

Carpenter Level 1

Carpenter

Unit: A0.1 Orientation to Carpenter Apprenticeship

Level: One

Duration: 4 hours

Theory: 4 hours

Practical: 0 hours

Overview:

Jobsite learning and teaching have long been fundamental to Carpenter trade-practice, including its safety, health, and environmental implications. The chance to gain maximum benefit from workplace trade learning can be shaped by such complex factors as production schedules and jobsite politics. As adult trade-learners, Carpenter apprentices at all levels of skill-development are encouraged to use their eyes, ears, prior knowledge, and interpersonal skills to encourage journeypersons to teach as well as to supervise them. This requires understanding the trade's dynamics, including the roles and responsibilities that order jobsite activity. Unit content outlines the trade's skill-requirements and long-term career possibilities. It includes suggestions about trade-related learning styles/strategies. It also introduces the concept of skills stewardship, stressing the obligations that apprentices incur in learning from journeypersons to 'pay it forward' by assisting other newcomers who will follow them into the trade. The unit's purpose is to provide this essential information about learning to learn as a Manitoba carpenter apprentice. Elsewhere in Technical Training, senior apprentices explore the importance of learning to teach in trade workplaces – a central and time-honoured foundation of Carpenter journeywork.

Objectives and Content:

Percentage of Unit Mark (%)

1. **Describe the structure and scope of the modern Carpenter trade.**
 - a. Historical background, including apprentice experiences
 - b. Structure/scope of the trade
 - International and national characteristics
 - Important features of practicing the trade in Manitoba
 - Trade and construction industry organizations
 - c. Opportunities and career ladders
 - Lead hands and other immediate supervisors
 - Geographic mobility
 - Job hierarchies and innovations

2. **Describe Manitoba's Carpenter Apprenticeship Program.**
 - a. Concept and significance of skills stewardship
 - To the trade
 - To apprentices
 - To journeypersons
 - To employers
 - b. Practical Training: on-site component of program
 - Roles/responsibilities of employer and journeyperson(s)
 - Roles/responsibilities of Apprenticeship Training Coordinator (ATC)
 - Roles/responsibilities of apprentice, including record-keeping re: job experience
 - c. Technical Training: off-site component of program

30%

30%

- Roles/responsibilities of instructors (including Related'-area faculty)
- Roles/responsibilities of apprentices
 - d. Attendance requirements
 - e. Progression requirements
 - f. Reporting of grades
 - g. The Carpenter Trade Regulation and its significance
 - h. Policies (e.g., on personal conduct, fees, supplemental tests, etc.)
- Of Apprenticeship Manitoba
- Of Technical Training Provider
 - i. Other (as may be specified by instructor)

3. Describe special opportunities and challenges re: Carpenter apprenticeship. 40 %

- a. Adapting personal learning goals to program contexts
- Principles of adult learning (including importance of self-direction)
- Description/recognition of learning and teaching styles
- Significance of work culture and interpersonal skills re: trade-learning
- Integrating Technical Training and Practical Training content
- Possibilities and perils of peer learning
- Budgeting and other necessary personal arrangements
- Identifying sources of support (e.g. upgrading trade-related math skills)
- b. On-site learning challenges and opportunities
- Significance of jobsite supervision roles and teaching styles (e.g. journey-level skills-coach vs.(mentor)
- Communication with journeypersons and employers
- Coverage of prescribed tasks/subtasks that define the scope of trade and the content of the certification exam administered to apprentices who are completing their program
- Getting help and fixing mistakes
- Maintaining personal record of trade-learning challenges/achievements (e.g. a learning journal, and/or a personal training plan, if possible, discussed with employers and others supporting the apprenticeship journey to certification)
- c. In-school opportunities/challenges
- Personal arrangements that support progress in technical training
- “Baggage-handling” – self-assessing potential impacts of previous experiences (favourable/unfavourable) on current learning; availability of supports
- Techniques for note-taking, record-keeping, and review
- Relations with instructors (including 'related'-area faculty)
- College resources (library, support services, etc.)

