Residential Construction Academy
National Association of Home Builders
Home Builders Institute

Residential Carpentry Standards

An Overview of HBI Framework for Skill Standards

We are pleased to present the first in a series of National Skill standards for the residential construction industry. The goal of this project is to establish national standards for the residential construction industry that reflect industry skill requirements. The standards will provide a basis for the certification and training of workers and provide employers with objective benchmarks for selecting employee and evaluating training needs. In addition, educators will find the standards useful for designing curriculum and evaluating individual training outcomes.

These standards in and by themselves do not represent a model-training program. These standards are designed to be a source for developing program and curriculum and evaluating the outcomes of residential carpentry training programs.

Residential Carpenter standards have been developed and validated and incorporate Level I standards for semi-skilled carpenters and Level II standards for skilled carpenters. Standards were developed and validated for the following 11 carpentry specialties: ***Wood Framing; Metal Framing; Interior Trim; Exterior Trim; Siding; Concrete Forms; Drywall; Roof Application; Stairs; Insulation; and, Cabinets and Countertops***. Thirty-two (32) critical work functions or duty areas were identified. Critical work functions describe the major tasks and content areas of work within each specialty. Key activities or major tasks and knowledge involved in completing critical work functions are also provided.

Performance Indicators, which help determine when critical work functions and key activities are being performed competently and meet standards, are referenced to critical work functions. These indicators are found in *Residential Construction Performance Guidelines for Professional Builders & Remodelers 2nd Edition* published by the National Association of Home Builders.[1]

In addition, applied academic skills required to perform key activities are provided. These include measurement, arithmetic, layout, geometry, communications and materials. Safety requirements involved in completing key activities have also been identified.

Committees of subject matter experts (SMEs) representing remodelers, custom builders, and small volume and production builders from different parts of the nation were used to establish and validate the standards. The final list of 32 critical work functions reflects and accommodates regional differences.

How the Standards Were Developed

The project called for the formation of a committee of National Association of Home Builders (NAHB) industry leaders in the field of residential carpentry including remodelers, custom builders, small volume and production builders as well as carpentry instructors and trainers. In addition, the author and editor of Delmar's carpentry text were included in this committee. A representative of the Vinyl Siding Institute also participated. One of the participants managed carpentry training for a nationwide high-production homebuilder. These leaders represented the following regions of the country: Northeast, Southeast, Southwest, Mid-Atlantic and Mid-Continent. Thus, builders from different regions of the nation provided input with respect to carpentry performance standards, building practices and materials unique to these various regions. The list of residential carpentry work functions and key activities produced in this project is appropriate for all regions of the nation, according to these committee industry leaders. It is significant to note the work functions and key activities developed in this project are

[1] Residential Constructional Performance Guidelines for Professional Builders & Remodelers 2nd Edition, National Association of Home Builders, Washington, DC, 2000.

sufficiently comprehensive and flexible to cover carpentry-building practices associated with home building in geographic areas subject to the effects of wind shear and hurricanes.

The initial group of seven industry leaders participated in reviewing and rating critical work functions and key activities and applied academic skills. This group also defined and classified residential carpentry into the following specialties: Wood Framing; Metal Framing, Interior Trim; Exterior Trim, Siding, Concrete Forms; Drywall; Roof Application; Stairs; Insulation and Cabinets and Countertops. During a two and a half-day meeting the committee reviewed, commented on and rated the importance of more than 200 critical work functions and key activities. The committee also reviewed and referenced applied academic skills and safety requirements to each of these functions and activities.

A second group of seven industry leaders validated the original list of critical work functions and key activities by reviewing and rating these functions and activities. Other critical work functions and key activities were added to the list of 200 by this committee.]. The final list includes 32 work functions and 231 key activities. This process allowed the project to develop a more robust set of standards than would have been possible if only one group of industry leaders was used.

Key activities were also cross-referenced by page numbers to Delmar's *Carpentry* (3rd edition, 2001) text.

Residential Carpentry Specialties

The occupational category covered by this standards project was residential carpenters. However, industry leaders further divided the occupational category into 11 carpentry specialties as described earlier. This reflects the trend towards specialization in the home building industry. Industry leaders determined which of the 231 key activities (tasks) or required content was related to each specialty. The percent of all carpentry task (231) performed by each of specialties is shown below.

Table 1. What percent of all carpentry activities are performed by each specialty?

	Specialty	Key Activities[2]	Percent
1	Wood Framing	154	67%
2	Exterior Trim	67	29%
3	Interior Trim	64	28%
4	Metal Framing	56	24%
5	Siding	52	23%
6	Stairs	53	23%
7	Concrete Forms	51	22%
8	Drywall	37	16%
9	Cabinets & Countertops	35	15%
10	Insulation	32	14%
11	Roofing	30	13%

Core Activities. Table 1 illustrates a set of key activities that are common to many residential carpentry specialties. A significant percent of wood framing key activities and knowledge required to perform are common and critical to many of the remaining specialties. By mastering wood framing, trainees should gain a broad base to work in the other specialties.

Appendix A displays a complete list of the percent of specialties that require mastery of key activities and knowledge required to perform. Table 2 below illustrates those key activities required across all 11 residential carpentry specialties.

[2] The total number of residential carpentry key activities and knowledge required to perform is 231.

Table 2. What key activities and knowledge are required by all residential carpentry specialties?

	Percent
Measuring and marking tools	100%
Leveling and layout tools	100%
Boring and cutting tools	100%
Fastening and dismantling tools	100%
Saws, drills and drivers	100%
Fastening tools (power-actuated, etc.)	100%
Safely set up and use saw horses	100%
Build a sawhorse and other construction aids	100%

Applied Academic Skills

The following are examples of applied academic skills statements developed in conjunction with industry leaders and review of authoritative references. The process involved using the residential carpentry critical work functions (duty areas) and key activities (tasks). Committee members were asked to identify the applied academic skills required to perform each key activity. Applied academic skills include measurement, mathematics, communications and use of materials. Appendix B indicates which academic skill goes with each key activity. Also, Appendix B reports safety requirements for each key activity. General statements describing academic skills were developed, reviewed and checked by industry committee members.

Applied Measurement Standards

1. Measure using tape or rule with +/- 1/8" of specifications.
2. Use builder's level or transit to determine site layout.
3. Use builder's level or transit to determine building elevations.
4. Determine approximate distance by pacing.

5. Use framing square to determine dimensions for roof framing.
6. Use tape measure, builder's level and transit to verify angular relationship of structural components of building.
7. Use tape measure and other measurement tools to verify that dimensions of features conform to plan specifications or manufacturer's tolerances.
8. Visually perceive geometric relationships of building elements.
9. Determine data needed to solve measurement problems.

Applied Math Standards

1. Convert measures from feet/inches to decimals and vice versa.
2. Convert oral information into math forms and vice versa.
3. Solve construction problems using whole numbers and fractions.
4. Solve problems using fractions, decimals, ratios and percentages.
5. Solve problems using conventional construction symbols.
6. Calculate necessary dimensions from blueprints.
7. Estimate the results of basic arithmetic functions and accurately round estimate using appropriate rule.
8. Apply simple equations for volume, square foot, cubic foot, etc.
9. Check and lay out right angle using 3/4/5 rule.
10. Solve problems using proportions of ingredients for mixes, etc.

Applied Communications Standards

1. Read and apply MSDS and other safety information.
2. Listen and follow verbal directions for work activity.
3. Give accurate verbal directions for work activity.
4. Lay out framing and other building materials from blueprints.
5. Read and apply manufacturers' specs for equipment and materials.
6. Understand and interpret hand signals for rigging and lifts.
7. Follow standard work procedures for job site safety.
8. Know how to treat effects of hazardous materials exposures on job site..

Applied Materials Standards

1. Understand impact of moisture in wood products.
2. Identify proper construction products from blueprint or specs.
3. Apply wood and building products appropriately.
4. Understand impact of temp and humidity on building products.
5. Understand plywood product standards & trademarks.
6. Understand softwood and hardwood grading systems.
7. Select and apply proper fasteners in construction.
8. Select and apply proper glues and sealants in construction.
9. Perform required test of materials (slump, compression strength) to maintain product standards during construction.

Analysis of committee members ratings found in Appendix B indicate that almost half (46%) of all key activities require measurement and applied mathematics skills, 39% require layout skills and only 14% of key activities require geometry. Over half (58%) of all key activities require following verbal and written directions and giving simple directions. About one-third (29%) requires giving complex directions. An overwhelming 95% of all key activities require residential carpenters to know what materials to select and apply correctly

Safety Skills

Industry committee members identified safety related skills for each key activity as found in Appendix B. The following is a list of safety-related skills and the percent of key activities that require these skills as displayed in Table 3 below. All key carpentry activities require the proper use of personal protection equipment and 70% or more require the following safety-related skills and/or knowledge: use of ladders and scaffolds (85%), proper electrical protection (76%), proper use of power tools (71%) and fall protection (71%). In addition, knowledge of OSHA regulations that pertain to residential home building and carpenters is required.

Training Standards

Quality training standards refer to minimal acceptable measures for ensuring quality training and instruction in construction. Appendix D organizes training standards for each of the 11 specialty areas. Committee members were asked to identify quality standards for use in training, curriculum design and development, and as a basis for measuring student outcomes in construction training.

Table 3. What safety-related skills and knowledge are required to perform key activities safely?

	Percent
Personal Protection Equipment	100%
Ladders and Scaffolds	85%
Electrical Protection	76%
Power Tools	71%
Fall Protection	71%
Hazardous Materials	25%
Silica Protection	7%
Trenching	6%
Rigging	2%
Concrete	1%

Tools

Industry committee identified standard hand tools and power tools required by each of the 11 residential carpentry specialties as reported in Appendix C. A list of standard hand tools required by all specialties is shown in Table 4.

