 - as listed in the range of conditions
- specifications:
 - job requirements
 - health and safety requirements
 - manufacturer specifications
 - safety data sheets (SDS)
 - SWMS
 - workplace and relevant work site procedures
- physical conditions:
 - construction work site
- relationship with team members and supervisor:
 - work must be undertaken as part of a team
- timeframe:
 - according to job requirements.

Assessor requirements

As a minimum, assessors must satisfy the assessor requirements in the Standards for Registered Training Organisations (RTOs) current at the time of assessment.

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