

Chapter 13 Engineered Wood

Estimating Sheathing

INTRODUCTION Engineered panel products are usually purchased in 4×8 sheets, but they are also available in 4×10 and 4×12 sheets. A 4×8 sheet contains 32 sq. ft. ($4 \times 8 = 32$ sq. ft.) of material, a 4×10 sheet covers 40 sq. ft, and a 4×12 sheet sheathes 48 sq. ft. Their thickness varies according to the job specifications.

NCTM STANDARDS
Geometry
Measurement
Number & Operations
Problem Solving

These panels cover floors, interior and exterior walls, and roofs. The area formulas (found in Chapter 8) are used to estimate the number of sheets of plywood, OSB, MDF, or fiberboard needed. Large openings such as garage doors should be subtracted from your estimates.

Hint: To estimate paneling needed for a room's four interior walls, determine the perimeter of the room. Multiply the perimeter times the height of the room, instead of calculating the area for each of the four walls and adding them.

Hint: When paneling estimates involve partial sheets, always round *up* to the next whole sheet.

Practice Exercises

Directions You will need one or two sheets of paper to work these practice and problem exercises.

EXERCISE 1: Determine how many 4×8 sheets of CDX are needed for a room that measures 10' × 12' and has 8'-high ceilings.

Step 1: Calculate the perimeter of the rectangular room.

$$2l + 2w = \text{Perimeter}$$

$$2(10') + 2(12') = 44'$$

Step 2: Multiply the perimeter (44') times the wall height (8') to determine the area of the walls to be covered.

$$44' \times 8' = 352 \text{ sq. ft.}$$

Step 3: Determine the square footage (area) of one sheet of plywood.

$$4 \times 8 = 32 \text{ sq. ft.}$$

Step 4: Divide the number of square feet (352 sq. ft.) to be covered by the area of one sheet of plywood (32 sq. ft.) to determine the actual number of sheets needed.

$$352 \text{ sq. ft.} \div 32 \text{ sq. ft./sheet} = 11 \text{ sheets}$$

Therefore, 11 sheets will be needed.

continued

Mathematics Application 13-2 (continued)

EXERCISE 2: A waste allowance of 5% must be added to the material order because of cutting, fitting, and imperfections. Add a 5% waste allowance to 11 sheets.

Step 1: Multiply the number of sheets (11) times 5%, using a calculator.

$$11 \text{ sheets} \times 5\% = 0.55 \text{ sheets or } 11 \text{ sheets} \times 0.05 = 0.55 \text{ sheets}$$

Step 2: Add the waste allowance sheets (0.55) to the number of sheets (11).

$$0.55 \text{ sheets} + 11 \text{ sheets} = 11.55 \text{ sheets}$$

Step 3: Round partial sheets (11.55) up to the nearest whole sheet (12).

$$11.55 \sim 12$$

You may also use the following method to calculate the same problem:

Step 1: Multiply the number of sheets (11) times 100%, plus the percentage of waste allowance (5%).

$$11 \times (100\% + 5\%) = 11.55$$

$$11 \times 105\% = 11.55$$

Step 2: Round partial sheets (11.55) up to nearest whole sheet (12).

$$11.55 \sim 12$$

Therefore, 12 sheets will be needed.

Problem Exercises

Directions For each problem, calculate the amount of material to be ordered, with waste allowances.

- 146 sheets of OSB, plus a 5% waste allowance. _____
- 68 squares of shingles, plus an 8% waste allowance. _____
- 2,675 bricks, plus a 2% waste allowance. _____
- 120 sq. ft. of finished flooring laid diagonally, plus a 15% waste allowance. _____
- 168' of aluminum flashing, plus a 10% waste allowance. _____
- 136' of sill sealer, plus a 10% waste allowance. _____
- Determine how many 4×10 sheets of OSB are needed to cover the walls of a room that measures 11' by 16' and has 10'-high ceilings. _____
- The interior walls of a garage are to be covered in perforated hardboard. How many 4×8 sheets of hardboard will you need to order if the garage measures 22' by 22' (with a 8' ceiling), and one of the walls has an 18'-wide garage door? _____

Mathematics Application 13-3

Chapter 13 Engineered Wood

Estimating Sheathing Applications

INTRODUCTION Carpenters and contractors will need to use a variety of geometric techniques to calculate the amount of material needed for various jobs. In addition, they will need to consult pricing tables to determine the costs of those materials.