Carpenter

Unit: A0.2 Trade Safety Awareness (ATB Board Standards)

Level: One

Duration: 7 hours

Theory: 7 hours

Practical: 0 hours

Overview:

Safe working procedures and conditions, injury prevention, and the preservation of health are of primary importance to industry in Canada. These responsibilities are shared and require the joint efforts of government, employers, and employees. It is imperative that all parties become aware of circumstances that may lead to injury or harm. Safe learning experiences and environments can be created by controlling the variables and behaviours that may contribute to incidents or injury. It is generally recognized that safety-conscious attitudes and work practices contribute to a healthy, safe, and incident-free working environment. It is imperative to apply and be familiar with the Workplace Safety and Health Act and Regulations. As well, it's essential to determine workplace hazards and take measures to protect oneself, co-workers, the public, and the environment. Safety education is an integral part of Carpenter apprenticeship training program both in school and on-the-job. Unit content is supplemented throughout technical training by trade-specific information about safety hazards and precautions presented in the appropriate contexts of discussion and study. Note: Percentage Weighting of Unit A0.2 objectives for grading purposes is at the discretion of the Instructor.

Objectives and Content:

Percentage of Unit Mark (%)

1. Identify safety and health requirements.

n/a

- a. Overview of Workplace Health and Safety Act
 - Rights and responsibilities of employees under the Act
 - Rights and responsibilities of employers
 - Rights and responsibilities of supervisors under the Act
- b. Fourteen (14) Regulations
- c. Codes of Practice
- d. Guidelines
- e. Right to refuse
 - Explanation of right-to-refuse process
 - Rights and responsibilities of employees under the Act
 - Rights and responsibilities of employers
 - Rights and responsibilities of supervisors under the Act

2. Identify personal protective equipment (PPE) and PPE procedures.

- a. Employer and employee responsibilities as related to PPE
- b. Standards: CSA; ANSI, and Guidelines.
- c. Work protective clothing and danger if it fits poorly
- d. Gloves – importance of proper selection for handling chemicals, cold items, etc.)
- e. Headwear – Appropriate headwear when required and the approved type of head wear
- f. Eye protection – Comparison/contrast between eyeglasses, industrial safety glasses, and safety goggles

- g. Foot protection – standards/requirements for selection and use
- h. Hearing protection
 - Noise hazards and noise-hazard rating standards (re: when protection is required)
 - Regulations
 - Types of hearing protection
- i. Respiratory protection – Variety; standards for use and selection
- j. Fall-protection equipment standards – Manitoba standards and guidelines; ANSI (U.S. standards); etc.
- k. Ladders and scaffolding
- l. Safety principles for working around hoisting, transport, and materials-handling equipment (e.g. boom trucks, forklifts, pallet trucks, semis, etc.)

3. Identify electrical safety.

- a. Effects of electric current on the human body
- b. Three factors that affect the severity of an electric shock
- c. The effects of electrical arc and blast of the human body and on equipment
- d. Hazards/precautions re: working with and/or around energized equipment

4. Identify fire safety.

- a. Types of fires
- b. Types of fire-fighting equipment
- c. Classification of fire extinguishers (A, B, and C)
- d. Location of fire extinguishers and fire exits
- e. Fire alarms and drills

5. Identify ergonomics.

- a. Definition/scope of ergonomics as a field of knowledge
- b. Ergonomically hazardous conditions and precautions regarding:
 - Postures during work
 - Repetitive activity/impacts
 - Force
 - Lifting
 - Tool use
 - Safety equipment
 - Hand-tool accidents
 - Equipment
 - Materials handling (including lifting, carrying, and putting down a load)

6. Identify hazard recognition and control.

- a. Safe work practices
- b. Basic risk assessment
- c. Injury prevention and control measures
- d. Hazards/precautions re: use of pneumatic tools

7. Describe the hazards of confined-space entry

- a. Definition and identification of confined space(s)
- b. Confined space hazards
 - Physical
 - Biological
- c. Precautions when working in confined space
- d. Emergency Response Plan
- e. Self-Contained Breathing Apparatus (SCBA)

8. Identify First Aid/Cardiopulmonary Resuscitation (CPR).

- a. Overview of First Aid Regulation
- b. Employer obligations re: First Aid
 - Who is certified to provide First Aid?
 - What is to be done while awaiting First Aid?
 - Where is First Aid Kit?
- b. Describe basic First Aid requirements and techniques
 - Definition, and scope/limits of First Aid interventions
 -

- Procedure for specific intervention re: cuts; burns; abrasions; sprains, fractures; suffocation; shock; electrical shock
- Interface with other services and agencies (e.g. Workers' Compensation claims)
- c. Describe basic CPR requirements and techniques
 - Definition, and scope/limits of CPR interventions
 - Varieties of CPR training and certification
 - Obtaining certification

