FORMAK Height Estimation Guideline

A number of assessments in FORMAK require the estimation of tree height or height of the forest canopy. Some approaches to estimating tree height are set out below.

Check how well you can estimate height before you start assessing a site - to "get your eye in". A good way to do this is to measure the height of a canopy tree and the height of something in the top of the canopy using a simple home made clinometer (see image below). Choose trees that can easily be measured with a clinometer – e.g. on flat ground with a relatively open understorey and clear view of the top of the tree.

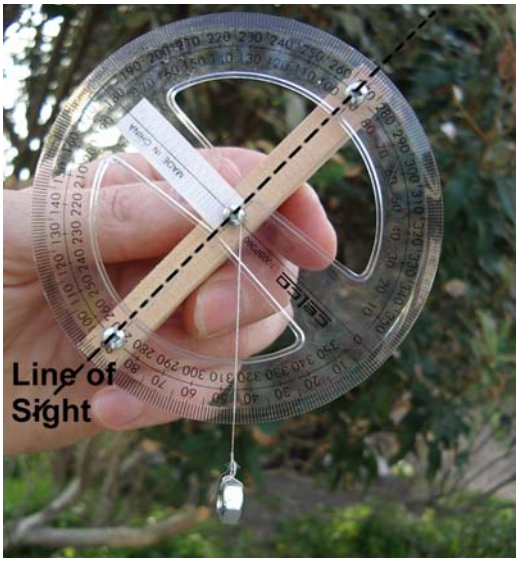
Once you know the height, try out the visual halving method and using the height pole for reference to help you do quick estimates of tree height of the same points. Practice these until you can get them close to the measure you got with the clinometer.

Using a home made clinometer.

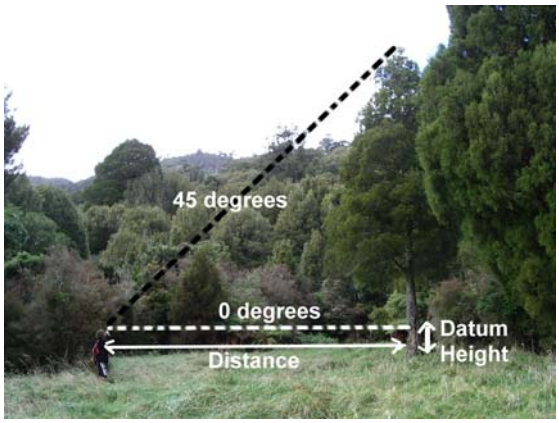
The clinometer will generally be used to check occasional heights – to make sure your height estimation is reasonably accurate. It is not intended to be used to measure all heights as this would be too time consuming. The clinometer is also used for measuring slope.

Using the clinometer to measure angles

1. Identify the point, e.g. top of a tree, you wish to get an angle to.
2. Hold the clinometer by the wooden bar so that the bar is level and the zero is below the bar.
3. Hold the clinometer up to your eye and tilt the wooden bar so that you can sight along the screws to your chosen point.
4. Keeping the tilt the same, tip the instrument so that the string is firmly resting on the scale.
5. You can now look at where the string is sitting on the scale (be careful not to tilt the clinometer in a way that will move the string) – this is the angle you have measured.



Measuring heights with a clinometer



1. Move to a point where
   - When you sight the top of the tree it is at a 45degree angle.
   - When you sight the bottom of the tree it is at 0 degrees (level). If you can't see the bottom of the tree, get an assistant to hold their hand against the trunk at a point where you can sight at 0 degrees. This is the "datum height".

   You are likely to have to move a number of times until you find a suitable point.

2. Measure the distance from the base of the tree to where you are standing using the tape measure. When measuring tall trees this length will be longer than the full length of the 20m tape measure. In these cases measure the full length of the tape, mark this point, then measure the remaining distance to get the total distance.

3. If you sighted on the tree stem above ground level (i.e your datum height was above ground level), measure this height from the ground using the height pole, and add it to the distance you are from the tree.

4. This total length is the height of the tree

Measuring slopes with the clinometer

1. Identify an object up or down slope where you can sight something the same height as your eye (e.g. a branch on a tree trunk).

2. Sight on that point

3. Measure the angle to that point using the clinometer (see measuring angles).

4. This is the slope.

Visual Halving

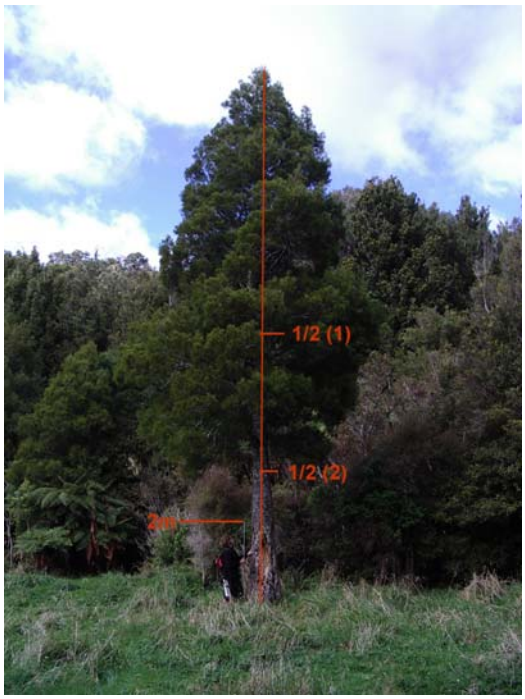
1. Stand back from the object you are estimating the height of, so you can see the base and top.

2. Identify the point halfway between the base and top.

3. Then identify the point halfway between this point and the base.

4. Once you have mentally fixed this point, estimate how far it is from the base. It is handy to refer to the 2m plot pole when doing this.

5. Multiply this by four (double it and then double it again) to get the total height.



Using the Height Pole

The height pole is very useful to help you with estimating heights.

1. Place the height pole upright beside the object you are estimating the height of.

2. Use the pole as a reference to visually estimate the number of two metre poles you could fit into the height from the base to the top.

3. Count this height in metres as you estimate it i.e “2, 4, 6, 8…”