Table 4. What standard hand tools are recommended for use in all 11 residential carpentry specialties?

Tool Box	Cat's Paw Nail Puller
Safety Glasses	Tape Measure 25' or more
Steel Toe Safety Shoes	Carpenter Pencils
Safety or Dust Filter Mask	Chalk Box
Hard Hat	Utility Knife
Gloves	Slotted and Phillips Screw Drivers
Individual Fall Arrest System	Hands Saws by Trade
Hammer	Nail Pouch with Belt

Skill Levels and Training

Level I carpenter standards can be met in a six months to one-year training program depending upon the student's prior educational background (especially in the area of measurement and applied mathematics), work experiences, interests and mechanical aptitude, as well as breadth, scope and sequence of the training program. Level I carpenters are commonly referred to as semi-skilled and usually perform work under the direction of a skilled or Level II carpenter. Level I standards are typically learned in a high school or community college vocational program, apprenticeship program, informal and formal builder-based training program, on-the-job training or some combination of these. Level II skilled carpenters typically perform work independently and may be required to supervise semi-skilled Level I carpenters. Level II standards typically require two years of training as well as two or more years of experience mastering skills learned in training. Incumbent workers with extensive experience in carpentry may be able to demonstrate competence on standards with little or no additional structured training.

Residential Carpentry Occupational Standards

Critical work functions (duty areas) and key activities (tasks) of a residential carpenter are listed in the Table 5. Duty areas and tasks were determined through committee meetings with residential carpentry industry leaders and review of authoritative texts and other references in the field of residential carpentry. Industry leaders were drawn from different regions of the country and represented remodelers, custom builders, small volume and production builders as well as carpentry instructors and trainers. A second group validated the preliminary results of an initial meeting with industry leaders and the results are shown in this table. The relative importance of each task for Level I semi-skilled and Level lI residential carpenters is reported. In addition, carpentry specialties, which perform each task or use the content area (knowledge required), are identified. Industry leaders identified a total of 231 tasks or content areas.

Importance Rating. The importance of each task or content area reported in the following table is the product of the proficiency or skill required to perform each task and the impact or risk to the carpenter, builder, and homeowner if the task is performed improperly. Impact or risk includes possible structural failure to the building, injury to the worker or homeowner, and financial exposure to the builder, to name but a few.

Proficiency was estimated by asking the industry experts the following: **What skill level is required of a semi-skilled and skilled residential carpenter?** This scale ranged from a rating of 1= Minimally Skilled to 4= Highly Skilled.

Impact on the building process was estimated by asking industry experts the question: **What is the impact of lack of knowledge or skills in this task or content area on building integrity, public confidence or safety?** The impact scale ranged from 1= Minimal to 4= Catastrophic.

Overall Importance Rating. The product of these two scales produced a 16-point importance scale that includes proficiency or skill in performing a task as well as impact on the building process if the task is performed improperly.

0-4 (**L**) Low Importance

5-8 (**M**) Moderate Importance

9-12 (**V**) Very Important

13-16 (**E**) Extremely Important

Percent of all Specialties column is the percent across all specialties that perform task or need to know content area. This can be used as a measure for determining core standards. A rating of 100% means that all specialties perform this task or require knowledge of this content area. A "Y" indicates that the skill or knowledge is unique to carpentry specialties**.** This is a measure of the degree of specialization; the fewer the **"Ys"** across a row the more specialized the task or content area.

Table 5. Residential Carpentry Standards

	Importance		*Pct of all*	*Which carpentry specialties use this content area/perform this task?*										
	Level I	***Level II***	*Specialties*	WF	MF	IT	ET	S	CF	D	RA	ST	I	C
Percent of task performed by specialty?				67%	24%	28%	29%	23%	22%	16%	13%	23%	14%	15%
1 Wood and Lumber														
1.1 Hardwood and softwood properties	L	M	55%	Y		Y	Y	Y				Y		Y
1.2 Moisture content	L	V	64%	Y	Y	Y	Y			Y		Y		Y
1.3 Grades and sizes of lumber	M	E	64%	Y	Y	Y	Y		Y			Y		Y
1.4 Types & species of lumber	M	E	45%	Y		Y	Y					Y		Y
	L	E	57%											
2 Engineered Products, Panels & Sheet Goods														
2.1 Plywood	L	E	91%	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y
2.2 OSB	L	E	91%	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y
2.3 Siding	L	V	18%				Y	Y						
2.4 Particleboard	L	V	27%			Y						Y		Y
2.5 Drywall, wallboard, cement board	L	E	45%	Y	Y	Y				Y		Y		
2.6 Fiberboard (Hardboard, MDF & others)	L	V	36%			Y	Y					Y		Y
2.7 Softboard (e.g., ceiling tiles)	L	M	18%		Y	Y								
2.8 Insulation board	L	E	82%	Y	Y	Y	Y	Y	Y	Y	Y		Y	
2.9 Waterproofing membranes (plastic, etc.)	L	E	73%	Y	Y		Y	Y	Y	Y	Y		Y	
2.10 Plastic laminates	L	M	27%			Y						Y		Y
2.11 Metal framing products	L	M	55%	Y	Y	Y				Y		Y		Y
	L	V	51%											

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	Level I	***Level II***	*Specialties*	WF	MF	IT	ET	S	CF	D	RA	ST	I	C
Percent of task performed by specialty?				67%	24%	28%	29%	23%	22%	16%	13%	23%	14%	15%
3Engineered Structural Components														
3.1Laminated veneer lumber	L	V	18%	Y								Y		
3.2Parallel strand lumber and laminated strand lumber	L	V	9%	Y										
3.3Wood & steel beams & columns	L	E	18%	Y					Y					
3.4Wood floor & roof trusses	L	V	36%	Y	Y						Y	Y		
3.5Steel floor & roof trusses	L	V	36%	Y	Y						Y	Y		
3.6Precast concrete structural components	L	V	18%	Y					Y					
3.7Sheer panels (e.g., Simpson panels—regional)	L	V	18%	Y				Y						
3.8Insulated structural panels (e.g., SIPs, EIFs)	L	V	27%	Y				Y					Y	
3.9Glue-laminated lumber	L	E	27%	Y								Y		Y
	L	V	23%											
4Fasteners														
4.1Nails, screws, bolts, staples	V	E	91%	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y
4.2Anchors, ties & connectors	M	E	82%	Y	Y	Y	Y		Y	Y	Y	Y		Y
4.3Adhesives	M	E	91%	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y
4.4Framing hardware	V	E	64%	Y	Y	Y	Y		Y	Y		Y		
	M	E	82%											

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Percent of task performed by specialty?				67%	24%	28%	29%	23%	22%	16%	13%	23%	14%	15%
5Hand Tools														
5.1Measuring and marking tools	V	E	100%	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5.2Leveling & layout tools	V	E	100%	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5.3Boring and cutting tools	V	E	100%	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5.4Fastening and dismantling tools	V	E	100%	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	V	E	100%											
6Portable Power Tools														
6.1Saws, drills and drivers	V	E	100%	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
6.2Planes, routers, and sanders	L	E	73%	Y	Y	Y	Y	Y		Y		Y		Y
6.3Fastening tools (power-actuated, etc.)	V	E	100%	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	M	E	91%											

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	Level I	***Level II***	*Specialties*	WF	MF	IT	ET	S	CF	D	RA	ST	I	C
Percent of task performed by specialty?				67%	24%	28%	29%	23%	22%	16%	13%	23%	14%	15%
7Stationary Tools														
7.1Miter & chop saws	M	V	73%	Y	Y	Y	Y	Y	Y			Y		Y
7.2Table saws	L	V	64%	Y		Y	Y	Y	Y			Y		Y
7.3Band saws	L	V	36%	Y		Y						Y		Y
7.4Sanders	L	V	36%			Y	Y					Y		Y
7.5Mortises, boring tools & shapers	L	M	27%			Y						Y		Y
7.6Joiner/planer	L	V	27%			Y						Y		Y
7.7Drill press	L	M	27%			Y						Y		Y
7.8Brakes	L	V	36%		Y		Y	Y			Y			
	L	V	41%											
8Blueprints and Building Codes														
8.1Site plans (Plot plans, etc.)	L	V	18%	Y					Y					
8.2Building plans (floor plans, sections, elevations)	L	V	91%	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y
8.3Engineering drawings (trusses, foundations, seismic, connectors)	L	E	27%	Y	Y				Y					
8.4Building codes and zoning regulations	L	V	91%	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
	L	E	57%											

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	Level I	***Level II***	*Specialties*	WF	MF	IT	ET	S	CF	D	RA	ST	I	C
Percent of task performed by specialty?				67%	24%	28%	29%	23%	22%	16%	13%	23%	14%	15%
9 Construct Concrete Forms														
9.1 Characteristics & testing of concrete	L	M	9%						Y					
9.2 Identify concrete forms (panels, ICFs, etc.)	L	V	9%						Y					
9.3 Lay out building lines	L	V	9%						Y					
9.4 Construct wall & column forms	L	V	9%						Y					
9.5 Construct concrete stair forms	L	V	9%						Y					
9.6 Construct slab-on-grade forms (incl. Vapor barriers)	L	E	9%						Y					
9.7 Construct pier & footing forms	L	E	9%						Y					
9.8 Identify & place anchoring devices	L	E	27%	Y	Y				Y					
9.9 Construct tie beam forms	L	V	9%						Y					
9.10 Construct structural beam forms	L	V	9%						Y					
9.11 Construct curved arch forms	L	V	9%						Y					
9.12 Construct lintel forms	L	V	9%						Y					
9.13 Set elevated slab forms	L	V	9%						Y					
9.14 Place control/expansion joints	L	V	9%						Y					
9.15 Identify & place proper reinforcement	V	E	9%						Y					
9.16 Place & finish concrete	L	E	9%						Y					
9.17 Strip and clean forms	V	V	9%						Y					
	L	E	10%											

