

CHAPTER 6

CARPENTRY

CSI DIVISION 6

06100 ROUGH CARPENTRY

06130 HEAVY TIMBER CONSTRUCTION

06170 PREFABRICATED STRUCTURAL WOOD

06200 FINISH CARPENTRY

06300 WOOD TREATMENT

06400 ARCHITECTURAL WOODWORK

06100 ROUGH CARPENTRY

To estimate carpentry quantities and costs accurately, an estimator should know how the various classes of work are constructed, where joists and studs should be doubled, where to place wood furring strips for walls and floors and openings requiring wood bucks, and where to place wood grounds. These may seem like small items, but they are important.

An inexperienced estimator who is unfamiliar with how work is conducted in the field might figure wood bucks for the exterior window frames. He or she must know how a job goes together and what is required for each item of work.

When taking off lumber quantities from the plans, always estimate as closely as possible the exact quantities of each kind required. Some contractors estimate the cost of wood floors at a certain price per sq. ft. including joists, bridging, subfloor, deadening felt, furring strips, and the finish wood flooring. Entering into the construction of such a floor are materials and labor operations of widely varying costs, yet certain contractors are content to estimate their work in this haphazard manner, and at the completion of the job have no more idea of their labor costs than before they took the job.

When estimating labor costs of rough carpentry, bear in mind the costs will vary with the class of work performed, with the ability of the carpenters employed, and with the experience and ability of the foreman or superintendent.

Modern tools, such as electric hand saws, electric drills, and sanders, play a big part in reducing labor costs. For instance an electric handsaw can cut a 2"x12" (50 x 300 mm) plank in 4 or 5 seconds, while it takes about a minute to do it by hand; it takes 10 to 12 minutes to rip a 12'-0" (3.6 m) plank 2" (50 mm) thick when sawing by hand, while an electric handsaw will do the work in less than a minute. In other words, an electric saw will cut 10 to 20 times as fast.

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Material Requirements for One Plywood Gusset Truss of Various Spans for a 3 in 12 Roof Slope (Continued)

Splice Plates.....4-25x100	4-25x100	4-25x100	4-25x100	4-25x100	4-25x100
.....0.90m	0.90m	1.2m	1.2m	1.2m	1.2m
.....3-25x150	2-25x150	2-25x150	2-25x150	2-25x150	2-25x150
.....0.90m	0.90m	0.90m	0.90m	0.90m	0.90m
.....	1-25x150	1-25x150	1-25x150	1-25x200	1-25x150
.....	1.2m	1.2m	1.2m	1.2m	0.90m
Total cu.m.....0.159	0.175	0.182	0.197	0.202	0.212
Nails,					
12d.....138	138	146	146	168	168
8d.....38	46	58	50	56	56

Material Requirements for One Plywood Gusset Truss of Various Spans for a 5 in 12 Roof Slope

Span.....24'-0"	26'-0"	28'-0"	30'-0"	32'-0"	34'-0"
Approx. Overhang..3-1/4	3-1/4	3-1/4	3-1/4	3-1/4	3-1/4
Top Chords.....2-2x4	2-2x4	2-2x6	2-2x6	2-2x6	2-2x6
.....14'-0"	16'-0"	16'-0"	18'-0"	18'-0"	20'-0"
Bottom Chords.....2-2x4	2-2x4	2-2x4	2-2x4	2-2x4	2-2x4
.....12'-0"	14'-0"	14'-0"	16'-0"	16'-0"	18'-0"
Diagonals.....2-1x6	2-1x6	2-1x6	2-1x6	2-1x6	2-1x6
.....12'-0"	12'-0"	14'-0"	14'-0"	14'-0"	16'-0"
.....1-2x4	1-2x4	1-2x4	1-2x4	1-2x4	1-2x4
.....6'-0"	8'-0"	8'-0"	8'-0"	8'-0"	10'-0"
Splice Plates.....6-1x6	6-1x6	4-1x4	4-1x4	4-1x4	4-1x4
.....2'-0"	2'-0"	3'-0"	3'-0"	3'-0"	3'-0"
.....1-1x6	1-1x6	2-1x6	2-1x6	2-1x6	2-1x6
.....3'-0"	3'-0"	2'-0"	2'-0"	2'-0"	2'-0"
.....	.....	1-1x6	1-1x6	1-1x8	1-1x8
.....	.....	3'-0"	3'-0"	3'-0"	3'-0"
Total Board Feet ..57-5/6	64-5/6	77-1/2	84-1/6	84-2/3	94-2/3
Nails,					
12d.....100	112	110	110	124	124
8d.....26	18	42	44	34	34

(metric)