9. Identify safety requirements as they apply to the WHMIS.

- a. WHMIS as a system
- b. Manitoba provincial regulation under the Safety and Health Act; WHMIS in other provinces
- c. Federal Hazardous Product's Act
- d. WHMIS generic training, including:
 - Identification, use, and format of WHMIS information tools
 - WHMIS and labeling by manufacturers, suppliers, and workplace sources
 - Definition and hazards/precautions re hazardous materials
 - Compliance with government safety standards and regulations
- e. WHMIS special-purpose certifications and associated rationale
- f. Typology of WHMIS labels, symbols, and classifications
- g. Scope and use of Materials Safety Data Sheets (MSDS)

10. Describe the identification and control of specified hazards.

- a. Basic control measures (injury-prevention)
- b. Safe work procedures
- c. Importance and scope of industrial housekeeping requirements
- d. Employer responsibilities
- e. How/where to store materials
- f. Safety hazards/precautions re walkways, stairs, floor/wall/roof openings, etc.
- g. Traffic-path hazards/precautions re: jobsite personnel and others

Carpenter

Unit: A1.1 Wood and Wood Products Unit Title

Level: One

Duration: 15 hours

Theory: 15 hours

Practical: 0 hours

Overview:

This unit of instruction is designed to provide the theoretical grounding needed to identify/describe lumber and wood products used in the carpentry trade.

Objectives and Content:

| | Percentage of Unit Mark (%) |
|---|--|
| 1. Describe/identify different types of wood. | 25% |
| a. Species/classification of hardwoods and softwoods | |
| b. Tree structure | |
| c. Wood species that carpenters commonly use | |
| 2. Identify characteristics of wood/lumber products. | 25% |
| a. Annual rings | |
| b. Bow | |
| c. Check | |
| d. Crook | |
| e. Cross-grain | |
| f. Cup | |
| g. Density | |
| h. Grain | |
| i. Heartwood | |
| j. Knots | |
| k. Moisture content | |
| l. Pitch-pockets | |
| m. Pith | |
| n. Rays | |
| o. Sapwood | |
| p. Shake | |
| q. Split | |
| r. Springwood | |
| s. Summerwood | |
| t. Twist/wind | |
| u. Wane | |
| v. Warp | |
| 3. Describe lumber production. | 10% |
| a. Drying | |
| b. Grading | |
| c. Planning | |

- d. Sawing (boards; lumber; timber)
- e. Treating (pressure, creosote, etc.)

4. Describe panel products. 10%

- a. Chipboards
- b. Fibreboard (e.g. MDF)
- c. Grading
- d. Interior/exterior latex glues
- e. Laminations
- f. Particleboard
- g. Plywood
- h. Strandboard
- i. Veneers

5. Describe manufactured structural elements/processes. 15%

- a. Finger-jointing
- b. Glulam (lumber products)
- c. Hot/cold gluing
- d. Laminated strand lumber (LSL)
- e. Laminated veneer lumber
- f. Parallel strand lumber (PSL)

6. Identify wood-product building components. 15%

- a. Engineered/manufactured joists
- b. Flooring
- c. Joists
- d. Laminated beams, etc.
- e. Millwork
- f. Rafters
- g. Sheathings
- h. Shingles
- i. Siding
- j. Stairs
- k. Studs
- l. Trusses

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Unit: A1.2 Non-wood Products

Level: One

Duration: 10 hours

Theory: 10 hours

Practical: 0 hours

Overview:

This unit of instruction is designed to provide the theoretical grounding needed to identify/describe plastic, metal, and composite products used in the carpentry trade.

Objectives and Content:

| | <u>Percentage of Unit Mark (%)</u> |
|---|--|
| 1. Identify important plastic products that carpenters use in their trade. | 50% |
| a. Doors/windows | |
| b. Eavestroughing | |
| c. Flooring | |
| d. Millwork | |
| e. Modular structural components | |
| f. Recycled plastics | |
| g. Roofing | |
| h. Siding | |
| i. Surfacing materials (solid and laminate) | |
| j. Trims | |
| 2. Identify important metal products that carpenters use in their trade. | 20% |
| a. Anchor bolts | |
| b. Cladding | |
| c. Connectors | |
| d. Doors/windows | |
| e. Fasteners | |
| f. Flashing | |
| g. Grates | |
| h. Hardware | |
| i. Meshes/laths | |
| j. Reinforcers | |
| k. Structural elements | |
| 3. Identify important composite products that carpenters use in their trade. | 30% |
| a. Asphalt products | |
| b. Asphalt-impregnated fibreboard | |
| c. Fibre cement products | |
| d. Gypsum-based products | |
| e. Plastic laminates | |

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Unit: A1.6 Fasteners/Adhesives Sealants/Fillers

Level: One

Duration: 10 hours

Theory: 10 hours

Practical: 0 hours

Overview:

This unit of instruction is designed to provide the theoretical grounding needed to identify the types of fasteners, adhesives, sealants, fillers, and mechanical connectors used in construction, as well as their respective applications.

