

Chapter 6 Distance Measuring Lecture Notes

6-1 Introduction

Distance measuring is generally regarded as the most fundamental of all surveying observations. Even though we measure many angles at least one side of every figure must have a length measurement. In distance all measurements are "reduced" to their corresponding horizontal length. Elevations are vertical distances above or below a datum or plane.

6-2 Summary of Methods for Making Linear Measurements

Linear measurements can be obtained from the following methods:

Estimation, Pacing, Odometer, Optical Range finders, Tacheometry (Stadia), Subtense Bars, taping, electronic distance meters, and satellite systems.

The most common measurements made today are pacing, taping EDM's and Satellite systems.

6-3 Pacing

6-4 Odometers

6-5 Optical Range Finders

6-6 Stadia

6-7 Subtense Bar

Distance Measuring By Tape

6-8 Intro to Taping

Using a steel tape we generally measure the distance between two points or layout a known distance. The six steps for taping are:

Lining up, applying correct tension, plumbing, marking tape lengths, reading the tape, and recording the distances.

6-9 Taping Equipment and Accessories

See inventory lab!

6-10 Care of Taping Equipment

See 6 pertinent points listed on page 130

6-11 Taping on Level Ground

Use the six steps for taping from 6-8

6-12 Horizontal Measurements on Sloping Ground

Since all measurements must be "reduced" to its horizontal distance, using plumb bobs to "break" tape is used. Break the sloped distance into smaller horizontal lengths and add them up.

You may also make a slope distance and reduce the measurements by knowing the slope angle, grade or difference in elevation between the two points measured. Apply the correct Trigonometric equation to get the indirect measurement.

6-13 Slope Measurements

See right triangle trig equations sheet.

6-14 Sources of Error in Taping

Three fundamental sources of error in taping: Instrumental, Natural, and Personal. Some may be corrected some may not.

Taping Corrections: Corrections for Length, temperature, tension, sag can be corrected by using the equations on your handout in the lab syllaus.

6-15 Tape Problems

You are either making a measurement to determine the distance between points or laying off a known distance. Corrections are as follows"

$$\text{Corrected Measured distance} = \text{Meas.} + C_l + C_t + C_p + C_s$$

$$\text{Corrected Layout Distance} = \text{Know Distance} - C_l - C_t - C_p - C_s$$

6-17 thru 6-24 Electronic Distance Measurement
We will come back to EDM measurements later in the semester

Review for our first exam next class meeting...Chapters 1, 2, 3, and 6.