

Design and fabricate structural timber connections

Overview

This standard is about designing, preparing and fabricating structural and pegged timber connections, interpreting information, adopting safe, healthy and environmentally responsible work practices, and selecting and using materials, components, tools and equipment

This standard is for people working in the occupational area of Wood Occupations and can be used by operatives, supervisors and managers

Performance criteria

- You must be able to:*
- P1 interpret the given information relating to the work and resources to confirm its relevance
 - P2 comply with the given, relevant legislation and official guidance to carry out your work and maintain safe and healthy work practices
 - P3 select the required quantity and quality of resources for the methods of work
 - P4 comply with organisational procedures to minimise the risk of damage to the work and surrounding area
 - P5 comply with the given contract information to carry out the work efficiently to the required specification
 - P6 complete the work within the allocated time, in accordance with the programme of work

Knowledge and understanding

You need to know and understand: **Performance Criteria 1**

Interpretation of information

K1 the organisational procedures developed to report and rectify inappropriate **information** and unsuitable **resources**, and how they are implemented

K2 the types of **information**, their source and how they are interpreted

K3 the organisational procedures to solve **problems** with the **information** and why it is important they are followed

Performance Criteria 2

Safe work practices

K4 the level of understanding operatives must have of **information** for relevant, current **legislation and official guidance** and how it is applied

K5 the types of **fire extinguishers** and how and when they are used

K6 how **emergencies** should be responded to and who should respond

K7 the organisational **security procedures** for tools, equipment and personal belongings

K8 what the accident reporting procedures are and who is responsible for making the report

K9 why, when and how **health and safety control equipment** should be used

K10 how to comply with environmentally responsible work practices to meet current **legislation and official guidance**

Performance Criteria 3

Selection of resources

K11 the characteristics, quality, uses, sustainability, limitations and defects associated with the **resources** and how defects should be rectified

K12 how the **resources** should be used and how any **problems** associated with the **resources** are reported

K13 the organisational procedures to select **resources**, why they have been developed and how they are used

K14 the **hazards** associated with the **resources** and **methods of work** and how they are overcome

Performance Criteria 4

Minimise the risk of damage

K15 how to **protect work** from damage and the purpose of protection

K16 why **disposal of waste** should be carried out safely and how it is achieved

Performance Criteria 5

Meet the contract specification

K17 how **methods of work**, to meet the specification, are carried out and **problems** reported

K18 how **maintenance** of tools and equipment is carried out

Performance Criteria 6

Allocated time

K19 what the **programme** is for the work to be carried out in the estimated, allocated time and why deadlines should be kept

Scope/range**Performance Criteria 1**

1 interpretation of drawings, specifications, schedules, method statements, risk assessments and manufacturers' information related to the work to be carried out

Performance Criteria 2

2 avoidance of risk by complying with the given information relating to at least four of the following

2.1 methods of work

2.2 safe use of health and safety control equipment

2.3 safe use of access equipment

2.4 safe use, storage and handling of materials, tools and equipment

2.5 specific risks to health

Performance Criteria 3

3 selection of resources associated with own work

3.1 materials, components and fixings

3.2 tools and equipment

Performance Criteria 4

4 protection of the work and its surrounding area from damage

5 maintain a clear and tidy work space

6 disposal of waste in accordance with current legislation

Performance Criteria 5

- 7 demonstration of work skills to design, measure, mark out, cut, fit, finish, position and secure
- 8 use and maintain hand and power tools
- 9 design and fabricate the following structural and pegged timber connections for post and beam floor, roof, wall or cross frames to given working instructions
 - 9.1 mortice and tenon
 - 9.2 barefaced tenon
 - 9.3 stopped tenon
 - 9.4 bevelled-shoulder tenon
 - 9.5 dovetailed tenon
 - 9.6 bridle joint
 - 9.7 tusk tenon
 - 9.8 pegged scarf joint for top plate, cill plate, purlin and tie beam
 - 9.9 dovetailed, secret dovetailed or cogged lap joint
 - 9.10 free and/or slip tenon or spline joint

Performance Criteria 6

- 10 completion of own work within the estimated, allocated time to meet the needs of other occupations and/or client

**Scope/range related
to knowledge and
understanding**

Disposal of waste

1 environmental responsibilities, organisational procedures, manufacturers' information, statutory regulations and official guidance

Emergencies

2 operative's response to situations in accordance with organisational authorisation and personal skills when involved with

2.1 fires, spillages, injuries

2.2 emergencies relating to occupational activities

Fire extinguishers

3 water, CO₂, foam, powder and their uses

Hazards

4 those identified by risk assessment, methods of work, manufacturers' technical information, statutory regulations and official guidance

Health and safety control equipment

5 identified by the principles of prevention for occupational use, types and purpose of each type, work situations and general work environment

5.1 collective protective measures

5.2 personal protective equipment (PPE)

5.3 respiratory protective equipment (RPE)

5.4 local exhaust ventilation (LEV)

Information

6 drawings, specifications, schedules, method statements, risk assessments, manufacturers' information, oral and written instructions, sketches, electronic data, official guidance and current building regulations associated with designing and fabricating structural timber connections

Legislation and official guidance

7 this relates to the operative's responsibilities regarding potential accidents, health hazards and the environment whilst working in the workplace, below ground level, in confined spaces, at height, with tools and equipment, with materials and substances, with movement and storage of materials by manual handling and mechanical lifting

Maintenance

8 operative care of hand and power tools

Methods of work

9 application of knowledge for safe and healthy work practices, procedures and skills relating to the method and area of work and materials used to

9.1 design pegged post and beam connections suitable for frames

9.2 identify loads that will act on a frame (dead, live and wind)

9.3 identify the effects of loads on a frame (sustained load, load duration, purlin load, floor joist loads, braces and wind loading and beam sizes)

9.4 identify the types of stress acting on a frame (compression, tension, shear and bending)

9.5 identify criteria to determine peg hole size and position

9.6 identify changes that will occur to connections with shrinkage

9.7 apply the theorem of Pythagoras

9.8 determine geometrical angles

9.9 determine graded timber tree anatomy and growth rates, shrinkage and defects

9.10 ensure safe and practical erection of components

9.11 work with lifting and hoisting equipment (an awareness of the necessity for user certification)

9.12 recognise and determine when specialist skills and knowledge are required and report accordingly

9.13 determine specific requirements for structures of special interest, traditional build (pre 1919) and historical significance

9.14 identify and follow the installation quality requirements

9.15 work with, around and in close proximity to plant and machinery

9.16 use hand and power tools

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- 9.17 work at height
- 9.18 use access equipment
- 10 team work and communication
- 11 needs of other occupations associated with fabrication of post and beam components

Problems

- 12 those arising from information, resources and methods of work
- 12.1 own authority to rectify
- 12.2 organisational reporting procedures

Programme

- 13 types of productivity targets and time scales
- 14 how times are estimated
- 15 organisational procedures for reporting circumstances which will affect the work programme

Protect work

- 16 protect work against damage from general workplace activities, other occupations and adverse weather conditions

Resources

- 17 materials, components and equipment relating to types, quantity, quality, sizes and the sustainability of standard and/or specialist
- 17.1 measuring and marking equipment
- 17.2 draw pins or podgers, wedges, clamps and trestles
- 17.3 lifting equipment and ancillaries
- 17.4 fittings and fixings
- 17.5 hand and power tools
- 18 confirm resources and materials conform with the specification including suitability, moisture and durability
- 19 methods of calculating quantity, length, area and wastage associated with the method and procedure to design and fabricate structural timber connections

Security procedures

20 site, workplace, company, operative and vehicles

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