Objectives and Content:

| Objectives and Content: | <u>Percentage of Unit Mark (%)</u> |
|--|---|
| <p>1. Identify common mechanical fasteners and their uses.</p> <ul style="list-style-type: none"> a. Anchors b. Gang nails c. Nails d. Screws e. Staples | 50% |
| <p>2. Identify industrial adhesives and their uses.</p> <ul style="list-style-type: none"> a. Contact cements b. Epoxy products c. Glues d. Hot-melt adhesives e. Resins f. Solders g. Solvent adhesives h. Spray adhesives i. Water-based adhesives | 20% |
| <p>3. Identify industrial sealants and their uses.</p> <ul style="list-style-type: none"> a. Acoustical sealants b. Caulking compounds c. Expanding foam d. Glazing compounds e. Putties f. Tapes | 10% |
| <p>4. Identify industrial fillers and their uses.</p> <ul style="list-style-type: none"> a. Backer rods b. Joint filler c. Plastic wood d. Wood filler | 10% |

5. Identify industrial connectors and their uses.

10%

- a. Fish plates
- b. Framing anchors
- c. Hurricane clips
- d. H-clips
- e. Joist hangers
- f. Shear plates
- g. Split rings
- h. T-plates
- i. Timber connectors

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Unit: A2.1 Tools and Equipment Theory

Level: One

Duration: 46 hours

Theory: 46 hours

Practical: 0 hours

Overview:

This unit of instruction introduces apprentices to the theoretical grounding needed to identify, use, and maintain the tools of the Carpenter trade.

Objectives and Content:

**Percentage of
Unit Mark (%)**
30%

1. Identify common hand tools.

- a. Adjustable wrench
- b. Angle divider
- c. Backsaw
- d. Brace and bits
- e. Brad-driver
- f. Builder's level
- g. Bull float
- h. Butt-gauge marker
- i. Carpenter's apron
- j. Caulking gun
- k. Chalkline
- l. Chisels
- m. Clamps
- n. Combination square
- o. Come-along
- p. Coping saw
- q. Darby
- r. Drill bits
- s. Dry-line
- t. Edgers
- u. File
- v. Framing square
- w. Hacksaw
- x. Hammer
- y. Hand level
- z. Hand-float
- aa. Handsaws
- bb. Hatchet
- cc. Nail sets
- dd. Nail-puller
- ee. Pencils and other marking instruments
- ff. Planes

- gg. Pliers
- hh. Plumb bob
- ii. Post-hole auger
- jj. Rake
- kk. Rasp
- ll. Screwdrivers
- mm. Sharpening stones
- nn. Shovels
- oo. Sidecutters
- pp. Sliding T-bevel
- qq. Stair gauge
- rr. Staplers
- ss. Tape measure
- tt. Trowel
- uu. Utility knife
- vv. Wrecking bar
- ww. Other (as specified by instructor)

2. Identify common power-tools. 30%

- a. Chainsaw
- b. Chopsaw
- c. Circular saw
- d. Compressor
- e. Concrete pumps
- f. Electric drill
- g. Generator
- h. Jigsaw
- i. Jitterbug
- j. Jointers
- k. Laminate trimmer
- l. Planer
- m. Portable power-tool accessories
- n. Powder-activated tools
- o. Power nailer/fastener
- p. Power trowels
- q. Reciprocating saw
- r. Routers
- s. Sanders
- t. Screwdriving bits
- u. Screw gun
- v. Other (as specified by instructor)

3. Identify common stationary power-tools. 30%

- a. Bandsaw
- b. Compressor
- c. Disk/belt sander
- d. Grinder
- e. Jointer
- f. Metal cut-off saw
- g. Radial arm saw
- h. Table saw
- i. Thickness planer
- j. Shaper

4. Identify materials-handling equipment. 5%

- a. Boom-truck
- b. Concrete pump
- c. Cranes and other hoisting equipment
- d. Forklift
- e. Rigging accessories
- f. Scissor-jack

- g. Skid-steer loader
- h. Other (as specified by instructor)

5. Identify roofing-specialty tools.

5%

- a. Air-nailer
- b. Metal nibbler (power shear)
- c. Portable masonry saw
- d. Power ladder
- e. Roofing shovel
- f. Power tools
- g. Roofer's knife
- h. Shingling hatchet

Carpenter

Unit: A2.2 Tools and Equipment Application

Level: One

Duration: 120 hours

Theory: 0 hours

Practical: 120 hours

Overview:

This unit of instruction is designed to provide practical experience in the use and maintenance of hand tools, power tools, stationary tools, and rigging equipment.