NCTM STANDARDS
 Geometry
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Problem Exercises

Refer to this sheathing pricing table for the following Problem Exercises.

Sheathing Pricing		
Type of Material	Size of Material	Cost of Material
OSB	$\frac{1}{4}" \times 4' \times 8'$	\$5.85
OSB	$\frac{7}{16}" \times 4' \times 8'$	\$6.98
OSB	$\frac{1}{2}" \times 4' \times 8'$	\$8.58
BC Southern Pine	$\frac{1}{4}" \times 4' \times 8'$	\$13.96
BC Southern Pine	$\frac{3}{8}" \times 4' \times 8'$	\$14.98
BC Southern Pine	$\frac{1}{2}" \times 4' \times 8'$	\$18.56
BC Southern Pine	$\frac{5}{8}" \times 4' \times 8'$	\$21.24
BC Southern Pine	$\frac{3}{4}" \times 4' \times 8'$	\$24.89
CDX	$\frac{3}{8}" \times 4' \times 8'$	\$9.79
CDX	$\frac{1}{2}" \times 4' \times 8'$	\$11.66
CDX	$\frac{5}{8}" \times 4' \times 8'$	\$14.95
CDX	$\frac{3}{4}" \times 4' \times 8'$	\$19.56
Plywood T&G	$\frac{3}{4}" \times 4' \times 8'$	\$19.95
OSB T&G	$\frac{3}{4}" \times 4' \times 8'$	\$13.69



Directions For each problem, estimate the actual square footage, the square footage with waste allowance, the number of sheets to order, and the cost. Figure a 5% waste allowance. You will need paper to work these exercises.

- Cover a ceiling that measures $12' \times 14'$ with $\frac{1}{2}" \times 4' \times 8'$ BC plywood.

(actual sq. ft.)	(sq. ft. with waste added)	(no. of sheets)	(cost)

- Cover an 8' wall that measures 32' long with $\frac{5}{8}" \times 4' \times 8'$ BC plywood.

(actual sq. ft.)	(sq. ft. with waste added)	(no. of sheets)	(cost)

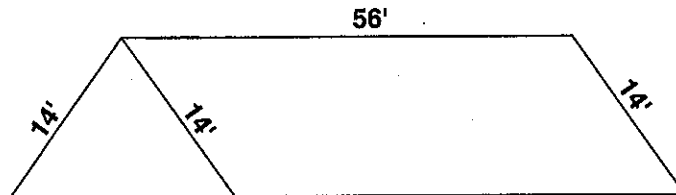
continued

Mathematics Application 13-3 (continued)

3. Cover a floor that measures $32' \times 40'$ and has two $40'' \times 147''$ stairwell openings with $\frac{3}{4}'' \times 4' \times 8'$ T&G OSB.

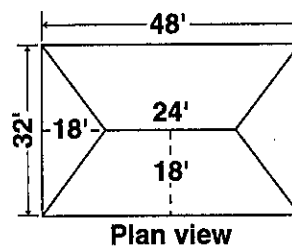
(actual sq. ft.)	(sq. ft. with waste added)	(no. of sheets)	(cost)
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4. Cover a gable roof that has a $56'$ ridge and $14'$ common rafters with $\frac{1}{2}'' \times 4' \times 8'$ CDX.



(actual sq. ft.)	(sq. ft. with waste added)	(no. of sheets)	(cost)
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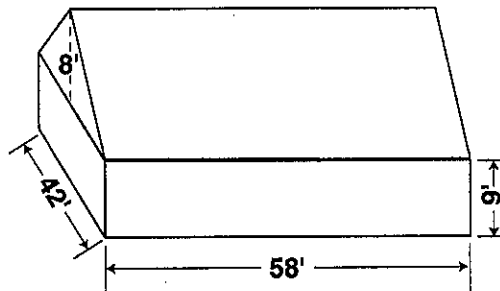
5. Cover a hip roof that measures $32' \times 48'$ and has $18'$ common rafters with $\frac{3}{4}'' \times 4' \times 8'$ CDX.



Plan view

(actual sq. ft.)	(sq. ft. with waste added)	(no. of sheets)	(cost)
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6. Cover the 4 exterior walls and the gable ends of the house pictured below with $\frac{1}{2}'' \times 4' \times 8'$ OSB.



(actual sq. ft.)	(sq. ft. with waste added)	(no. of sheets)	(cost)
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