

# Instructional Framework

## Carpentry

46.0400.30

This Instructional Framework identifies, explains, and expands the content of the standards/measurement criteria, and, as well, guides the development of multiple-choice items for the Technical Skills Assessment. This document corresponds with the Technical Standards endorsed on July 14, 2019.



### Domain 1: Rough Carpentry

Instructional Time: 40-50%

#### STANDARD 5.0 DEMONSTRATE BASIC FLOOR FRAMING

5.1 Differentiate lumber type and material (e.g., OSB, plywood, and pressure-treated lumber)	<ul style="list-style-type: none"><li>• OSB</li><li>• Plywood</li><li>• Pressure treated wood</li><li>• Etc.</li></ul>
5.2 Install sill plates	<ul style="list-style-type: none"><li>• Sizes and types</li><li>• Code</li><li>• Fasteners</li></ul>
5.3 Install floor joists	<ul style="list-style-type: none"><li>• Sizes and types</li><li>• Code</li><li>• Fasteners</li></ul>
5.4 Identify the purpose of fasteners used in floor framing according to national, state, and local building codes	<ul style="list-style-type: none"><li>• Type of fasteners meet codes</li></ul>
5.5 Install a subfloor (e.g., tongue and groove and OSB panels)	<ul style="list-style-type: none"><li>• Tongue and groove</li><li>• OSB panels</li><li>• Fasteners</li></ul>
5.6 Identify different floor systems (e.g., cantilever, TGI truss, and conventional)	<ul style="list-style-type: none"><li>• Cantilever</li><li>• TGI truss</li><li>• Conventional framing</li><li>• 16" or 24" o.c.</li></ul>

<b>STANDARD 6.0 DEMONSTRATE WALL AND CEILING FRAMING</b>	
6.1 Lay out and snap wall lines, including plates, corner posts, door and window openings, partition Ts, and bracing, and plan for installation of fire stops	<ul style="list-style-type: none"> <li>• Chalk line method</li> <li>• Mark material</li> </ul>
6.2 Lay out and assemble exterior stud walls (e.g., wood and metal)	<ul style="list-style-type: none"> <li>• Advantages and disadvantages</li> <li>• Code</li> </ul>
6.3 Erect and brace exterior walls	<ul style="list-style-type: none"> <li>• Physical lift</li> <li>• Crane</li> <li>• Lift</li> </ul>
6.4 Cut and install ceiling joists	<ul style="list-style-type: none"> <li>• Conventional framing</li> <li>• Code</li> <li>• Truss</li> </ul>
<b>STANDARD 7.0 DEMONSTRATE FRAMING AND FINISHING A ROOF</b>	
7.1 Set truss systems	<ul style="list-style-type: none"> <li>• Rise, run and slope</li> <li>• Truss types</li> <li>• Truss anatomy</li> <li>• Truss layout (i.e. 16", 24", 32" o.c.)</li> </ul>
7.2 Install roof sheathing	<ul style="list-style-type: none"> <li>• Underlayment</li> <li>• Snow and ice shield</li> <li>• Metal - aggregate</li> <li>• Type of sheathing</li> <li>• Roll roofing</li> <li>• Mop</li> </ul>
7.3 Frame a roof opening	<ul style="list-style-type: none"> <li>• Flashing</li> <li>• Apron</li> <li>• Types of opening <ul style="list-style-type: none"> <li>○ Dormers</li> <li>○ Skylights</li> <li>○ Trap door</li> <li>○ Etc.</li> </ul> </li> </ul>

## Domain 2: Safety and Tools

Instructional Time: 25-35%

### STANDARD 1.0 MAINTAIN A SAFE WORK ENVIRONMENT ACCORDING TO OSHA STANDARDS

1.1 Recognize the purpose of OSHA	<ul style="list-style-type: none"><li>• Standards of safety within industry</li></ul>
1.2 Recognize how workers protect themselves from hazards associated with stairways and ladders	<ul style="list-style-type: none"><li>• Railing of stairs</li><li>• Four points of contact and three for user</li><li>• Handicap considerations</li></ul>
1.3 Recognize how workers protect themselves from hazards associated with material handling	<ul style="list-style-type: none"><li>• Use of material handling</li><li>• Use of tools</li></ul>
1.4 Recognize how workers protect themselves from hazards associated with construction crane operations	<ul style="list-style-type: none"><li>• Crane operations signaling</li><li>• Rigging equipment<ul style="list-style-type: none"><li>◦ Slings</li><li>◦ Eyebolts</li><li>◦ Shackles</li><li>◦ Hitches</li><li>◦ Etc.</li></ul></li></ul>
1.5 Recognize how workers protect themselves from hazards associated with excavations	<ul style="list-style-type: none"><li>• Sloping</li><li>• Benching</li><li>• Shielded trench structure</li><li>• Retainers</li><li>• Railings</li><li>• Shoring</li></ul>
1.6 Recognize how workers protect themselves from common health hazards found in construction industry workplaces	<ul style="list-style-type: none"><li>• First Aid</li><li>• CPR basic</li><li>• Safety management procedures</li></ul>
1.7 Select appropriate personal protective equipment for common construction industry hazards	<ul style="list-style-type: none"><li>• Appropriate attire and equipment of PPE<ul style="list-style-type: none"><li>◦ Hardhats</li><li>◦ Gloves</li><li>◦ Safety glasses</li><li>◦ Harness</li><li>◦ Etc.</li></ul></li></ul>

