

## Lesson 9: Determining Spacing

### SPECIFIC OBJECTIVES

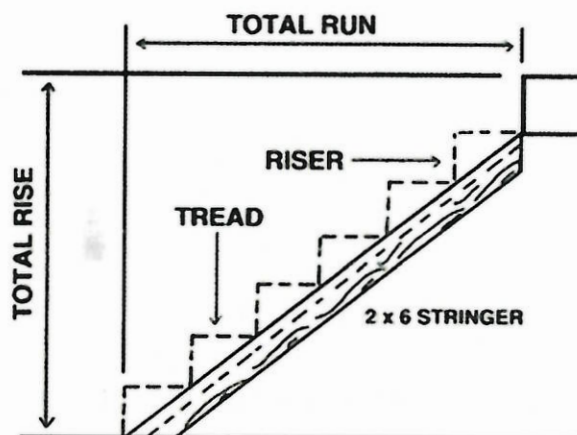
By the end of this lesson, you should understand that

- Spacing of things can be adjusted mathematically to create even spacing
- This is used in many different situations

By the end of this lesson, you should be able to

- Calculate and layout things with even spacing
- Use Construction Master to do this, using memory button

### PROBLEM SITUATION 1: Stairs



**Total rise:** With respect to stairs, this is the vertical distance from the lower finished floor to the upper finished floor.

**Riser:** The vertical part of each step in a flight of stairs.

1. Do the following problem (this is from your Lesson 3 Practice Set):  
The landing of a stairway is 59" inches high, and each rise is  $7\frac{3}{8}$ " high. How many risers does it take to reach the landing?

$$59" \div 7\frac{3}{8}" = 8 \text{ risers}$$

2. You are designing a stairway for a private home. Wisconsin Code requires a riser NO GREATER THAN 8" for each riser in a stair in a private home. If the home has a total rise for the stairway of 93"...

- a. How many risers will you need? Write down your answer and the math you did to find it.

$$93" \div 8" = 11.625 \text{ risers} \rightarrow \text{round up to 12}$$

Another method... guess # of risers

$$93" \div 11 = 8 \frac{7}{10}" \leftarrow \text{too big}$$

# of risers  $93" \div 12 = 7 \frac{3}{4}" \leftarrow \text{good since it's less than } 8"$

- b. Discuss with your group a strategy you can use to make sure each riser is the same height. Write down the strategy below.

Another method... guess the height

$$93" \div 7 \frac{3}{4}" = 12 \text{ risers}$$

- c. What is the height of each riser?

Possible Process:

1. Divide Total rise by code max
2. Round answer up to a whole # of risers
3. Divide Total rise by the whole # of risers = height of each riser

## PROBLEM SITUATION 2: Siding

Siding: The exterior covering of a house. It is often made of horizontal pieces of wood (clapboards) that are partially overlapped.

Reveal: How much of a piece of siding is left visible. This is also called exposure.

Course: A horizontal row of a building material that has been applied to the house.



In this problem situation you will be working to determine the spacing you need to install siding on a house. When doing a job like this, it is important to keep in mind:

- The siding must overlap a minimum of 1"
- A professional siding installation needs to have all of the courses (exposure) of siding be the same width.

You have siding that is  $5\frac{3}{4}$ " wide. It is necessary to side a section of a house that is  $40\frac{1}{2}$ " high. You need to determine what the 'reveal' (exposed amount) of the siding will be for each course to ensure that they are all the same width.

3. Discuss with your group a strategy you would use for this problem situation. Keep in mind that it is similar to the stairs problem. Write down the strategy below.

$$5\frac{3}{4}" - 1" = 4\frac{3}{4}" \text{ max reveal}$$

$$40\frac{1}{2}" \div 4\frac{3}{4}" = 8.5 \text{ courses} \in \text{can't have partial courses}$$

4. Now calculate (be sure to show your calculations along with your answers):
  - a. The number of siding courses you need

9 courses

- b. The 'reveal' for each course

$$40\frac{1}{2}" \div 9 = 4\frac{1}{2}" \text{ reveal}$$

- c. The 'overlap' for each course

$$5\frac{3}{4}" - 4\frac{1}{2}" = 1\frac{1}{4}" \text{ overlap} \checkmark$$

5. Now verify you are correct by using a marker on the 40 1/2" board to draw out your siding courses. Show your completed board to the instructor before moving on to Question 6.

Additional Practice - work on determining the spacing for two different siding scenarios

6. You measured the distance from the soffit to the bottom of the house to be 12' 8 1/2". Your siding is 5 3/4" wide.
- a. How many courses will you need of the siding? Be sure to show your calculations along with your answer.

$$\frac{12' 8\frac{1}{2}''}{(5\frac{3}{4}'' - 1'')} = 32.11 \rightarrow \text{Round up to } 33$$

4 3/4" max reveal

- b. What is the exposure amount for each course?

$$12' 8\frac{1}{2}'' \div 33 \text{ courses} = 4\frac{5}{8}'' \text{ exposure}$$

- c. What is the overlap for each course?

$$5\frac{3}{4}'' - 4\frac{5}{8}'' = 1\frac{1}{8}''$$

7. You measured the distance from the soffit to the bottom of the house to be 11' 1". Your siding is 7 1/2" wide. How many courses will you need of the siding?

$$\rightarrow - 1'' = 6\frac{1}{2}'' \text{ max exposure}$$

- a. How many courses will you need of the siding? Be sure to show your calculations along with your answer.

$$11' 1'' \div 6\frac{1}{2}'' = 20.46 \text{ courses}$$

Round to 21 courses

- b. What is the exposure amount for each course?

$$11' 1'' \div 21 \text{ courses} = 6\frac{5}{16}''$$

- c. What is the overlap for each course?

$$7\frac{1}{2}'' - 6\frac{5}{16}'' = 1\frac{3}{16}''$$

### **PRACTICE for Lesson 9, Problem Situations 1 and 2**

Note: When building stairs, the Wisconsin building code requires that all risers be  $\leq 8"$  and that all risers be the same.

1. For a flight of stairs with a total rise of 96"
  - a. What is the height of each riser? Show your work.
  - b. How many risers will the stairs have? Show your work.
2. For a flight of stairs with a total rise of 101"
  - a. What is the height of each riser? Show your work.
  - b. How many risers will the stairs have? Show your work.

Note: When installing wood siding on a house, it is important that each piece overlap the piece below it by at least 1" but no more than 2" as shown in the drawing below. Best practice is to install the siding so that each course of siding has the same reveal.

3. The height from the bottom to the top of a wall is 120". You will be installing wood siding that is 8" wide. If each piece of siding must overlap the previous piece by no less 1" and no more than 2"
  - a. What is the reveal of each course of siding? Show your work.
  - b. How many courses of siding will there be on the finished wall? Show your work.
4. The height from the bottom to the top of a wall is 120". You will be installing wood siding that is  $6\frac{3}{4}"$  wide. If each piece of siding must overlap the previous piece by no less 1" and no more than  $1\frac{3}{4}"$ 
  - a. What is the reveal of each course of siding? Show your work.
  - b. How many courses of siding will there be on the finished wall? Show your work.