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Percent of task performed by specialty?				67%	24%	28%	29%	23%	22%	16%	13%	23%	14%	15%
10 Alternative Foundation & Framing Systems														
10.1 Wood foundations (pilings, wood foundations)	L	M	9%	Y										
10.2 Log framing	L	L	18%	Y			Y							
10.3 CMU	L	L	9%	Y										
	L	M	12%											
11 Insect Prevention														
11.1 Identification	L	M	45%	Y			Y	Y	Y				Y	
11.2 Techniques to Prevent Termites/Carpenter ants	L	M	45%	Y			Y	Y	Y				Y	
	L	M	45%											
12 Framing Systems														
12.1 Identify metal/wood framing components	V	E	64%	Y	Y	Y	Y	Y		Y			Y	
12.2 Platform Frame Construction	M	E	36%	Y	Y					Y			Y	
12.3 Post-and-Beam Frame Construction	L	M	45%	Y		Y		Y		Y			Y	
12.4 Balloon Frame Construction	L	M	27%	Y						Y			Y	
12.5 Modular frame systems	L	V	45%	Y	Y			Y		Y			Y	
	M	V	44%											

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Percent of task performed by specialty?				67%	24%	28%	29%	23%	22%	16%	13%	23%	14%	15%
13 Wood Floor Framing Layout & Construction														
13.1 Check square & level of foundation, subsurface	V	V	27%	Y					Y			Y		
13.2 Install sill systems	M	V	27%	Y					Y				Y	
13.3 Install solid, composite, steel & built-up floor beams	M	V	18%	Y					Y					
13.4 Install wood & steel columns	M	V	18%	Y					Y					
13.5 Layout, cut & install floor joists (TGIs, dimension lumber, etc)	M	E	9%	Y										
13.6 Install draft (fire) stops	M	V	18%	Y									Y	
13.7 Frame floor opening	M	E	18%	Y								Y		
13.8 Install cantilevered floor joists	M	V	9%	Y										
13.9 Install bridging and blocking	M	V	18%	Y									Y	
13.10 Install subfloor sheathing	M	E	18%	Y								Y		
	M	E	18%											
14 Wall Framing with Wood														
14.1 Identify load-and non-load-bearing walls & partitions	L	E	18%	Y	Y									
14.2 Lay out walls on floor deck or foundation	L	E	9%	Y										
14.3 Lay out wall framing detail on wall plates	L	E	9%	Y										
14.4 Cut wall plates	M	E	9%	Y										

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Percent of task performed by specialty?				67%	24%	28%	29%	23%	22%	16%	13%	23%	14%	15%
14.5 Calculate lengths of wall components	M	E	9%	Y										
14.6 Cut studs, headers, jacks, rough sills and cripples	V	E	9%	Y										
14.7 Assemble header, corner and tee posts	V	E	9%	Y										
14.8 Frame door opening	V	E	9%	Y										
14.9 Frame window opening	V	E	9%	Y										
14.10 Assemble wall section	V	E	9%	Y										
14.11 Install sheer panels & moment frames	L	E	9%	Y										
14.12 Install connectors & ties	V	E	9%	Y										
14.13 Install backing, blocking & bases	V	V	9%	Y										
14.14 Install top plate (cap plate)	V	E	9%	Y										
14.15 Install draft (fire) stops	V	E	9%	Y										
14.16 Install corner, diagonal or wind bracing	V	E	9%	Y										
14.17 Install exterior wall sheathing	V	E	9%	Y										
14.18 Raise and anchor wall section	V	E	9%	Y										
14.19 Plumb, align and brace wall section	V	E	9%	Y										
14.20 Install fur downs, soffits, bulkheads, chases	V	E	9%	Y										
	V	E	10%											

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Percent of task performed by specialty?				67%	24%	28%	29%	23%	22%	16%	13%	23%	14%	15%
15 Non-structural Steel Wall Framing														
15.1 Lay out walls on floor deck or foundation	L	V	18%	Y	Y									
15.2 Cut & install tracks	M	V	18%	Y	Y									
15.3 Lay out wall framing detail on tracks	L	V	18%	Y	Y									
15.4 Calculate lengths of wall components	L	V	18%	Y	Y									
15.5 Cut studs, jacks, rough sills and cripples	M	V	18%	Y	Y									
15.6 Assemble head piece & king stud	M	V	18%	Y	Y									
15.7 Install studs	M	V	18%	Y	Y									
15.8 Install wall blocking (backing)	M	V	18%	Y	Y									
15.9 Install draft (fire) stops	M	V	18%	Y	Y									
15.10 Install fur downs, soffits, bulkheads, chases	L	V	18%	Y	Y									
	M	V	18%											

Table 5. Residential Carpentry Standards

	Importance		*Pct of all*	*Which carpentry specialties use this content area/perform this task?*										
	Level I	***Level II***	*Specialties*	WF	MF	IT	ET	S	CF	D	RA	ST	I	C
Percent of task performed by specialty?				67%	24%	28%	29%	23%	22%	16%	13%	23%	14%	15%
16 Ceiling Framing in Wood														
16.1 Lay out ceiling framing detail on top wall plate	L	V	9%	Y										
16.2 Cut ceiling joists	V	V	9%	Y										
16.3 Install ceiling joists	V	V	9%	Y										
16.4 Frame ceiling opening	V	V	9%	Y										
16.5 Install riband	V	V	9%	Y										
16.6 Install strongback (stiffener)	V	V	9%	Y										
16.7 Install ceiling backing (deadwood or nailers)	V	V	9%	Y										
16.8 Frame interior soffit	V	V	9%	Y										
	V	V	9%											
17 Temporary Work Platforms														
17.1 Identify scaffolds & components	E	E	91%	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
17.2 Erect and dismantle scaffolds & platforms	E	E	91%	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
17.3 Safely erect and use ladders	E	E	100%	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
17.4 Safely set up and use saw horses	E	E	100%	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
17.5 Build a sawhorse & other construction aids	E	E	100%	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
17.6 Safely install and use roof brackets	E	E	18%	Y							Y			
17.7 Safely install temporary access, stairs	E	E	55%	Y	Y	Y	Y	Y	Y					
17.8 Safely set up and use ladder jacks	E	E	55%	Y	Y	Y	Y	Y			Y			
	E	E	76%											

Table 5. Residential Carpentry Standards

	Importance		*Pct of all*	*Which carpentry specialties use this content area/perform this task?*										
	Level I	***Level II***	*Specialties*	WF	MF	IT	ET	S	CF	D	RA	ST	I	C
Percent of task performed by specialty?				67%	24%	28%	29%	23%	22%	16%	13%	23%	14%	15%
18 Truss Installation (Metal & Wood)														
18.1 Lay out for truss installation	L	V	18%	Y	Y									
18.2 Set trusses by hand	V	E	18%	Y	Y									
18.3 Set trusses with light crane	M	E	18%	Y	Y									
18.4 Brace trussed roof assembly	V	E	18%	Y	Y									
18.5 Frame opening in trussed roof assembly	V	E	18%	Y	Y									
18.6 Frame overhangs	V	V	18%	Y	Y									
18.7 Install framing hardware (connectors, hurricane clips, etc)	V	E	18%	Y	Y									
	V	E	18%											

Table 5. Residential Carpentry Standards

				Which carpentry specialties use this content area/perform this task?										
	Importance		Pct of all											
	Level I	**Level II**	Specialties	WF	MF	IT	ET	S	CF	D	RA	ST	I	C
Percent of task performed by specialty?				67%	24%	28%	29%	23%	22%	16%	13%	23%	14%	15%
19 Roof Framing														
19.1 Lay out roof framing detail on cap plate & ridge	L	V	9%	Y										
19.2 Lay out & cut common rafters	L	E	9%	Y										
19.3 Lay out & cut hip & valley rafters & jacks	L	V	9%	Y										
19.4 Install ridgeboard & rafters	V	E	9%	Y										
19.5 Install collar beams (rafter ties)	V	V	9%	Y										
19.6 Frame/install hips & valleys	L	V	9%	Y										
19.7 Install rafter support purlins & bracing	M	E	9%	Y										
19.8 Frame roof opening	L	V	9%	Y										
19.9 Install sub-fascia	M	V	9%	Y										
19.10 Frame gable end	L	V	0.09	Y										
19.11 Frame gable end overhang	L	V	9%	Y										
19.12 Frame dormers	L	V	9%	Y										
19.13 Install roof sheathing (incl. nailing zones)	V	E	9%	Y										
19.14 Frame chimney saddle (cricket)	L	V	9%	Y										
19.15 Provide for proper roof ventilation	L	E	9%	Y										
19.16 Install dry-in (roofing felt, ice & water shield)	L	E	18%	Y							Y			
	M	E	10%											

Table 5. Residential Carpentry Standards

	Importance		*Pct of all*	*Which carpentry specialties use this content area/perform this task?*										
	Level I	***Level II***	*Specialties*	WF	MF	IT	ET	S	CF	D	RA	ST	I	C
Percent of task performed by specialty?				67%	24%	28%	29%	23%	22%	16%	13%	23%	14%	15%
20 Roofing														
20.1 Apply underlayment or substrate	V	E	18%	Y							Y			
20.2 Install flashing	V	E	18%	Y							Y			
20.3 Apply shingles & roll roofing	V	E	18%	Y							Y			
20.4 Install ridge cap	V	E	9%								Y			
	V	E	16%											
21 Insulation and Ventilation														
21.1 Install flexible insulation	M	V	9%										Y	
21.2 Install rigid insulation	M	V	18%	Y									Y	
21.3 Install acoustical insulation	L	L	9%										Y	
21.4 Install soffit & roof ventilation	V	E	18%				Y						Y	
21.5 Install moisture control/vapor barriers (regional)	M	V	18%	Y									Y	
	M	V	15%											
22 Cornices														
22.1 Install soffit (wood, aluminum, vinyl, stucco)	M	V	18%				Y	Y						
22.2 Install fascia	M	V	18%				Y	Y						
22.3 Install frieze	M	V	18%				Y	Y						
	M	V	18%											

