Individual Tree Measurements

FIELD EXERCISE 2 – Due We 3 Feb 2016

OBJECTIVES

1. To learn how to measure individual trees for DBH (diameter at breast height), total height, height to crown base, crown width, and
2. To introduce the use of the Spiegel Relaskop for upper-stem diameter measurement.

FIELD WORK

Equipment: clinometer, Relaskop, 100-ft cloth tape, D-tape, field notebook, pencil, rain gear, and sturdy boots or shoes, preferably weatherproof.

Procedure:

1. Set up field book with columns for: Tree number, Dbh (nearest 0.1 inch), Crown Width (2 measurements), RUs at top of 1st 32-ft log, Total tree height (nearest foot), Height to Crown Base, and etc. For total tree height and Height to Crown Base you will need to record the following information:
   - distance to tree, Dist. (nearest 0.1 foot)
   - angle to tree base, B (nearest 1%)
   - angle to tree top, T (nearest 1%)
   - angle to crown base, C (nearest 1%)
   - add-on, if necessary (i.e., when base is not clearly visible, nearest 0.1 foot)

   Also provide space for three merchantable height estimates, and any defects. Your field notebook page might look like the following:

Tree (spp)	DBH (in.)	CW1 (ft)	CW2 (ft)	RUs @ 33'	Dist. (ft)	B (%)	T (%)	C (%)	Add-On (ft)	HM.5D (%)	h_6 (ft)	HM6" (%)	Defects

2. Measure DBH on a sample of three or more (3+) large conifer trees (DBH > 9.9") using the D-tape. Measure the trees also for crown width (2 directions).
3. Measure 'form' (for Girard's form quotient) on each tree by taking a relaskop reading (RUs@33') at the top of the first 32-ft log (33.3 ft above ground). This can be done by standing 33.3 ft away (assumes 1-ft stump, 0.3 ft trim), making sure that T% - B% = 100%. First, observe B%, then solve for T% as B%+100%, then read RUs at T%.
4. Measure the trees for total height and height to live crown base (crown point). Also, determine the point (height) on the tree stem that is 50% of DBH. Do this by first observing RUs at BH. Take ½ this value and scan up the tree until stem width is this # RUs. Record the angle to that point (H_m .5D) to the nearest 1%.
5. Ocularly estimate (just "eyeball it!") the height to an ocularly estimated six-inch top diameter, h_6, and record your estimate (in ft). Then, determine the number of relaskop units equaling six inches given your distance from your vantage point by solving for $RU = \frac{d_m}{0.0050505 \bullet L}$ and *measure* the actual height (in %) to the six-inch top (HM6").
6. Note the location (height to nearest 1/4 log, ie., 8 ft) and extent (affected length of log) of any defects for the purposes of finding sound volume. Defects include forked boles, crooks, severe sweep, ramicorn branches (so-called spike knots or steep-angled branches). Decay may be present in fire scars and other wounds and around conks.

OFFICE WORK
Written reports (one per crew) should include the following:

1. A description of the project area, weather conditions at time of data collection.
2. Calculated diameters at the top of the first 32-foot log for each tree from the Relaskop measurements.
3. Calculated heights to the point on the stem where diameter is 50% of DBH.
4. *Estimated* and *calculated* heights to 6-inch top and number of 32-ft logs this represents (to nearest ½ log).
5. Computed *total* under bark stem volume including top and stump (CVTS) for each tree using a suitable *standard* volume equation, computed *total* merchantable under bark stem volume to a 6-in. top (CV6), and Scribner volume to a 6-in. top in 32-ft logs (SV632) using the tarif system.
6. Use the truncated Behre hyperbola to estimate upper stem diameters on the small end of the logs in the tree between the 1st 32-ft log and a 6-in. top and "scale" all the logs using the Scribner log rule (BF6).
7. Computed *sound* (excluding defects) under bark merchantable (6-in. top) board-foot volume (sound-BF6) for each tree. For this, use the appropriate double-bark thickness ratio (cf. §4.1 of class notes and/or Bell & Dilworth).
8. Computed individual tree descriptive sample statistics (mean, min, max, range, standard deviation) for:
    a. DBH (in.)
    b. Total height (ft.)
    c. Live Crown Ratio (LCR) = (total height - height to crown base) / total height
    d. Average Crown Width
    e. H/DBH ratio (should be unitless, i.e., ft. over ft.)
    f. Board-foot : Cubic-foot (BF:CF) ratios for *total* BF6 and CV6.
9. Comment on:
    a. The agreement (or disagreement) between SV632 and BF6.
    b. The magnitude of the BF:CF ratios you computed (unexpectedly large / small?).
    c. One thing that may have "surprised" you to learn.

Written reports for this exercise should include Intro / Summary, brief narrative of Data Collection methods, Conclusion(s), and Appendix to include copy of relevant field notebook pages, and a worked example for each *type* of calculation performed.