Objectives and Content:

| | <u>Percentage of Unit Mark (%)</u> |
|---|---|
| 1. Use hand tools. a. Inspection b. Maintenance c. Operation | 30% |
| 2. Use power tools. a. Inspection b. Maintenance c. Operation | 50% |
| 3. Use common stationary power-tools. a. Inspection b. Maintenance c. Operation | 10% |
| 4. Use rigging accessories. a. Inspection b. Maintenance c. Operation | 10% |

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Unit: A3.1 Personal Protective Equipment/Clothing

Level: One

Duration: 6 hours

Theory: 6 hours

Practical: 0 hours

Overview:

This unit of instruction is designed to provide the theoretical grounding required to identify personal protective equipment/clothing (PPE/PPC), and to describe the purpose, use, and maintenance of these safety aids.

Objectives and Content:

| | Percentage of Unit Mark (%) |
|--|--|
| 1. Identify PPE/PPC. | 15% |
| a. Eye | |
| b. Foot | |
| c. Hand | |
| d. Hearing | |
| e. Respiratory | |
| 2. Describe hearing protection. | 10% |
| a. Combination | |
| b. Decibels (sound measurement) | |
| c. Muffs | |
| d. Plugs | |
| 3. Describe eye protection. | 10% |
| a. From compressed air | |
| b. Hot objects | |
| c. Light | |
| d. Liquids | |
| e. Solid objects | |
| 4. Describe respiratory protection. | 15% |
| a. Air purifying | |
| b. Fit-tests | |
| c. Respiratory system (inhalation) | |
| d. Self-contained breathing apparatus (SCBA) | |
| e. Supplied-air | |
| 5. Describe body coverings. | 10% |
| a. Coveralls (Tyvek suits) | |
| b. Fabrics (natural/synthetic) | |
| c. Rain wear | |
| d. Skin protection (sun/UV/corrosives, etc.) | |
| e. Winter-garment layering | |

- | | | |
|-----------|--|------------|
| 6. | Describe foot protection. | 10% |
| | a. Ankles | |
| | b. Arches | |
| | c. Puncture-proofing | |
| | d. Toe protection | |
| 7. | Describe hand protection. | 10% |
| | a. Abrasion | |
| | b. Chemical exposure | |
| | c. Temperature | |
| | d. Vibration | |
| 8. | Describe head protection. | 10% |
| | a. Chinstraps | |
| | b. Hardhat classification | |
| | c. Liners | |
| 9. | Identify inspection/maintenance procedures for PPE/PPC. | 10% |
| | a. Body | |
| | b. Eye | |
| | c. Hand | |
| | d. Foot | |
| | e. Head | |
| | f. Hearing | |
| | g. Respiratory | |

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Unit: A3.2 Fall Protection

Level: One

Duration: 6 hours

Theory: 6 hours

Practical: 0 hours

Overview:

This unit of instruction is designed to provide the theoretical grounding required to identify fall-protection equipment and to describe the use and function of this safety apparatus.

Objectives and Content:

Percentage of Unit Mark (%)

- | | |
|--|-------------------|
| <p>1. Identify types of fall protection equipment.</p> <ul style="list-style-type: none"> a. Arrest b. Prevention c. Restraint | <p>30%</p> |
| <p>2. Describe fall arrest equipment.</p> <ul style="list-style-type: none"> a. Harnesses b. Lanyards c. Lifelines (horizontal/vertical) d. Rope-grabs e. Safety nets f. Shock absorbers g. Tie-ins/anchor points h. Work above water | <p>20%</p> |
| <p>3. Describe travel arrest equipment.</p> <ul style="list-style-type: none"> a. Belly-hooks b. Belts c. Harnesses d. Half-harnesses e. Lanyards f. Rope-grabs g. Tie-ins h. Anchor points | <p>20%</p> |
| <p>4. Describe fall prevention systems.</p> <ul style="list-style-type: none"> a. Floor-opening protection b. Guardrail systems c. Wall openings | <p>30%</p> |

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Unit: A3.3 Working Environments

Level: One

Duration: 7 hours

Theory: 7 hours

Practical: 0 hours

Overview:

This unit of instruction is designed to provide the theoretical grounding required to identify and control hazards in carpentry-trade work environments.