Table 5. Residential Carpentry Standards

	Importance		*Pct of all*	*Which carpentry specialties use this content area/perform this task?*										
	Level I	***Level II***	*Specialties*	WF	MF	IT	ET	S	CF	D	RA	ST	I	C
Percent of task performed by specialty?				67%	24%	28%	29%	23%	22%	16%	13%	23%	14%	15%
23 Siding														
23.1 Apply underlayment (building wrap)	M	E	27%	Y			Y	Y						
23.2 Install window and door flashing	E	E	18%				Y	Y						
23.3 Install beveled siding	M	V	18%				Y	Y						
23.4 Install board-and-batten siding	M	V	18%				Y	Y						
23.5 Install board-on-board siding	M	V	18%				Y	Y						
23.6 Install log siding	M	V	18%				Y	Y						
23.7 Install tongue-and-groove siding	M	V	18%				Y	Y						
23.8 Install lap siding	M	V	18%				Y	Y						
23.9 Install shake or shingle siding	M	V	18%				Y	Y						
23.10 Install plywood siding	M	V	18%				Y	Y						
23.11 Install hardboard and particleboard siding	M	V	18%				Y	Y						
23.12 Install fiber-cement siding	M	V	18%				Y	Y						
23.13 Install vinyl and metal siding & accessories	M	V	18%				Y	Y						
23.14 Install gutters & downspouts	M	V	18%				Y	Y						
	M	V	19%											

Table 5. Residential Carpentry Standards

	Importance		*Pct of all*	*Which carpentry specialties use this content area/perform this task?*										
	Level I	***Level II***	*Specialties*	WF	MF	IT	ET	S	CF	D	RA	ST	I	C
Percent of task performed by specialty?				67%	24%	28%	29%	23%	22%	16%	13%	23%	14%	15%
24 Door And Window Installation														
24.1 Install windows (framed, arched, circles, shutters, etc.)	L	E	18%	Y			Y							
24.2 Install prehung doors	L	E	27%	Y		Y	Y							
24.3 Install locksets, hardware & weather-stripping	M	E	27%	Y		Y	Y							
24.4 Install sidelight	L	V	18%	Y			Y							
24.5 Install transom	L	V	18%	Y			Y							
24.6 Assemble/install sliding glass/French patio door	L	E	18%	Y			Y							
24.7 Install jamb for bi-fold doors	L	V	18%	Y		Y								
24.8 Install inside jamb for garage door (regional)	L	E	9%				Y							
24.9 Install skylight	L	E	18%	Y			Y							
	L	E	19%											

Table 5. Residential Carpentry Standards

	Importance		*Pct of all*	*Which carpentry specialties use this content area/perform this task?*										
	Level I	***Level II***	*Specialties*	WF	MF	IT	ET	S	CF	D	RA	ST	I	C
Percent of task performed by specialty?				67%	24%	28%	29%	23%	22%	16%	13%	23%	14%	15%
25 Drywall Application														
25.1 Align framing members	M	V	9%							Y				
25.2 Cut drywall	M	M	9%							Y				
25.3 Make cutouts in wall panels	M	M	9%							Y				
25.4 Fasten horizontal, vertical or curved panels	V	V	9%							Y				
25.5 Apply corner bead and other trim	M	V	9%							Y				
25.6 Apply joint compound and tape	L	M	9%							Y				
25.7 Apply fill and finishing coats	L	M	9%							Y				
25.8 Apply drywall texture	L	L	9%							Y				
	M	V	15%											

Table 5. Residential Carpentry Standards

	Importance		*Pct of all*	*Which carpentry specialties use this content area/perform this task?*										
	Level I	***Level II***	*Specialties*	WF	MF	IT	ET	S	CF	D	RA	ST	I	C
Percent of task performed by specialty?				67%	24%	28%	29%	23%	22%	16%	13%	23%	14%	15%
26 Frame/Construct Porches & Decks														
26.1 Install ledger and make water-tight	M	V	27%	Y			Y	Y						
26.2 Layout and construct footings	M	V	9%	Y										
26.3 Erect and fasten supporting posts	M	V	9%	Y										
26.4 Install girders	M	V	9%	Y										
26.5 Install joists	M	V	9%	Y										
26.6 Apply deck boards	L	M	9%	Y										
26.7 Apply trim	L	M	18%	Y			Y							
26.8 Install stairs and rails	L	M	27%	Y			Y					Y		
	M	V	15%											
27 Wall Sheet Paneling														
27.1 Mark location of each wall stud	L	M	9%			Y								
27.2 Cut out wall outlets	L	M	9%			Y								
27.3 Install paneling	L	M	9%			Y								
27.4 Install trim	L	M	9%			Y								
	L	M	9%											

Table 5. Residential Carpentry Standards

	Importance		*Pct of all*	*Which carpentry specialties use this content area/perform this task?*										
	Level I	***Level II***	*Specialties*	WF	MF	IT	ET	S	CF	D	RA	ST	I	C
Percent of task performed by specialty?				67%	24%	28%	29%	23%	22%	16%	13%	23%	14%	15%
28 Suspended Ceilings														
28.1 Sketch a grid plan	L	V	9%			Y								
28.2 Construct ceiling grid (& set up laser level)	L	V	9%			Y								
28.3 Cut and install ceiling panels	L	V	9%			Y								
28.4 Install ceiling tiles	L	V	9%			Y								
	L	V	9%											
29 Interior Trim														
29.1 Apply decorative ceiling and wall molding	L	V	9%			Y								
29.2 Apply interior door casings, baseboard, base cap & shoe	L	V	9%			Y								
29.3 Install window trim	L	V	9%			Y								
29.4 Install closet shelves and closet pole	L	V	9%			Y								
29.5 Install fireplace mantels	L	V	9%			Y								
	L	V	9%											

Table 5. Residential Carpentry Standards

	Importance		*Pct of all*	*Which carpentry specialties use this content area/perform this task?*										
	Level I	***Level II***	*Specialties*	WF	MF	IT	ET	S	CF	D	RA	ST	I	C
Percent of task performed by specialty?				67%	24%	28%	29%	23%	22%	16%	13%	23%	14%	15%
30 Stair Construction, Installation & Finishing														
30.1 Lay out/install straight run stair stringer	L	V	18%	Y								Y		
30.2 Fabricate/install stair components (treads & risers)	L	V	18%	Y								Y		
30.3 Layout dado and assemble housed-stringer staircase	L	V	9%									Y		
30.4 Apply finish trim to open and closed staircases	L	V	18%			Y						Y		
30.5 Install straight balustrade system	L	V	9%									Y		
30.6 Install attic & pull-down stairs	L	V	18%	Y								Y		
30.7 Frame curved or circular stairs	L	M	9%									Y		
30.8 Install prefabricated stair unit	L	V	18%	Y								Y		
30.9 Estimating & takeoffs	L	V	27%	Y		Y						Y		
	L	V	16%											

Table 5. Residential Carpentry Standards

	Importance		Pct of all	Which carpentry specialties use this content area/perform this task?										
	Level I	**Level II**	Specialties	WF	MF	IT	ET	S	CF	D	RA	ST	I	C
Percent of task performed by specialty?				67%	24%	28%	29%	23%	22%	16%	13%	23%	14%	15%
31 Finish Floors														
31.1 Apply underlayments	L	V	9%			Y								
31.2 Apply strip, plank, and parquet finish flooring	L	M	9%			Y								
	L	V	9%											
32 Cabinets and Countertops														
32.1 Install manufactured cabinets & tops	L	V	18%			Y								Y
32.2 Install cabinet hardware	L	V	18%			Y								Y
32.3 Fabricate & install laminated surfaces	L	V	9%											Y
	L	V	15%											

Appendix A. Percent of Specialties Requiring Task or Content Knowledge in Rank Order

Task	*What percent of all carpentry tasks are performed by specialty?*	***Importance Level I***	***Level II***	*Pct of all Specialties*
5.1	Measuring and marking tools	V	E	100%
5.2	Leveling & layout tools	V	E	100%
5.3	Boring and cutting tools	V	E	100%
5.4	Fastening and dismantling tools	V	E	100%
6.1	Saws, drills and drivers	V	E	100%
6.3	Fastening tools (power-actuated, etc.)	V	E	100%
17.3	Safely erect and use ladders	E	E	100%
17.4	Safely set up and use saw horses	E	E	100%
17.5	Build a sawhorse & other construction aids	E	E	100%
2.1	Plywood	L	E	91%
2.2	OSB	L	E	91%
4.1	Nails, screws, bolts, staples	V	E	91%
4.3	Adhesives	M	E	91%
8.2	Building plans (floor plans, sections, elevations)	L	V	91%
17.1	Identify scaffolds & components	E	E	91%
17.2	Erect and dismantle scaffolds & platforms	E	E	91%
2.8	Insulation board	L	E	82%
4.2	Anchors, ties & connectors	M	E	82%
2.9	Waterproofing membranes (plastic, etc)	L	E	73%
6.2	Planes, routers, and sanders	L	E	73%
7.1	Miter & chop saws	M	V	73%
1.2	Moisture content	L	V	64%
1.3	Grades and sizes of lumber	M	E	64%
4.4	Framing hardware	V	E	64%
7.2	Table saws	L	V	64%
12.1	Identify metal/wood framing components	V	E	64%
1.1	Hardwood and softwood properties	L	M	55%
2.11	Metal framing products	L	M	55%
17.7	Safely install temporary access, stairs	E	E	55%
17.8	Safely set up and use ladder jacks	E	E	55%
1.4	Types & species of lumber	M	E	45%
2.5	Drywall, wallboard, cement board	L	E	45%
11.1	Identification	L	M	45%