Span.....7.3m	7.9m	8.5m	9.1m	9.8m	10.4m
Approx. Overhang..56.25	56.25	56.25	56.25	56.25	56.25
Top Chords.....2-50x100	2-50x100	2-50x150	2-50x150	2-50x150	2-50x150
.....4.3m	4.9m	4.9m	5.5m	5.5m	6.1m
Bottom Chords....2-50x100	2-50x100	2-50x100	2-50x100	2-50x100	2-50x100
.....3.6m	4.3m	4.3m	4.9m	4.9m	5.5m
Diagonals.....2-50x150	2-50x150	2-50x150	2-50x150	2-50x150	2-50x150
.....3.6m	3.6m	4.3m	4.3m	4.3m	4.9m
.....1-50x100	1-50x100	1-50x100	1-50x100	1-50x100	1-50x100

Framing and Placing Foundation Wall Plates. Where 2"x4" (50 x 100 mm) or 2"x6" (50 x 150 mm) wood plates are placed on top of foundation walls or concrete slab to receive the floor joists and exterior wall studs, it is customary to place anchor bolts in the walls and floors. The plates are then bored to receive the bolts and placed on the wall (and usually wedged with shingles) ready to receive the joists and exterior wall studs. Special purpose nails may be used for anchoring wall plates to concrete.

Where just an ordinary grade of workmanship is required, two carpenters working together should handle, frame and place 225 to 275 l.f. (67.5-82.5 m) of 2"x4" (50 x 100 mm) or 2"x6" (50 x 150 mm) plates per 8-hr. day, at the following cost per 100 l.f. (30 m):

	Hours	Rate	Total	Rate	Total
Carpenter	6.4	\$....	\$....	\$26.44	\$169.22
Cost per l.f. ....			....		1.69
per m .....			....		5.55

First Grade Workmanship

On jobs where first grade workmanship is required, with the foundation wall plates drilled for bolts, plates set and bedded absolutely level in a bed of cement mortar, two carpenters working together should handle, frame, and place 175 to 225 l.f. (52.5-67.5 m) of 2"x4" (50 x 100 mm) or 2"x6" (50 x 150 mm) wall plates per 8-hr. day at the following labor cost per 100 l.f. (30 m):

	Hours	Rate	Total	Rate	Total
Carpenter	8	\$....	\$....	\$26.44	\$211.52
Cost per l.f. ....			....		2.12
per m .....			....		6.94

Framing and Placing Box Sills and Plates. On platform framing, where a wood box sill and plate is formed by using a 2" x 4" (50 x 100 mm) or 2"x6" (50 x 150 mm) plate and a 2" x 8" (50 x 200 mm) or 2" x 10" (50 x 250 mm) on the end of the joists to form a box sill, the wall plate should be drilled, leveled, and set the same as described above, and the side or end piece is nailed after the joists are set.

This work should be estimated as given above for "Foundation Wall Plates" and the 2" x 8" (50 x 200 mm) or 2" x 10" (50 x 250 mm) end pieces should be figured in with the floor joists.

Framing and Erecting Exterior Stud Walls for Frame Buildings. The labor cost of framing and erecting stud walls is subject to wide variation, depending upon the type of building, height, regularity of the walls, etc.

The framing on square or rectangular buildings, such as Cape Cod and colonial type houses, costs much less than for English type houses, having walls of irregular shape and height. The average house requires only 1,500 to 2,500 ft. (450-750 m) of lumber for outside stud walls.

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On square or rectangular shaped buildings, such as colonial, Georgian houses, etc., a carpenter should frame and erect 350 to 400 b.f. (0.83-0.94 cu.m) of lumber per 8-hr. day, at the following cost per 1,000 b.f. (2.36 cu.m):

	Hours	Rate	Total	Rate	Total
Carpenter	21.4	\$....	\$....	\$26.44	\$565.82
Labor	6	....	....	21.04	<u>126.24</u>
Cost 1,000 b.f.			\$....		\$ 692.06
per cu.m.....			....		293.25

On English type and other buildings having irregular wall construction, a carpenter should frame and erect 250 to 300 b.f. (0.59-0.70 cu.m) of lumber per 8-hr. day, at the following labor cost per 1,000 b.f. (2.36 cu.m):

	Hours	Rate	Total	Rate	Total
Carpenter	29.1	\$....	\$....	\$26.44	\$769.40
Labor	6	....	....	21.04	<u>126.24</u>
Cost 1,000 b.f.			\$....		\$ 895.64
per cu.m.....			....		379.51

First Grade Workmanship

In high class wood constructed buildings, where every precaution is taken to prevent settling due to shrinkage, where the wood studs rest on masonry walls or steel I beams and are not set on top of the floor joists, and where it is necessary to bridge or truss between all studs and over door and window openings, a carpenter should frame and erect 225 to 275 b.f. (0.53-0.65 cu.m) of lumber per 8-hr. day, on square or rectangular type buildings, at the following labor cost per 1,000 b.f. (2.36 cu.m):

	Hours	Rate	Total	Rate	Total
Carpenter	32	\$....	\$....	\$26.44	\$846.08
Labor	10	....	....	21.04	<u>210.40</u>
Cost 1,000 b.f.			\$....		\$1,056.48
per cu.m.....			....		447.66

On English type and other buildings having irregular wall construction, a carpenter should frame and erect 150 to 200 b.f. (0.35-0.47 cu.m) of lumber per 8-hr day, at the following labor cost per 1,000 b.f. (2.36 cu.m):

	Hours	Rate	Total	Rate	Total
Carpenter	45.7	\$....	\$....	\$26.44	\$1,208.31
Labor	10	21.04	<u>210.40</u>
Cost 1,000 b.f.			\$....		\$1,418.71
per cu.m.....				601.15

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Approximate costs of various materials and labor required for sidewall sheathing are given below.