Objectives and Content:

| | Percentage of Unit Mark (%) |
|---|--|
| 1. Identify hazards associated with confined-space work | 20% |
| a. Emergency response | |
| b. Explosive atmospheres | |
| c. Health hazards | |
| d. Immediately dangerous to life or health (IDLH) | |
| e. Monitoring equipment | |
| f. Oxygen deficiency/enrichment | |
| g. Retrieval devices | |
| 2. Describe safe procedures associated with excavation work. | 50% |
| a. Access | |
| b. Backfilling/compaction | |
| c. Shoring | |
| d. Sloping/angle of repose | |
| e. Soil types | |
| f. Spoil pile | |
| 3. Review hazards associated with work in climatically-extreme conditions. | 10% |
| a. Cold stress | |
| b. Dehydration | |
| c. Frostbite | |
| d. Heat stress | |
| e. Hypothermia | |
| 4. Describe fire-control equipment. | 20% |
| a. Fire-blankets | |
| b. Fire classification (A, B, C) | |
| c. Fire-extinguishers classification | |

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Unit: A3.4 Industrial Health Hazards

Level: One

Duration: 2 hours

Theory: 2 hours

Practical: 0 hours

Overview:

This unit of instruction is designed to provide the theoretical grounding required to identify and control industrial health hazards.

Objectives and Content:

| | Percentage of Unit Mark (%) |
|---|--|
| 1. Identify types of industrial hazards. | 20% |
| a. Atmospheric | |
| b. Electrical | |
| c. Ergonomic | |
| d. Liquid | |
| 2. Identify ways hazardous materials enter the body. | 20% |
| a. Absorption | |
| b. Ingestion | |
| c. Inhalation | |
| 3. Describe workplace hazardous materials. | 30% |
| a. Biohazards | |
| b. Compressed gases | |
| c. Corrosives | |
| d. Dangerously reactive substances | |
| e. Flammables | |
| f. Hazardous fibres | |
| g. Oxidizers | |
| h. Poisons (acute/chronic) | |
| i. WHMIS symbols | |
| 4. Describe health hazards associated with building materials. | 30% |
| a. Dusts | |
| b. Fibres | |
| c. Heavy metals | |
| d. Off-gassing | |
| e. Wood preservatives | |

Carpenter

Unit: A3.5 Statutory Documents

Level: One

Duration: 3 hours

Theory: 3 hours

Practical: 0 hours

Overview:

This unit of instruction is designed to provide the theoretical grounding required to identify health and safety legislation, and to describe its specific applications to the carpentry jobsite.

Objectives and Content:

**Percentage of
Unit Mark (%)**
50%

1. Identify applicable health and safety legislation.

- a. Access/egress
- b. Confined space
- c. Electrical hazards
- d. Fall protection
- e. Harassment
- f. Health
- g. Materials handling
- h. Personal protection
- i. Rigging
- j. Right to refuse
- k. Signaling/flagging
- l. Temporary support-structures (scaffolding, falsework, etc.)
- m. Working environment

1. Describe the requirements specified in applicable health and safety legislation.

50%

- a. Access/egress
- b. Confined space
- c. Electrical hazards
- d. Fall protection
- e. Harassment
- f. Health
- g. Materials handling
- h. Personal protection
- i. Rigging
- j. Right to refuse
- k. Signaling/flagging
- l. Temporary support-structures (scaffolding, falsework, etc.)
- m. Working environment

Carpenter

Unit: A5.3 Construction Math/Geometry

Level: One

Duration: 16 hours

Theory: 16 hours

Practical: 0 hours

Overview:

This unit of instruction is designed to provide the theoretical grounding required to perform construction-related mathematical and geometrical operations.

Objectives and Content:

| | <u>Percentage of Unit Mark (%)</u> |
|--|---|
| 1. Perform basic operations. a. Addition b. Subtraction c. Multiplication d. Division | 15% |
| 2. Perform linear measurement. a. Imperial/metric b. Perimeter (rectangles; squares; circles) | 20% |
| 3. Calculate area/volume. a. Geometrical shapes b. Board-foot measure (BFM) | 20% |
| 4. Calculate ratios/proportions. a. Like-ratios b. Mechanical advantage c. Percentages d. Similar triangles | 30% |
| 5. Apply geometrical principles. a. Bisecting angles/lines b. Ellipses/spring line c. Perpendicular parallel lines d. Pythagorean Theorem | 15% |

Carpenter

Unit: A7.1 Ladders and Ramps

Level: One

Duration: 6 hours

Theory: 6 hours

Practical: 0 hours

Overview:

This unit of instruction is designed to provide the theoretical grounding required to describe the construction and use of ladders, ramps, runways, and stairs as jobsite aids.