Appendix A. Percent of Specialties Requiring Task or Content Knowledge in Rank Order

Task	*What percent of all carpentry tasks are performed by specialty?*	***Importance Level I***	***Level II***	*Pct of all Specialties*
11.2	Techniques to Prevent Termites/Carpenter ants	L	M	45%
12.3	Post-and-Beam Frame Construction	L	M	45%
12.5	Modular frame systems	L	V	45%
2.6	Fiberboard (Hardboard, MDF & others)	L	V	36%
3.4	Wood floor & roof trusses	L	V	36%
3.5	Steel floor & roof trusses	L	V	36%
7.3	Band saws	L	V	36%
7.4	Sanders	L	V	36%
7.8	Brakes	L	V	36%
12.2	Platform Frame Construction	M	E	36%
2.4	Particleboard	L	V	27%
2.10	Plastic laminates	L	M	27%
3.8	Insulated structural panels (e.g., SIPs, EIFs)	L	V	27%
3.9	Glue-laminated lumber	L	E	27%
7.5	Mortises, boring tools & shapers	L	M	27%
7.6	Joiner/planer	L	V	27%
7.7	Drill press	L	M	27%
8.3	Engineering drawings (trusses, foundations, seismic, connectors)	L	E	27%
9.8	Identify & place anchoring devices	L	E	27%
12.4	Balloon Frame Construction	L	M	27%
13.1	Check square & level of foundation, subsurface	V	V	27%
13.2	Install sill systems	M	V	27%
23.1	Apply underlayment (building wrap)	M	E	27%
24.2	Install prehung doors	L	E	27%
24.3	Install locksets, hardware & weather-stripping	M	E	27%
26.1	Install ledger and make water-tight	M	V	27%
26.8	Install stairs and rails	L	M	27%
30.9	Estimating & takeoffs	L	V	27%
2.3	Siding	L	V	18%
2.7	Softboard (e.g. ceiling tiles)	L	M	18%
3.1	Laminated veneer lumber	L	V	18%
3.3	Wood & steel beams & columns	L	E	18%
3.6	Precast concrete structural components	L	V	18%

Appendix A. Percent of Specialties Requiring Task or Content Knowledge in Rank Order

Task	*What percent of all carpentry tasks are performed by specialty?*	***Importance Level I***	***Level II***	*Pct of all Specialties*
3.7	Sheer panels (e.g., Simpson panels--regional)	L	V	18%
8.1	Site plans (Plot plans, etc)	L	V	18%
10.2	Log framing	L	L	18%
13.3	Install solid, composite, steel & builtup floor beams	M	V	18%
13.4	Install wood & steel columns	M	V	18%
13.6	Install draft (fire) stops	M	V	18%
13.7	Frame floor opening	M	E	18%
13.9	Install bridging and blocking	M	V	18%
13.10	Install subfloor sheathing	M	E	18%
14.1	Identify load-and nonload-bearing walls & partitions	L	E	18%
15.1	Lay out walls on floor deck or foundation	L	V	18%
15.2	Cut & install tracks	M	V	18%
15.3	Lay out wall framing detail on tracks	L	V	18%
15.4	Calculate lengths of wall components	L	V	18%
15.5	Cut studs, jacks, rough sills and cripples	M	V	18%
15.6	Assemble head piece & king stud	M	V	18%
15.7	Install studs	M	V	18%
15.8	Install wall blocking (backing)	M	V	18%
15.9	Install draft (fire) stops	M	V	18%
15.10	Install fur downs, soffits, bulkheads, chases	L	V	18%
17.6	Safely install and use roof brackets	E	E	18%
18.1	Lay out for truss installation	L	V	18%
18.2	Set trusses by hand	V	E	18%
18.3	Set trusses with light crane	M	E	18%
18.4	Brace trussed roof assembly	V	E	18%
18.5	Frame opening in trussed roof assembly	V	E	18%
18.6	Frame overhangs	V	V	18%
18.7	Install framing hardware (connectors, hurricane clips, etc)	V	E	18%
19.16	Install dry-in (roofing felt, ice & water shield)	L	E	18%
20.1	Apply underlayment or substrate	V	E	18%
20.2	Install flashing	V	E	18%
20.3	Apply shingles & roll roofing	V	E	18%
21.2	Install rigid insulation	M	V	18%

Appendix A. Percent of Specialties Requiring Task or Content Knowledge in Rank Order

Task	*What percent of all carpentry tasks are performed by specialty?*	***Importance Level I***	***Level II***	*Pct of all Specialties*
21.4	Install soffit & roof ventilation	V	E	18%
21.5	Install moisture control/vapor barriers (regional)	M	V	18%
22.1	Install soffit (wood, aluminum, vinyl, stucco)	M	V	18%
22.2	Install fascia	M	V	18%
22.3	Install frieze	M	V	18%
23.2	Install window and door flashing	E	E	18%
23.3	Install beveled siding	M	V	18%
23.4	Install board-and-batten siding	M	V	18%
23.5	Install board-on-board siding	M	V	18%
23.6	Install log siding	M	V	18%
23.7	Install tongue-and-groove siding	M	V	18%
23.8	Install lap siding	M	V	18%
23.9	Install shake or shingle siding	M	V	18%
23.10	Install plywood siding	M	V	18%
23.11	Install hardboard and particleboard siding	M	V	18%
23.12	Install fiber-cement siding	M	V	18%
23.13	Install vinyl and metal siding & accessories	M	V	18%
23.14	Install gutters & downspouts	M	V	18%
24.1	Install windows (framed, arched, circles, shutters, etc.)	L	E	18%
24.4	Install sidelight	L	V	18%
24.5	Install transom	L	V	18%
24.6	Assemble/install sliding glass/French patio door	L	E	18%
24.7	Install jamb for bi-fold doors	L	V	18%
24.9	Install skylight	L	E	18%
26.7	Apply trim	L	M	18%
30.1	Lay out/install straight run stair stringer	L	V	18%
30.2	Fabricate/install stair components (treads & risers)	L	V	18%
30.4	Apply finish trim to open and closed staircases	L	V	18%
30.6	Install attic & pull-down stairs	L	V	18%
30.8	Install prefabricated stair unit	L	V	18%
32.1	Install manufactured cabinets & tops	L	V	18%
32.2	Install cabinet hardware	L	V	18%
3.2	Parallel strand lumber and laminated strand lumber	L	V	9%

Appendix A. Percent of Specialties Requiring Task or Content Knowledge in Rank Order

Task	*What percent of all carpentry tasks are performed by specialty?*	***Importance*** ***Level I***	***Level II***	*Pct of all Specialties*
9.1	Characteristics & testing of concrete	L	M	9%
9.2	Identify concrete forms (panels, ICFs, etc.)	L	V	9%
9.3	Lay out building lines	L	V	9%
9.4	Construct wall & column forms	L	V	9%
9.5	Construct concrete stair forms	L	V	9%
9.6	Construct slab-on-grade forms (incl. Vapor barriers)	L	E	9%
9.7	Construct pier & footing forms	L	E	9%
9.9	Construct tie beam forms	L	V	9%
9.10	Construct structural beam forms	L	V	9%
9.11	Construct curved arch forms	L	V	9%
9.12	Construct lintel forms	L	V	9%
9.13	Set elevated slab forms	L	V	9%
9.14	Place control/expansion joints	L	V	9%
9.15	Identify & place proper reinforcement	V	E	9%
9.16	Place & finish concrete	L	E	9%
9.17	Strip and clean forms	V	V	9%
10.1	Wood foundations (pilings, wood foundations)	L	M	9%
10.3	CMU	L	L	9%
13.5	Layout, cut & install floor joists (TGIs, dimension lumber, trusses)	M	E	9%
13.8	Install cantilevered floor joists	M	V	9%
14.2	Lay out walls on floor deck or foundation	L	E	9%
14.3	Lay out wall framing detail on wall plates	L	E	9%
14.4	Cut wall plates	M	E	9%
14.5	Calculate lengths of wall components	M	E	9%
14.6	Cut studs, headers, jacks, rough sills and cripples	V	E	9%
14.7	Assemble header, corner and tee posts	V	E	9%
14.8	Frame door opening	V	E	9%
14.9	Frame window opening	V	E	9%
14.10	Assemble wall section	V	E	9%
14.11	Install sheer panels & moment frames	L	E	9%
14.12	Install connectors & ties	V	E	9%
14.13	Install backing, blocking & bases	V	V	9%
14.14	Install top plate (cap plate)	V	E	9%

Appendix A. Percent of Specialties Requiring Task or Content Knowledge in Rank Order

