Carpentry Level One

Building Materials, Fasteners, and Adhesives 27102-13

Objectives

- Explain how to calculate the quantities of lumber, panel, and concrete products using industry-standard methods.

    a. Calculate lumber quantities.

    b. Calculate panel quantities.

    c. Calculate the volume of concrete required for rectangular and cylindrical shapes.

Performance Task

2. Calculate the quantities of lumber, panel, and concrete products using industry-standard methods.

Kickoff Activity

- Walk around the classroom and "guesstimate" the area of the classroom walls (in square feet), the amount of concrete used for the floor (in cubic yards), and how many OSB panels will be needed for the room. Write down your responses.

Section 4.1.0

- A board foot is equivalent to a piece of lumber that is 1" thick, 12" wide, and 1' long. Each board to the right represents one board foot.

- Board feet = number of pieces × thickness (in inches) × width (in inches) × length (in feet) ÷ 12
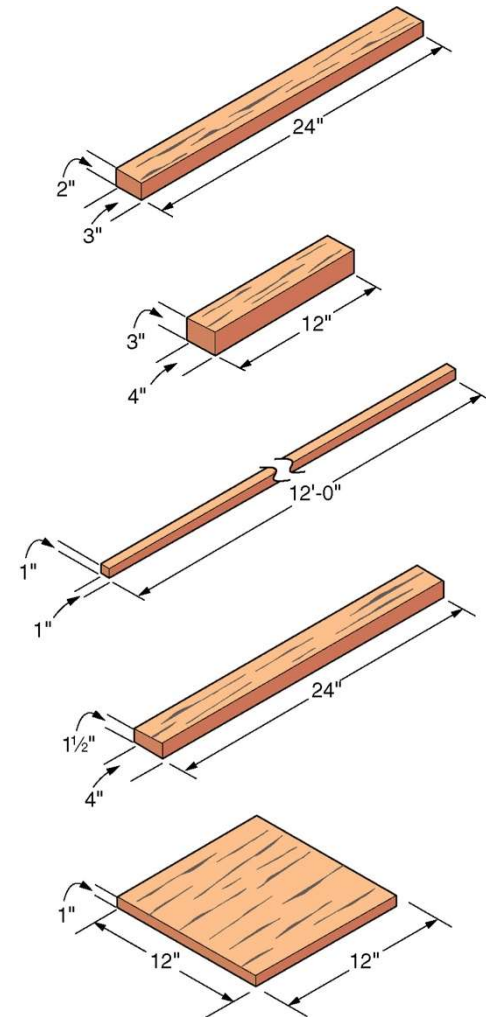
Section 4.1.0

- Determine the total board feet for 10 pieces of 2" × 6" lumber that are each 12" long.

10 board feet

Section 4.2.0

- Panel products, such as plywood, particleboard, and OSB, are calculated by first determining the area to be covered.

- The following formula is used to calculate board feet of panel products:

Section 4.2.0

- Determine the number of 4' x 8' OSB panels needed for a 26' by 48' roof.

Section 4.3.1

- You can use the following formula to determine the volume of concrete needed for a rectangular object:

  - Cubic yards of concrete (rounded up to the next ¼ yard) = thickness (in feet) × width or height (in feet) × length (in feet) ÷ 27 (cubic feet/cubic yard)

Section 4.3.1

- All dimensions in inches must be converted to feet and/or fractions of a foot and then into a decimal equivalent. For example:
    - 7" = (7/12)' or (7 ÷ 12)' = 0.58'
    - 8" = (8/12)' or (8 ÷ 12)' = 0.66'
    - 23" = (23/12)' or (23 ÷ 12)' = 1.92'

Section 4.3.1

- When you know the width or height and length of an area in feet, along with the thickness in inches, you can determine the volume using a construction calculator or a concrete table and a simple formula.

ONE CUBIC YARD OF CONCRETE WILL PLACE:			
THICKNESS	SQ FT	THICKNESS	SQ FT
1"	324	7"	46
1¼"	259	7¼"	45
1½"	216	7½"	43
1¾"	185	7¾"	42
2"	162	8"	40
2¼"	144	8¼"	39
2½"	130	8½"	38
2¾"	118	8¾"	37
3"	108	9"	36
3¼"	100	9¼"	35
3½"	93	9½"	34
3¾"	86	9¾"	33
4"	81	10"	32.5
4¼"	76	10¼"	31.5
4½"	72	10½"	31
4¾"	68	10¾"	30
5"	65	11"	29.5
5¼"	62	11¼"	29
5½"	59	11½"	28
5¾"	56	11¾"	27.5
6"	54	12"	27
6¼"	52	15"	21.5
6½"	50	18"	18
6¾"	48	24"	13.5

Section 4.3.3

- The volume of concrete required for a circular column or pier can be calculated by using the following formula:
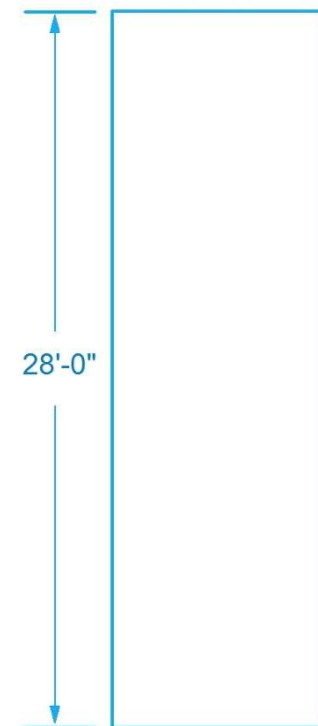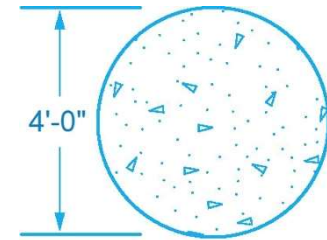
  Radius diameter (in feet) of column 2

  Measurements in inches are converted to feet

Section 4.3.4

- The circular volume formula is used to determine the amount of concrete required for a typical circular column plan.

- Determine the volume of concrete required for the circular column shown to the right.

4'-0"

28'-0"

Section 4.3.4

1. Determine the radius of the column.

   4' ÷ 2 = 2'

2. Radius squared = 4'

3. π × 4 = 12.56

4. 12.56 × 28 = 351.68

5. 351.68 ÷ 27 = 13.025, rounded up to 13¼ cubic yards

Wrap Up

- Calculate the areas of the walls in your classroom.

- Calculate the volume of concrete needed for the floor based on a 6" slab thickness.

- Calculate the number of panels required for a 20' × 40' roof.

Next Lesson: Fasteners
Review Sections 5.0.0–5.5.3