

## **MODULE 5 - LINEAR MEASUREMENTS**

### **Slide 1 WELCOME**

Welcome to the Florida Department of Transportation's computer-based training series on Final Estimates, Level 1 Training. This is Module 5, Linear Measurements. This CBT contains audio and interactive elements. An alternate version is available on the resources page. To begin, select the start button or press Shift+N on your keyboard.

### **Slide 2 INTRODUCTION**

Many pay items are measured based on linear measurements - items such as guardrail, pipe culvert, curb and gutter, fencing, striping, etc. These measurements are usually not as complex as area or volume measurements, but there are some things you should know about properly performing and recording linear measurements.

### **Slide 3 UNITS OF MEASUREMENT**

Most linear measurement pay items are measured in linear feet. Fortunately, most field surveys (both vertical and horizontal) are in the same measurement units. When there is need to convert units, the following relationships should be noted:

- 1 foot = 12 inches
- 1 station = 100 feet
- 1 mile = 5,280 feet

### **Slide 4 METHODS FOR COMPUTING LENGTHS**

There are several methods for making linear measurements.

1. Stationing - When the pay item is constructed parallel to the base survey line, such as curb and gutter and the beginning and end of the construction is identified with right angle ties to the stationing of the survey line, the difference in stationing is an acceptable basis for linear measurement.
2. Taping or Chaining - Some items which cannot be measured by stationing may be measured directly by tape or chain.
3. Level Notes - Elevation measurements made with a survey level are a convenient way of measuring the lengths of piling in place.

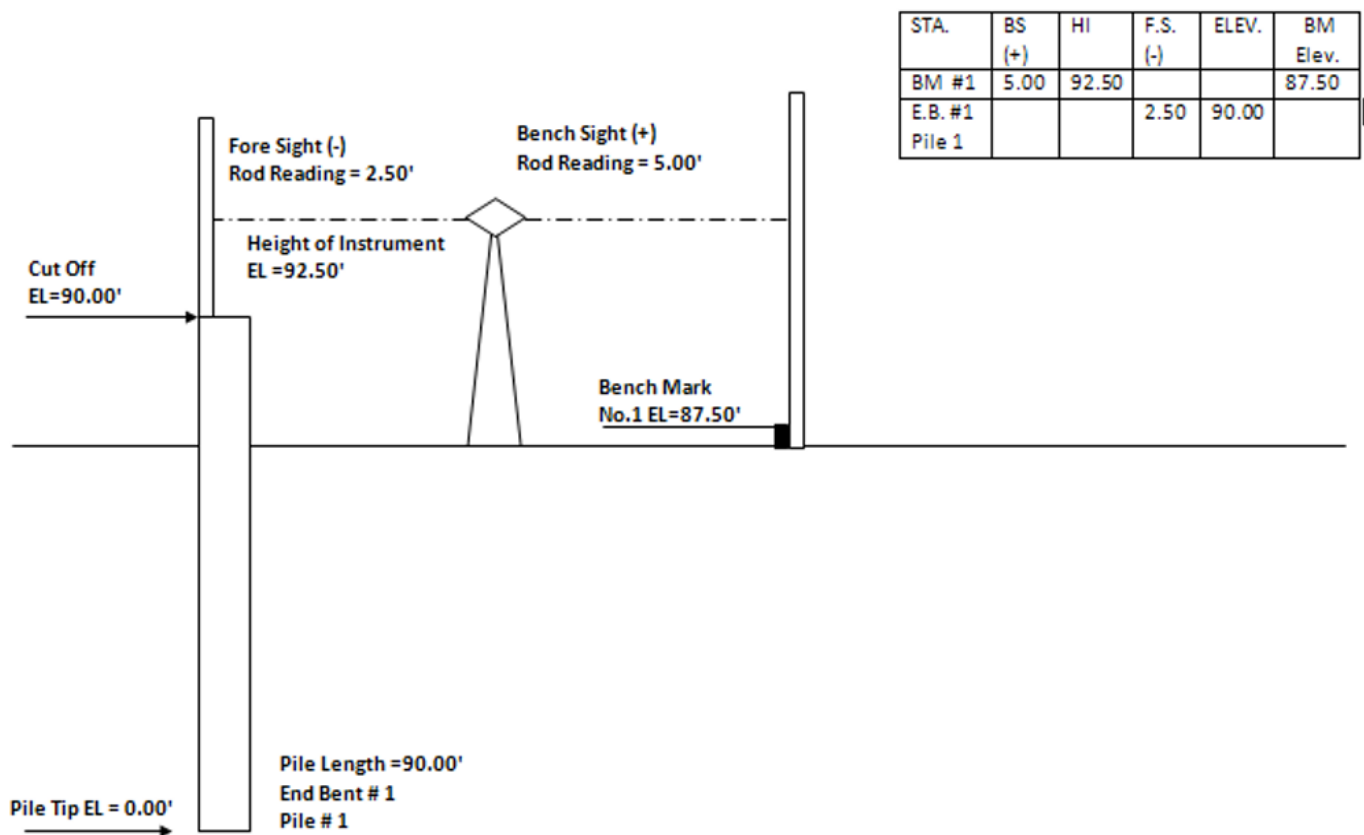
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Each of these methods has advantages for particular situations. In fact, some measurements may involve a combination of methods.

For example, fencing is a plan quantity pay item paid by linear feet. However, sometimes changes are authorized or errors in the plans are discovered and new measurements are required. Seldom are these changes measured by stationing alone, unless they are parallel to the centerline. Usually there are irregular breaks in fencing, which require field measurements by a tape or chain as well.

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Another example of a linear measurement is piling. Structural Piling is paid on a linear foot basis. Most piling measurements are done using a survey level. Here is an example of how level notes are used for determining lengths.



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To determine the length of piling to be paid, the top of the pile must be surveyed to obtain the elevation. In this case, the survey level will be set so both the benchmark and pile cut off elevation can be seen. Based on the rod readings, the height of instrument can be calculated and used to determine the cut off elevation. This elevation will quantify the amount of piling to be paid.

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Now let's test your knowledge.

- 1) Fencing can always be measured by stationing.
  - A. True
  - B. False**

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- 2) Most linear measurement pay items are measured in:
  - A. Linear Yards.
  - B. Cubic Yards.
  - C. Linear Feet.**
  - D. Linear Inches.
  - E. None of the above.

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- 3) The methods for making linear measurements are:
  - A. Stationing, Chaining, and Cubic Yard Measurements
  - B. Stationing, Chaining, and Square Yard Measurements
  - C. Stationing, Chaining, and Level Notes**
  - D. All of the above
  - E. None of the above

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- 4) If you have pile cut off elevation at 50.00 ft and a tip elevation (bottom of the piling elevation) of 10.00 ft, which of the following would be your pile length?
  - A. 10 ft.
  - B. 60 ft.
  - C. 40 ft.**
  - D. 50 ft.
  - E. None of the above

## Slide 12 CONCLUSION

This is the end of Module 5. Thank you for your time and attention.