Task	*What percent of all carpentry tasks are performed by specialty?*	***Importance Level I***	***Level II***	*Pct of all Specialties*
14.15	Install draft (fire) stops	V	E	9%
14.16	Install corner, diagonal or wind bracing	V	E	9%
14.17	Install exterior wall sheathing	V	E	9%
14.18	Raise and anchor wall section	V	E	9%
14.19	Plumb, align and brace wall section	V	E	9%
14.20	Install fur downs, soffits, bulkheads, chases	V	E	9%
16.1	Lay out ceiling framing detail on top wall plate	L	V	9%
16.2	Cut ceiling joists	V	V	9%
16.3	Install ceiling joists	V	V	9%
16.4	Frame ceiling opening	V	V	9%
16.5	Install riband	V	V	9%
16.6	Install strongback (stiffener)	V	V	9%
16.7	Install ceiling backing (deadwood or nailers)	V	V	9%
16.8	Frame interior soffit	V	V	9%
19.1	Lay out roof framing detail on cap plate & ridge	L	V	9%
19.2	Lay out & cut common rafters	L	E	9%
19.3	Lay out & cut hip & valley rafters & jacks	L	V	9%
19.4	Install ridgeboard & rafters	V	E	9%
19.5	Install collar beams (rafter ties)	V	V	9%
19.6	Frame/install hips & valleys	L	V	9%
19.7	Install rafter support purlins & bracing	M	E	9%
19.8	Frame roof opening	L	V	9%
19.9	Install sub-fascia	M	V	9%
1910	Frame gable end	L	V	0.09
19.11	Frame gable end overhang	L	V	9%
19.12	Frame dormers	L	V	9%
19.13	Install roof sheathing (incl. nailing zones)	V	E	9%
19.14	Frame chimney saddle (cricket)	L	V	9%
19.15	Provide for proper roof ventilation	L	E	9%
20.4	Install ridge cap	V	E	9%
21.1	Install flexible insulation	M	V	9%
21.3	Install acoustical insulation	L	L	9%
24.8	Install inside jamb for garage door (regional)	L	E	9%

Appendix A. Percent of Specialties Requiring Task or Content Knowledge in Rank Order

Task	*What percent of all carpentry tasks are performed by specialty?*	***Importance Level I***	***Level II***	*Pct of all Specialties*
25.1	Align framing members	M	V	9%
25.2	Cut drywall	M	M	9%
25.3	Make cutouts in wall panels	M	M	9%
25.4	Fasten horizontal, vertical or curved panels	V	V	9%
25.5	Apply corner bead and other trim	M	V	9%
25.6	Apply joint compound and tape	L	M	9%
25.7	Apply fill and finishing coats	L	M	9%
25.8	Apply drywall texture	L	L	9%
26.2	Layout and construct footings	M	V	9%
26.3	Erect and fasten supporting posts	M	V	9%
26.4	Install girders	M	V	9%
26.5	Install joists	M	V	9%
26.6	Apply deck boards	L	M	9%
27.1	Mark location of each wall stud	L	M	9%
27.2	Cut-out wall outlets	L	M	9%
27.3	Install paneling	L	M	9%
27.4	Install trim	L	M	9%
28.1	Sketch a grid plan	L	V	9%
28.2	Construct ceiling grid (& set up laser level)	L	V	9%
28.3	Cut and install ceiling panels	L	V	9%
28.4	Install ceiling tiles	L	V	9%
29.1	Apply decorative ceiling and wall molding	L	V	9%
29.2	Apply interior door casings, baseboard, base cap & shoe	L	V	9%
29.3	Install window trim	L	V	9%
29.4	Install closet shelves and closet pole	L	V	9%
29.5	Install fireplace mantels	L	V	9%
30.3	Layout dado and assemble housed-stringer staircase	L	V	9%
30.5	Install straight balustrade system	L	V	9%
30.7	Frame curved or circular stairs	L	M	9%
31.1	Apply underlayments	L	V	9%
31.2	Apply strip, plank, and parquet finish flooring	L	M	9%
32.3	Fabricate & install laminated surfaces	L	V	9%

Appendix B. Applied Academics and Safety

	Math	Comm.	Materials	Safety
1 Wood and Lumber				
1.1 Hardwood and softwood properties			2	3
1.2 Moisture content	2		2	
1.3 Grades and sizes of lumber	2		2	
1.4 Types & species of lumber			2	3
2 Engineered Products, Panels & Sheet Goods				
2.1 Plywood	1		2	3
2.2 OSB	1		2	3
2.3 Siding	1		2	3
2.4 Particleboard	1		2	3
2.5 Drywall, wallboard, cement board	1		2	2,3
2.6 Fiberboard (Hardboard, MDF & others)	1		2	3
2.7 Softboard (e.g. ceiling tiles)	1		2	3
2.8 Insulation board	1		2	3
2.9 Waterproofing membranes (plastic, etc.)	1		2	3
2.10 Plastic laminates	1		2	3
2.11 Metal framing products	1		2	3
3 Engineered Structural Components				
3.1 Laminated veneer lumber	1		2	3
3.2 Parallel strand lumber and laminated strand lumber	1		2	3
3.3 Wood & steel beams & columns	1		2	3
3.4 Wood floor & roof trusses	1		2	3
3.5 Steel floor & roof trusses	1		2	
3.6 Precast concrete structural components	1		2	2
3.7 Sheer panels (e.g., Simpson panels—regional)	1		2	3
3.8 Insulated structural panels (e.g., SIPs, EIFs)	1		2	3
3.9 Glue-laminated lumber	1		2	3
4 Fasteners				
4.1 Nails, screws, bolts, staples	1		2	
4.2 Anchors, ties & connectors	1		2	
4.3 Adhesives			2	3
4.4 Framing hardware	1		2	

Appendix B. Applied Academics and Safety

	Math	Comm.	Materials	Safety
5 Hand Tools				
5.1 Measuring and marking tools	1			9
5.2 Leveling & layout tools	1			9
5.3 Boring and cutting tools	1			9
5.4 Fastening and dismantling tools	1			9
6 Portable Power Tools				
6.1 Saws, drills and drivers	1	2	2	4,9
6.2 Planes, routers, and sanders		2	2	4,9
6.3 Fastening tools (power-actuated, etc.)		2	2	4,9
7 Stationary Tools				
7.1 Miter & chop saws	1	2		4,9
7.2 Table saws	1	2		4,9
7.3 Band saws		2		4,9
7.4 Sanders		2		4,9
7.5 Mortises, boring tools & shapers	1	2		4,9
7.6 Joiner/planer	1	2		4,9
7.7 Drill press	1	2		4,9
7.8 Brakes	1	2		9
8 Blueprints and Building Codes				
8.1 Site plans (Plot plans, etc.)	4	4		
8.2 Building plans (floor plans, sections, elevations)	4	4		
8.3 Engineering drawings (trusses, seismic, connectors, etc.)	4	4		
8.4 Building codes and zoning regulations	4	4		
9 Construct Concrete Forms				
9.1 Characteristics & testing of concrete	2		2	2,3,7,9
9.2 Identify concrete forms (panels, ICFs, etc.)			2	
9.3 Lay out building lines	4	4		4,5,8,9,10
9.4 Construct wall & column forms	4	4	2	4,5,8,9,10
9.5 Construct concrete stair forms	4	4	2	4,5,8,9,10
9.6 Construct slab-on-grade forms (incl. Vapor barriers)	4	4	2	4,5,8,9
9.7 Construct pier & footing forms	3	4	2	4,5,8,9,10
9.8 Identify & place anchoring devices	3	4	2	4,5,8,9,10

Appendix B. Applied Academics and Safety

		Math	Comm.	Materials	Safety
9.9	Construct tie beam forms	3	4	2	1,4,5,8,9,10
9.10	Construct structural beam forms	3	4	2	1,4,5,8,9
9.11	Construct curved arch forms	3	4	2	4,5,8,9
9.12	Construct lintel forms	3	4	2	4,5,8,9
9.13	Set elevated slab forms	4	4	2	1,4,5,8,9
9.14	Place control/expansion joints	3	3	2	1,4,5,8,9
9.15	Identify & place proper reinforcement	3	3	2	1,4,5,8,9
9.16	Place & finish concrete		3		2,3,7,8,9,10
9.17	Strip and clean forms		3		2,3,4,5,6,8,9,10
10	Alternative Foundation & Framing Systems				
10.1	Wood foundations	4	2	2	1,2,3,4,5,8,9,10
10.2	Log framing	4	2	2	1,2,3,4,5,8,9,10
10.3	CMU	4	2	2	1,2,3,4,5,7,8,9,10
11	Insect Prevention				
11.1	Identification		2		
11.2	Techniques to Prevent Termites/Carpenter ants	2	2	2	3,9
12	Framing Systems				
12.1	Identify metal/wood framing components		2		
12.2	Platform Frame Construction		2		
12.3	Post-and-Beam Frame Construction		2		
12.4	Balloon Frame Construction		2		
12.5	Modular frame systems		2		
13	Wood Floor Framing Layout & Construction				
13.1	Check square & level of foundation, subsurface	4	3		
13.2	Install sill systems	3	3	2	1,4,5,8,9
13.3	Install solid, composite, steel & builtup floor beams	3	3	2	1,4,5,6,8,9
13.4	Install wood & steel columns	3	3	2	1,4,5,6,8,9
13.5	Layout, cut & install floor joists TGIs, dimension lumber, trusses)	3	4	2	1,4,5,8,9
13.6	Install draft (fire) stops	2	3	2	1,4,5,8,9
13.7	Frame floor opening	3	4	2	1,4,5,8,9
13.8	Install cantilevered floor joists	3	3	2	1,4,5,8,9
13.9	Install bridging and blocking	2	3	2	1,4,5,8,9