Objectives and Content:

Percentage of Unit Mark (%)

- | | |
|---|-------------------|
| <p>1. Describe types of ladders.</p> <ul style="list-style-type: none"> a. Fixed b. Job-built c. Manufactured d. Regulations governing ladder-construction | <p>30%</p> |
| <p>2. Describe safe ladder-use.</p> <ul style="list-style-type: none"> a. Base-to-height ratio b. Electrical hazards c. Fall prevention d. Founding e. Ladder cages f. Ladder jacks g. Minimum extension h. Overlaps i. Rest platform j. Safety feet k. Three-point contact l. Tie-off | <p>20%</p> |
| <p>3. Describe ramps, runways, and stairs.</p> <ul style="list-style-type: none"> a. Guardrails and handrails b. Regulations c. Slope d. Stepping laths (cleats) e. Tread rise/run f. Widths | <p>10%</p> |
| <p>4. Describe construction standards for ladders, ramps, runways, and stairs.</p> <ul style="list-style-type: none"> a. Bearers (transoms/ledgers) b. Braces c. Handrails, guardrails, and toe-boards d. Loading e. Platform material f. Rails/rungs | <p>10%</p> |

- g. Ribbons
- h. Sills
- i. Stringers
- j. Treads
- k. Uprights

5. Describe the construction of ladders, ramps, runways, and stairs.

30%

- a. Guardrails and handrails
- b. Job-built ladders
- c. Ramps
- d. Runways
- e. Temporary stairs

Carpenter

Unit: A7.2 Access and Temporary Structures

Level: One

Duration: 14 hours

Theory: 14 hours

Practical: 0 hours

Overview:

This unit of instruction introduces apprentices to the theoretical grounding required to identify access systems and temporary structures, and to describe the erection, maintenance, and disassembly of scaffolds.

Objectives and Content:

**Percentage of
Unit Mark (%)**

1. Identify access-scaffold structures.

7%

- a. Birdcage
- b. Cantilever
- c. Independent/dependent
- d. Rolling

2. Identify access-scaffold components.

8%

- a. Baseplates
- b. Bearers
- c. Braces (horizontal/vertical)
- d. Casters
- e. Clamps
- f. Connectors/couplers
- g. Farm wagons
- h. Frames
- i. Ledgers
- j. Outriggers
- k. Planks (decks/grates)
- l. Putlogs
- m. Rails
- n. Reveal pins
- o. Ribbons
- p. Screw-jacks
- q. Sills
- r. Standards
- s. Toeboards
- t. Transoms
- u. Trusses
- v. U-heads
- w. Uprights

3. Identify loads on scaffolding.

8%

- a. Dead/live loads

- b. Ground loads
- c. Legs
- d. Loads
- e. Rolling loads
- f. Safe workloads
- g. Static loads
- h. Wind loads

4. Describe erection, maintenance, and disassembly of independent scaffolding. 7%

- a. Access/egress
- b. Base lift
- c. Base-to-height ratio
- d. Bracing
- e. Duty ratings (light/heavy)
- f. Foundations
- g. Guardrails
- h. Single-/double-pole
- i. Tie-ins (horizontal/vertical)
- j. Wood and metal

5. Describe erection, maintenance, and disassembly of birdcage scaffolding. 7%

- a. Access
- b. Bases
- c. Beams
- d. Braces
- e. Extension devices
- f. Frames
- g. Guardrails
- h. Ledgers
- i. Planks/plywood
- j. Positive ties
- k. Sills
- l. Standards
- m. Transoms
- n. U-heads

6. Describe erection, maintenance, and disassembly of rolling scaffolds. 7%

- a. Access to platform
- b. Base-to-height ratio
- c. Casters
- d. Fold down
- e. Frames
- f. Guardrails
- g. Outriggers
- h. Rolling load
- i. Static load
- j. Tipping
- k. Toeboards
- l. Tube and clamp
- m. Work platforms