1.8 Recognize how workers protect themselves from hazards associated with scaffolds	<ul style="list-style-type: none"> <li>● Regulations for scaffolding</li> </ul>
1.9 Recognize how workers protect themselves from hazards associated with the use of tools (i.e., hand and power)	<ul style="list-style-type: none"> <li>● Power and hand tools usage and safety</li> </ul>
<b>STANDARD 2.0 OPERATE HAND AND POWER TOOLS AND EQUIPMENT ACCORDING TO OSHA STANDARDS</b>	
2.1 Inspect, use, and maintain hand tools, portable power tools, powder-actuated tools, and pneumatic tool	<ul style="list-style-type: none"> <li>● Common name and usage of tools <ul style="list-style-type: none"> <li>○ Speed square</li> <li>○ Hammer</li> <li>○ Chisels</li> <li>○ Nail set</li> <li>○ Pneumatic framing nailers</li> <li>○ Pneumatic finishing nailers</li> <li>○ Etc.</li> </ul> </li> </ul>
2.2 Inspect, use, and maintain extension cords, cartridges, and hoses	<ul style="list-style-type: none"> <li>● Identify repair problem areas on respective equipment</li> </ul>
2.3 Recognize use and maintenance of power equipment (i.e., compressors, generators, engine-driven, etc.)	<ul style="list-style-type: none"> <li>● Compressors</li> <li>● Generators</li> <li>● Engine-driven</li> <li>● Etc.</li> </ul>

## Domain 3: Finish Carpentry

Instructional Time: 20-25%

### STANDARD 8.0 RECOGNIZE PURPOSE OF THERMAL AND MOISTURE PROTECTION

8.1 Identify purpose and use of vapor barrier	<ul style="list-style-type: none"> <li>● House wraps</li> <li>● Black paper</li> <li>● Plastic and rubber membranes</li> </ul>
8.2 Identify purpose and use of insulation	<ul style="list-style-type: none"> <li>● R-values and U-values</li> <li>● Advantages and disadvantages of different types of thermal insulation <ul style="list-style-type: none"> <li>○ Fiberglass</li> <li>○ Foam</li> <li>○ Chemical treated paper</li> <li>○ Wool</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>○ Specialty insulation</li> <li>○ Etc.</li> </ul>
<b>STANDARD 9.0 DEMONSTRATE EXTERIOR FINISHES</b>	
9.1 Install frieze boards or soffit	<ul style="list-style-type: none"> <li>● Eaves</li> <li>● Types and methods of installations</li> <li>● Advantages and disadvantages</li> </ul>
9.2 Install exterior moldings and trim	<ul style="list-style-type: none"> <li>● Types and methods of installations</li> <li>● Common types of molding and trim</li> </ul>
9.3 Install siding	<ul style="list-style-type: none"> <li>● Types and methods of installations</li> <li>● Common types of siding</li> </ul>
<b>STANDARD 11.0 DEMONSTRATE INTERIOR WALL AND CEILING FINISH</b>	
11.1 Cut and install drywall	<ul style="list-style-type: none"> <li>● Types of drywall (i.e., fire rated, moisture rated, size, etc.)</li> </ul>
11.2 Mud, tape, and texture drywall	<ul style="list-style-type: none"> <li>● Types of mud standard quick mud set specialty</li> <li>● Tape and corner beads</li> <li>● Texture <ul style="list-style-type: none"> <li>○ Skip</li> <li>○ Orange peel</li> <li>○ Spray</li> <li>○ Etc.</li> </ul> </li> </ul>

<b>Domain 4: Windows, Doors, and Installation</b>	
<b>Instructional Time: 10-15%</b>	
<b>STANDARD 10.0 DEMONSTRATE DOOR AND WINDOW INSTALLATION</b>	
10.1 Install doors	<ul style="list-style-type: none"> <li>● Rough openings</li> <li>● Weather sealing</li> <li>● Headers, sill</li> <li>● Molding and trim</li> <li>● Bypass</li> <li>● Bifold</li> <li>● Standard</li> </ul>