Appendix B. Applied Academics and Safety

		Math	Comm.	Materials	Safety
13.10	Install subfloor sheathing	3	3	2	1,4,5,8,9
14	Wall Framing with Wood				
14.1	Identify load bearing & nonload-bearing walls & partitions		2		
14.2	Lay out walls on floor deck or foundation	4	4	2	1,8,9
14.3	Lay out wall framing detail on wall plates	4	4	2	1,8,9
14.4	Cut wall plates	3	3	2	1,4,5,8,9
14.5	Calculate lengths of wall components	2	3	2	1,8,9
14.6	Cut studs, headers, jacks, rough sills and cripples	2	3	2	1,4,5,8,9
14.7	Assemble header, corner and tee posts	3	3	2	1,4,5,8,9
14.8	Frame door opening	3	4	2	1,4,5,8,9
14.9	Frame window opening	3	4	2	1,4,5,8,9
14.10	Assemble wall section	4	4	2	1,4,5,8,9
14.11	Install sheer panels & moment frames	3	3	2	1,4,5,8,9
14.12	Install connectors & ties	3	3	2	1,4,5,8,9
14.13	Install backing, blocking & bases	3	3	2	1,4,5,8,9
14.14	Install top plate (cap plate)	3	3	2	1,4,5,8,9
14.15	Install draft (fire) stops	3	3	2	1,4,5,8,9
14.16	Install corner, diagonal or wind bracing	4	4	2	1,4,5,8,9
14.17	Install exterior wall sheathing	3	3	2	1,4,5,8,9
14.18	Raise and anchor wall section	3	4		1,4,5,8,9
14.19	Plumb, align and brace wall section	4	4	2	1,4,5,8,9
14.20	Install fur downs, soffits, bulkheads, chases	3	4	2	1,4,5,8,9
15	Non-structural Steel Wall Framing				
15.1	Lay out walls on floor deck or foundation	3	3	2	1,8,9
15.2	Cut & install tracks	2	3	2	1,4,5,8,9
15.3	Lay out wall framing detail on tracks	3	3	2	1,8,9
15.4	Calculate lengths of wall components	2	3	2	1,8,9
15.5	Cut studs, jacks, rough sills and cripples	2	3	2	1,4,5,8,9
15.6	Assemble head piece & king stud		3	1	1,4,5,8,9
15.7	Install studs		3	1	1,4,5,8,9
15.8	Install wall blocking (backing)	1	3	1	1,4,5,8,9
15.9	Install draft (fire) stops	1	3	1	1,4,5,8,9
15.10	Install fur downs, soffits, bulkheads, chases	3	3	1	1,4,5,8,9

Appendix B. Applied Academics and Safety

	Math	Comm.	Materials	Safety
16 Ceiling Framing in Wood				
16.1 Lay out ceiling framing detail on top wall plate	3	3		1,8,9
16.2 Cut ceiling joists	1	3	2	1,4,5,8,9
16.3 Install ceiling joists		2	2	1,4,5,8,9
16.4 Frame ceiling opening	3	3	2	1,4,5,8,9
16.5 Install riband	1	3	2	1,4,5,8,9
16.6 Install strongback (stiffener)	1	3	2	1,4,5,8,9
16.7 Install ceiling backing (deadwood or nailers)	1	3	2	1,4,5,8,9
16.8 Frame interior soffit	3	3	2	1,4,5,8,9
17 Temporary Work Platforms				
17.1 Identify scaffolds & components		2		
17.2 Erect and dismantle scaffolds & platforms	1	4	2	1,8,9
17.3 Safely erect and use ladders	2	3	2	1,8,9
17.4 Safely setup and use sawhorses	1	3	2	1,8,9
17.5 Build a sawhorse & other construction aids	2	3	2	1,4,5,8,9
17.6 Safely install and use roof brackets	1	3	2	1,4,5,8,9
17.7 Safely install temporary access, stairs	1	3	2	1,4,5,8,9
17.8 Safely setup and use ladder jacks	1	3	2	1,8,9
18 Truss Installation (Metal & Wood)				
18.1 Lay out for truss installation	3	3		1,8,9
18.2 Set trusses by hand	1	3	2	1,8,9
18.3 Set trusses with light crane	1	3	2	1,6,8,9
18.4 Brace trussed roof assembly	3	4	2	1,4,5,8,9
18.5 Frame opening in trussed roof assembly	3	3	2	1,4,5,8,9
18.6 Frame overhangs	3	3	2	1,4,5,8,9
18.7 Install framing hardware (connectors, hurricane clips, etc.)	1	3	2	1,8,9
19 Roof Framing				
19.1 Lay out roof framing detail on cap plate & ridge	3	4		1,8,9
19.2 Lay out & cut common rafters	3	4		1,8,9
19.3 Lay out & cut hip & valley rafters & jacks	3	4		1,8,9
19.4 Install ridgeboard & rafters	1	4	2	1,4,5,8,9
19.5 Install collar beams (rafter ties)	1	4	2	1,4,5,8,9
19.6 Frame/install hips & valleys	3	4	2	1,4,5,8,9
19.7 Install rafter support purlins & bracing	1	4	2	1,4,5,8,9

Appendix B. Applied Academics and Safety

		Math	Comm.	Materials	Safety
19.8	Frame roof opening	3	4	2	1,4,5,8,9
19.9	Install sub-fascia	2	4	2	1,4,5,8,9
19.10	Frame gable end	3	4	2	1,4,5,8,9
19.11	Frame gable end overhang	3	4	2	1,4,5,8,9
19.12	Frame dormers	4	4	2	1,4,5,8,9
19.13	Install roof sheathing (incl. nailing zones)	3	4	2	1,4,5,8,9
19.14	Frame chimney saddle (cricket)	4	4	2	1,4,5,8,9
19.15	Provide for proper roof ventilation	2	4	2	1,4,5,8,9
19.16	Install dry-in (roofing felt, ice & water shield)	2	4	2	1,8,9
20	Roofing				
20.1	Apply underlayment or substrate	2	3	2	1,8,9
20.2	Install flashing	2	4	2	1,8,9
20.3	Apply shingles & roll roofing	3	3	2	1,4,5,8,9
20.4	Install ridge cap	3	3	2	1,4,5,8,9
21	Insulation and Ventilation				
21.1	Install flexible insulation	1	3	2	1,8,9
21.2	Install rigid insulation	1	3	2	1,8,9
21.3	Install acoustical insulation	1	3	2	1,8,9
21.4	Install soffit & roof ventilation	1	3	2	1,4,5,8,9
21.5	Install moisture control/vapor barriers (regional)	1	4	2	1,8,9
22	Cornices				
22.1	Install soffit (wood, aluminum, vinyl, stucco)	3	3	2	1,4,5,8,9
22.2	Install fascia	3	3	2	1,4,5,8,9
22.3	Install frieze	3	3	2	1,4,5,8,9
23	Siding				
23.1	Apply underlayment (building wrap)	2	3	2	1,8,9
23.2	Install window and door flashing	2	3	2	1,8,9
23.3	Install beveled siding	3	3	2	1,4,5,8,9
23.4	Install board-and-batten siding	3	3	2	1,4,5,8,9
23.5	Install board-on-board siding	3	3	2	1,4,5,8,9
23.6	Install log siding	3	3	2	1,4,5,8,9
23.7	Install tongue-and-groove siding	3	3	2	1,4,5,8,9
23.8	Install lap siding	3	3	2	1,4,5,8,9

Appendix B. Applied Academics and Safety

		Math	Comm.	Materials	Safety
23.9	Install shake or shingle siding	3	3	2	1,4,5,8,9
23.10	Install plywood siding	3	3	2	1,4,5,8,9
23.11	Install hardboard and particleboard siding	3	3	2	1,4,5,8,9
23.12	Install fiber-cement siding	3	3	2	1,4,5,8,9
23.13	Install vinyl and metal siding & accessories	3	3	2	1,4,5,8,9
23.14	Install gutters & downspouts	3	3	2	1,4,5,8,9
24	Door And Window Installation				
24.1	Install windows (framed, arched, circles, shutters, etc.)	1	3	2	1,8,9
24.2	Install prehung doors	4	3	2	8,9
24.3	Install locksets, hardware & weather-stripping	3	3	2	4,5,9
24.4	Install sidelight	1	3	2	4,5,9
24.5	Install transom	1	3	2	1,8,9
24.6	Assemble/install sliding glass/French patio door	3	4	2	4,5,8,9
24.7	Install jamb for bi-fold doors	1	4	2	4,5,9
24.8	Install inside jamb for garage door (regional)	1	3	2	4,5,8,9
24.9	Install skylight	1	3	2	1,4,5,8,9
25	Drywall Application				
25.1	Align framing members		3	2	4,5,8,9
25.2	Cut drywall	3	3	2	2,3,4,5,9
25.3	Make cutouts in wall panels	3	3	2	2,3,4,5,9
25.4	Fasten horizontal, vertical or curved panels	3	3	2	4,5,8,9
25.5	Apply corner bead and other trim	2	3	2	8,9
25.6	Apply joint compound and tape	1	3	2	2,3,8,9
25.7	Apply fill and finishing coats	1	3	2	2,3,8,9
25.8	Apply drywall texture	1	3	2	2,3,8,9
26	Frame/Construct Porches & Decks				
26.1	Install ledger and make water-tight	2	3	2	1,3,4,5,8,9
26.2	Layout and construct footings	3	3	2	3,4,5,9
26.3	Erect and fasten supporting posts	2	3	2	1,3,4,5,8,9
26.4	Install girders	3	3	2	1,3,4,5,8,9
26.5	Install joists	3	3	2	1,3,4,5,8,9
26.6	Apply deck boards	3	3	2	1,3,4,5,8,9
26.7	Apply trim	2	3	2	1,3,4,5,8,9
26.8	Install stairs and rails	4	4	2	1,3,4,5,8,9