7. Describe erection, maintenance, and disassembly of bridging/cantilever scaffolds. 7%

- a. Check clamps
- b. Knee braces
- c. Puncheon
- d. Rakers
- e. Spurs

8. Describe types of machine scaffolds. 7%

- a. Articulated booms
- b. Mast-climbing scaffolds

- c. Scissor-lifts
- d. Zooms

9. Describe equipment set-up and operation. 7%

- a. Articulating booms
- b. Inspection for maintenance
- c. Mast-climbing scaffolds
- d. Scissor-lifts
- e. Zooms

10. Describe bleachers and stages. 7%

- a. Bleachers
- b. Canopies/swings
- c. Equipment towers
- d. Grandstands
- e. Multilevel stages
- f. Simple stages

11. Describe the components of bleachers and stages. 7%

- a. Aisles
- b. Baseplates
- c. Bleacher bents
- d. Braces
- e. Guardrails/handrails
- f. Ledgers
- g. Screwjacks
- h. Seatbacks
- i. Seats
- j. Sills
- k. Standards
- l. Transoms
- m. Walkways/footboards

12. Describe loads and safety issues associated with bleachers and stages. 7%

- a. Aisle widths
- b. Distance to exits
- c. Live/dead load
- d. Loading
- e. Seat-loads
- f. Seats

13. Describe the erection, maintenance, and disassembly of bleachers. 7%

- a. Bleacher bents
- b. Guardrails/handrails
- c. Layout
- d. Seats
- e. Standard scaffold
- f. Steps

14. Describe the erection, maintenance, and disassembly of with stages. 7%

- a. Beams
- b. Layout
- c. Platform materials
- d. Standard scaffold equipment

Carpenter

Unit: A7.3 Suspended Access Equipment

Level: One

Duration: 5 hours

Theory: 5 hours

Practical: 0 hours

Overview:

This unit of instruction introduces apprentices to the theoretical grounding required to identify suspended scaffolds and access equipment, and to describe the erection, maintenance, and disassembly of these jobsite aids.

Objectives and Content:

**Percentage of
Unit Mark (%)**

1. Identify suspended scaffolds.

10%

- a. Boatswain's (bosun's) chairs
- b. Hangers
- c. Suspended scaffolds
- d. Swing stages
- e. Angle drawing

2. Identify the components of suspended access equipment.

20%

- a. Anchors
- b. Beam clamps
- c. Beams
- d. Cables
- e. Climbers
- f. Counterweights
- g. Descenders
- h. Fall protection
- i. Guardrails
- j. Puncheons
- k. Rigging
- l. Safety lines
- m. Tiebacks
- n. Tie-ins

3. Describe loads and safety factors.

30%

- a. Equipment safety factor
- b. Live/dead load
- c. Point load
- d. Rigging safety factor
- e. Safe workloads

4. Describe erection, maintenance, and disassembly of boatswain's (bosun's) chairs.

10%

- a. Anchors

- b. Ascenders
- c. Balance-points
- d. Beams/thrust-outs
- e. Counterweights
- f. Descenders
- g. Fall protection
- h. Rigging
- i. Tiebacks

5. Describe erection, maintenance, and disassembly of swing-stages. 10%

- a. Anchors
- b. Ascenders
- c. Balance-points
- d. Beams/thrust-outs
- e. Counterweights
- f. Descenders
- g. Fall protection
- h. Rigging
- i. Tiebacks

6. Describe erection, maintenance, and disassembly of suspended scaffolds. 10%

- a. Beam clamps
- b. Guardrails (toeboards)
- c. Hoarding
- d. Moving
- e. Multipoint suspension
- f. Platform materials
- g. Rigging
- h. Trusses/beams

7. Describe erection, maintenance, and disassembly of hanging scaffolds. 10%

- a. Box-ties
- b. Check clamps
- c. Guardrails
- d. Puncheons
- e. Rakers

Carpenter

Unit: A 7.4 Hoardings

Level: One

Duration: 3 hours

Theory: 3 hours

Practical: 0 hours

Overview:

This unit of instruction is designed to provide the theoretical grounding required to identify types of jobsite hoarding, and to describe their assembly/disassembly.

Objectives and Content:

| Objectives and Content: | Percentage of <u>Unit Mark (%)</u> |
|--|---|
| 1. Describe the different kinds of hoarding. a. Environmental b. Containment | 40% |
| 2. Describe the construction and dismantling of hoarding. a. Adhesives b. Fibreglass c. Heaters d. Poly e. Tarpaulins (including insulated tarpaulins) f. Ventilation g. Waste control | 60% |