10.2 Install door hardware	<ul style="list-style-type: none"> <li>● Entry knobs</li> <li>● Bypass</li> <li>● Bifold</li> <li>● Standard</li> <li>● Exterior and interior doors</li> <li>● Doorknobs</li> <li>● Etc.</li> </ul>
10.3 Install windows	<ul style="list-style-type: none"> <li>● Rough opening</li> <li>● Weather sealing</li> <li>● Headers</li> <li>● Molding and trill</li> <li>● Sill</li> <li>● Types of windows <ul style="list-style-type: none"> <li>○ Single hung</li> <li>○ Sliders</li> <li>○ Picture</li> <li>○ Specialty windows</li> </ul> </li> </ul>
<b>STANDARD 12.0 DEMONSTRATE THRESHOLD AND CASING INSTALLATIONS</b>	
12.1 Install threshold	<ul style="list-style-type: none"> <li>● Standard framing technique and code</li> <li>● Types of materials and procedure <ul style="list-style-type: none"> <li>○ Wood</li> <li>○ Stone</li> <li>○ Metal</li> <li>○ Etc.</li> </ul> </li> </ul>
12.2 Install window casing	<ul style="list-style-type: none"> <li>● Types of materials and procedure <ul style="list-style-type: none"> <li>○ Wood</li> <li>○ Vinyl</li> <li>○ Aluminum</li> <li>○ Etc.</li> </ul> </li> </ul>
12.3 Install door casing	<ul style="list-style-type: none"> <li>● Styles of trim and procedure <ul style="list-style-type: none"> <li>○ Wood</li> <li>○ Vinyl</li> <li>○ Stone</li> <li>○ Metal</li> <li>○ Etc.</li> </ul> </li> </ul>

## Domain 5: Blueprints, Codes, and Layouts

Instructional Time: 5-10%

### STANDARD 3.0 USE PLANS, SPECIFICATIONS, AND CODES

3.1 Identify blueprint terms, components, and symbols	<ul style="list-style-type: none"><li>● Blueprint terms/components/symbols<ul style="list-style-type: none"><li>○ Legends</li><li>○ Assembly drawing</li><li>○ Auxiliary view</li><li>○ Title blocks</li><li>○ Scheduling</li><li>○ Electrical symbols</li><li>○ HVAC symbols</li><li>○ Plumbing symbols</li></ul></li></ul>
3.2 Identify a set of drawings, symbols, scales, and legends	<ul style="list-style-type: none"><li>● Blueprint terms/components/symbols<ul style="list-style-type: none"><li>○ Dimensioning</li><li>○ Schematic drawing</li><li>○ Framing plans</li><li>○ Section views</li><li>○ Detail views</li><li>○ Architectural scale</li><li>○ Civil scale</li><li>○ Legends</li></ul></li></ul>
3.3 Interpret material schedules on blueprints	<ul style="list-style-type: none"><li>● Material types</li><li>● Size</li><li>● Timeline</li><li>● Quantities</li></ul>
3.4 Relate information on blueprints to actual locations	<ul style="list-style-type: none"><li>● Surveying</li><li>● Scheduling/placing<ul style="list-style-type: none"><li>○ Location of windows on an existing blueprint</li><li>○ Etc.</li></ul></li></ul>
3.5 Identify and use drawing dimensions	<ul style="list-style-type: none"><li>● Dimension and extension line usage</li></ul>
3.6 Estimate the amount of material for carpentry	<ul style="list-style-type: none"><li>● Material takeoff list<ul style="list-style-type: none"><li>○ Framing</li><li>○ Block</li></ul></li></ul>

	<ul style="list-style-type: none"> <li>○ Electrical</li> <li>○ Plumbing</li> <li>○ HVAC</li> <li>○ Etc.</li> </ul>
3.7 Determine elevations using levels (i.e., builders, transit, laser, etc.)	<ul style="list-style-type: none"> <li>● Builders/transit</li> <li>● Laser</li> <li>● 3-4-5 method/Pythagorean theorem</li> </ul>
<b>STANDARD 4.0 LAY OUT BUILDING LINES</b>	
4.1 Identify methods used to ensure precision horizontal measurements (e.g., mathematical formulas such as 3.4.5 rule, Pythagorean Theorem, and diagonal method for solving square)	<ul style="list-style-type: none"> <li>● Mathematical formulas such as 3-4-5 method/Pythagorean theorem</li> <li>● Diagonal method for solving square</li> </ul>
4.2 Recognize building lines	<ul style="list-style-type: none"> <li>● Batter boards</li> <li>● Property lines</li> <li>● Setbacks</li> <li>● Existing utility rights of way</li> <li>● Easements, alleys</li> <li>● Sidewalks</li> <li>● Contour lines</li> <li>● Etc.</li> </ul>
4.3 Determine elevations using levels (i.e., builders/transit, laser, etc.)	<ul style="list-style-type: none"> <li>● Builders/transit</li> <li>● Laser level</li> <li>● GPS instrument</li> <li>● Leveling rods</li> <li>● Etc.</li> </ul>