Appendix B. Applied Academics and Safety

		Math	Comm.	Materials	Safety
27	Wall Sheet Paneling				
27.1	Mark location of each wall stud	1	3	2	8,9
27.2	Cut-out wall outlets	3	3	2	3,4,5,8,9
27.3	Install paneling	3	3	2	3,4,5,8,9
27.4	Install trim	3	3	2	3,4,5,8,9
28	Suspended Ceilings				
28.1	Sketch a grid plan	4	3		
28.2	Construct ceiling grid (& set up laser level)	3	3	2	1,4,8,9
28.3	Cut and install ceiling panels	2	3	2	1,3,4,5,8,9
28.4	Install ceiling tiles	3	3	2	1,3,8,9
29	Interior Trim				
29.1	Apply decorative ceiling and wall molding	4	3	2	1,4,5,8,9
29.2	Apply interior door casings, baseboard, base cap & shoe	2	3	2	4,5,8,9
29.3	Install window trim	2	3	2	4,5,8,9
29.4	Install closet shelves and closet pole	2	3	2	4,5,8,9
29.5	Install fireplace mantels	3	3	2	4,5,8,9
30	Stair Construction, Installation & Finishing				
30.1	Lay out/install straight run stair stringer	4	4	2	1,4,5,8,9
30.2	Fabricate/install stair components (treads & risers)	3	4	2	1,4,5,8,9
30.3	Layout dado and assemble housed-stringer staircase	4	4	2	1,4,5,8,9
30.4	Apply finish trim to open and closed staircases	1	3	2	1,4,5,8,9
30.5	Install straight balustrade system	4	4	2	1,4,5,8,9
30.6	Install attic & pull-down stairs	3	3	2	1,4,5,8,9
30.7	Frame curved or circular stairs	4	4	2	1,4,5,8,9
30.8	Install prefabricated stair unit	1	3	2	1,4,5,8,9
30.9	Estimating & takeoffs	4	4		
31	Finish Floors				
31.1	Apply underlayments	3	3	2	4,5,9
31.2	Apply strip, plank, and parquet finish flooring	3	4	2	4,5,9
32	Cabinets and Countertops				
32.1	Install manufactured cabinets & tops	3	4	2	4,5,9
32.2	Install cabinet hardware	1	3	2	4,5,9
32.3	Fabricate & install laminated surfaces	4	4	2	3,4,5,9

Appendix B Coding

Mathematics

1= Measurement

2= Arithmetic

3= Layout

4= Applied Geometry

Communications

1=Follow Verbal Directions

2=Follow Written Directions

3=Give Simple Directions

4=Give Complex Directions

Materials

1=Select Appropriate Materials

2=Apply Materials as Specified

Safety

1=Fall Protection

2=Silica Protection

3=Hazardous Materials

4=Electrical Protection

5=Power Tools

6=Rigging

7=Concrete

8=Ladders and Scaffolds

9=PPE

Appendix C. Tools

		Which carpentry specialties use these tools?										
	Pct of all	WF	MF	IT	ET	S	CF	D	RA	ST	I	C
	Specialties	88%	70%	84%	86%	86%	70%	45%	54%	84%	39%	86%
Standard Hand Tools												
Tool box	100%	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Safety glasses	100%	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Steel toe safety shoes	100%	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Safety or dust filter mask	100%	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Hard hat	100%	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Gloves	100%	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Individual fall arrest	100%	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Hammer for job	100%	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Tape measure 25' or more	100%	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Carpenter pencils	100%	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Chalk box	100%	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Utility knife	100%	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Slotted screwdrivers	100%	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Phillips screwdrivers	100%	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Adjustable wrench	100%	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Pliers	100%	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Nail pouch w/belt	100%	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Hand saws by trade	100%	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Cat's paw nail puller	82%	Y	Y	Y	Y	Y	Y		Y	Y		Y
Wrecking bar	82%	Y	Y	Y	Y	Y	Y		Y	Y		Y
Framing square w/rafter tables	73%	Y	Y	Y	Y	Y	Y			Y		Y
Quick/speed square	73%	Y	Y	Y	Y	Y	Y			Y		Y
Combination square	73%	Y	Y	Y	Y	Y	Y			Y		Y
T-square	73%	Y	Y	Y	Y	Y		Y			Y	Y
Spirit levels	73%	Y	Y	Y	Y	Y	Y			Y		Y
Plumb bob	73%	Y	Y	Y	Y	Y	Y			Y		Y
Rafter/stair gauges (2)	64%	Y	Y	Y	Y	Y				Y		Y
Set of wood chisels	55%	Y		Y	Y	Y				Y		Y
Nail sets	55%	Y		Y	Y	Y				Y		Y
Scriber	55%			Y	Y	Y		Y		Y		Y
Tin/metal snips	45%	Y	Y					Y	Y	Y		

Appendix C. Tools

	Pct of all Specialties	WF 88%	MF 70%	IT 84%	ET 86%	S 86%	CF 70%	D 45%	RA 54%	ST 84%	I 39%	C 86%
Hand planes	45%			Y	Y	Y				Y		Y
Laser levels	36%	Y	Y				Y					Y
Tape measure 100' or more	27%	Y	Y				Y					
Builder's level/transit	27%	Y	Y				Y					
Shovel	18%						Y		Y			
Drywall tools	9%							Y				
Standard Power Tools (All Heavy Duty)												
Electric cords	100%	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Variable speed reversible drill	91%	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y
Reciprocating saw	82%	Y	Y	Y	Y	Y	Y		Y	Y		Y
Electric screwgun	82%	Y	Y	Y	Y	Y	Y	Y		Y		Y
Air compressor	82%	Y	Y	Y	Y	Y	Y		Y	Y		Y
Generator	82%	Y	Y	Y	Y	Y	Y		Y	Y		Y
Circular saw (7-1/4")	73%	Y		Y	Y	Y	Y		Y	Y		Y
Pneumatic nailer	73%	Y		Y	Y	Y	Y		Y	Y		Y
Miter saws	64%	Y	Y	Y	Y	Y				Y		Y
Routers	64%	Y		Y	Y	Y		Y		Y		Y
Sanders	55%	Y		Y	Y	Y				Y		Y
Power planers	55%	Y		Y	Y	Y				Y		Y
Electric staplers	55%	Y		Y	Y	Y					Y	Y
Table saws	55%	Y		Y	Y	Y				Y		Y
Planers & joiners	45%			Y	Y	Y				Y		Y
Drill press	45%			Y	Y	Y				Y		Y
Powder-actuated tools	36%	Y	Y				Y			Y		
Brakes	27%				Y	Y			Y			
Variable speed reversible hammer drill (1/2")	18%	Y					Y					

Appendix D. Quality Training Construction Standards

Framing Standards – Wood & Metal

Quality Standards refers to minimal acceptable measures for ensuring quality training in construction.

1. Lay out ± 1/16" of plans or specification
2. Cutting ± 1/8" of plans or specification
3. Location of features ± 1/8" of specifications
4. Level ± 1/4" in eight (8) linear feet
5. Plumb ± 1/4" in eight (8) linear feet
6. Foundation square ± 1/2" for every 50' linear feet corner to corner diagonal measurement
7. Framing wall square ± 1/8" for every 10' linear feet of diagonal measurement
8. Straight ± 1/4" maximum curve or bow for every 10 linear feet of material
9. Squareness of opening ± 1/8" as pulled across diagonal
10. Meets applicable code specifications

Interior Trim Standards

1. Lay out ± 1/16" of plans or specification
2. Cutting ± 1/16" of plans or specification
3. Location of features ± 1/8" of specifications
4. Level ± 1/8" in eight (8) linear feet
5. Plumb ± 1/8" in eight (8) linear feet
6. Features true to ± 1/8" of adjacent structure
7. Squareness of feature ± 1/8" as pulled across diagonal
8. Meets applicable code specifications

Exterior Trim Standards

1. Lay out ± 1/8" of plans or specification
2. Cutting ± 1/8" of plans or specification
3. Location of features ± 1/8" of specifications
4. Level ± 1/8" in eight (8) linear feet
5. Plumb ± 1/8" in eight (8) linear feet
6. Features true to ± 1/8" of adjacent structure
7. Squareness of feature ± 1/8" as pulled across diagonal
8. Meets applicable specifications

Appendix D. Quality Training Construction Continued

Siding Standards

1. Lay out ± 1/8" of plans or specification
2. Cutting ± 1/8" of plans or specification
3. Location of features ± 1/8" of specifications
4. Level ± 1/8" in eight (8) linear feet
5. Plumb ± 1/8" in eight (8) linear feet
6. Features true to ± 1/8" of adjacent structure
7. Squareness of feature ± 1/8" as pulled across diagonal
8. Meets applicable specifications

Concrete Forms Standards

1. Lay out ± 1/4" of plans or specification
2. Cutting ± 1/4" of plans or specification
3. Foundation square ± 1/2" for every 50' linear feet corner to corner diagonal measurement
4. Location of features ± 1/4" of specifications
5. Straight ± 1/4" maximum curve or bow for every 10 linear feet of material
6. Level ± 1/4" in eight (8) linear feet
7. Plumb ± 1/4" in eight (8) linear feet
8. Meets applicable specifications

Drywall Standards

1. Lay out ± 1/8" of plans or specification
2. Cutting ± 1/4" of plans or specification
3. Level ± 1/4" in eight (8) linear feet
4. Plumb ± 1/4" in eight (8) linear feet
5. Meets applicable specifications

Roofing Standards

1. Follows manufacturers' instructions
2. Meets applicable specifications

Insulation Standards

1. Follows manufacturers' instructions
2. Meets applicable specifications

Appendix D. Quality Training Standards Continued

Stairs Standards

1. Lay out ± 1/16" of plans or specification
2. Cutting ± 1/16" of plans or specification
3. Location of features ± 1/8" of specifications
4. Level ± 1/8" in eight (8) linear feet
5. Plumb ± 1/8" in eight (8) linear feet
6. Features true to ± 1/8" of adjacent structure
7. Meets applicable specifications

Cabinets & Counters Standards

1. Lay out ± 1/16" of plans or specification
2. Cutting ± 1/16" of plans or specification
3. Location of features ± 1/16" of specifications
4. Level ± 1/8" in eight (8) linear feet
5. Plumb ± 1/8" in eight (8) linear feet
6. Features true to ± 1/16" of adjacent structure
7. Meets applicable specifications