Labor Cost of 100 S.F. (9 Sq.M) of Structural Insulating Sidewall Sheathing Applied to Square or Rectanglar Buildings of Regular Construction

	Hours	Rate	Total	Rate	Total
Carpenter sheathing.....	1.0	\$....	\$....	\$26.44	\$26.44
Helper unloading and carrying sheets.....	0.3	....	....	21.04	<u>6.31</u>
Cost per 100 s.f.			\$....		\$32.75
per s.f.....			....		0.33
per sq.m.....			....		3.55

No paper required as insulating sheathing is treated to resist moisture.
On buildings of irregular construction, add 1 hr. carpenter time.

Labor Cost of 100 S.F. (9 Sq.M) of 1"x6" (25 x 150 mm) Wood Sidewall Sheathing Applied Horizontally to Square or Rectangular Buildings of Regular Construction

	Hours	Rate	Total	Rate	Total
Carpenter sheathing.....	1.5	\$....	\$....	\$26.44	\$39.66
Labor unloading and carrying lumber	0.5	....	....	21.04	10.52
Carpenter applying building paper.....	0.4	....	....	26.44	<u>10.58</u>
Cost per 100 s.f. (9 sq.m).....			\$....		\$ 60.76
per s.f.....			....		0.61
per sq.m.....			....		6.56

If 1"x8" (25 x 200 mm) shiplap is used instead of 1"x6" (25 x 150 mm) D&M lumber, deduct 5 b.f. (0.01 cu.m) lumber and 0.1 hr. carpenter time per 100 s.f. (9 sq.m) of wall.

On buildings of irregular construction, add 1 hr. carpenter time.

Labor Cost of 100 S.F. (9 Sq.M) of 1"x6" (25 x 150 mm) Wood Sidewall Sheathing Applied Diagonally to Square or Rectangular Buildings of Regular Construction

	Hours	Rate	Total	Rate	Total
Carpenter sheathing.....	2.0	\$....	\$....	\$26.44	\$52.88
Labor unloading and carrying lumber	0.5	....	....	21.04	10.52
Carpenter applying paper.....	0.4	26.44	<u>10.58</u>
Cost per 100 s.f.			\$....		\$73.98
per s.f.....				0.74
per sq.m.....				7.96

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On large panels, from 3'-0"x5'-0" (0.9 x 1.5 m) to 4'-0"x6'-0" (1.2 x 1.8 m), where each panel contains 16 to 20 l.f. (4.8-6.0 m) of panel molding, a carpenter should complete about 6 to 8 panels, containing 120 to 150 l.f. (36-45 m) of molding per 8-hr. day, at the following labor cost per 100 l.f. (30 m):

	Hours	Rate	Total	Rate	Total
Carpenter	6.0	\$....	\$....	\$26.44	\$158.64
Labor	0.5	....	....	21.04	<u>10.52</u>
Cost per 100 l.f.			\$....		\$169.16
per l.f. ....			....		1.69
per m .....			....		5.54

Placing Wood Ceiling Beams. In buildings where built-up ceiling beams are used, the labor costs will vary according to the number of intersections of beams in each room and the length of the beams. It is as easy to erect a 12'-0" (3.6 m) built-up beam as an 8'-0" (2.4 m) one.

On average work, a carpenter should place 35 to 45 l.f. (10.5-13.5 m) of built-up wood beams per 8-hr. day, at the following labor cost per 100 l.f. (30 m):

	Hours	Rate	Total	Rate	Total
Carpenter	20	\$....	\$....	\$26.44	\$528.80
Labor	3	....	....	21.04	<u>63.12</u>
Cost per 100 l.f.			\$....		\$591.92
per l.f. ....			....		5.92
per m .....			....		19.41

First Grade Workmanship

In the better class of buildings using wood ceiling beams, a carpenter should place 30 to 35 l.f. (9.0-10.5 m) per 8-hr. day, at the following labor cost per 100 l.f. (30 m):

	Hours	Rate	Total	Rate	Total
Carpenter	25	\$....	\$....	\$26.44	\$ 661.00
Labor	3	....	....	21.04	<u>63.12</u>
Cost per 100 l.f.			\$....		\$724.12
per l.f. ....			....		7.24
per m .....			....		23.75