Timber Stack Measurement

It is important to estimate timber volumes accurately either in the forest or when leaving. A number of methods can be used:

- Crop inventory carried out by a qualified professional in the forest prior to felling
- It can be calculated by modern thinning machines as harvesting takes place
- The timber can be measured in the stacks at roadside (see method described below)
- Weighing of the timber as it passes though the mill gate

Timber Stack Measurement

Advantages

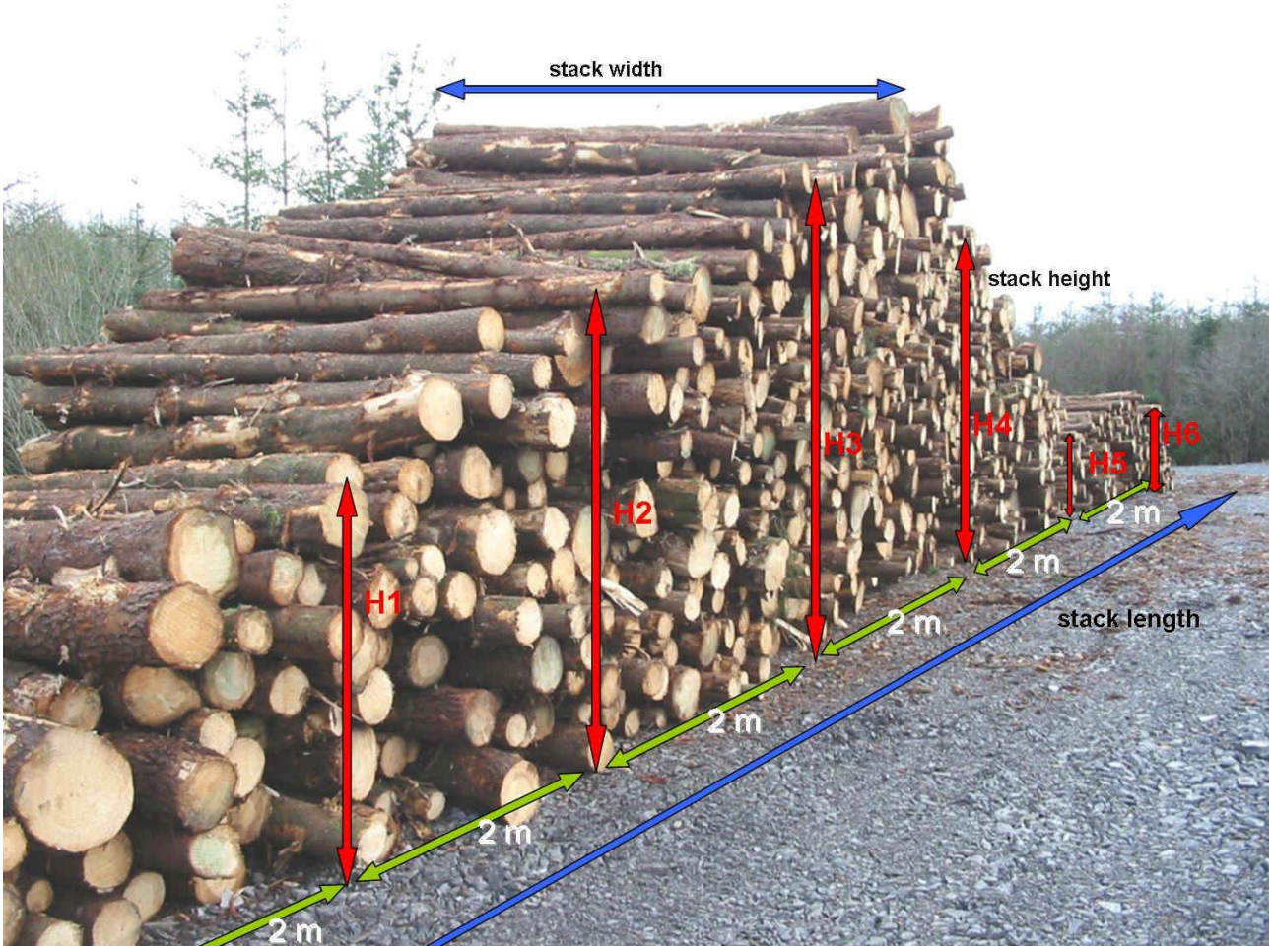
It is useful to estimate timber that is stacked at roadside:

- It can be done quickly by the forest owner
- It is useful to know how much timber is leaving the forest
- It is useful to calculate the volume of different individual stacks, which is important if different timber products are being sold separately from the one harvesting operation

Disadvantages

All logs in a stack must be of uniform length and the stack should be built neatly and tidy for easy measurement and accuracy. Large stacking space is required to ensure that all harvested material can be stacked at roadside before any removal is carried out by timber trucks.

*Length * Width * Height* = **Volume** (unit = m^3)



Some definitions

- ***Stack width***
  The width is the specified length of the timber product in the stack. A number of sample lengths (billets) should be checked to verify the stack width.
- ***Stack length***
  Stack length is the average length of the front and back face of the stack. The stack should be measured from the centre point of the outermost billets at one end of the stack to the centre of the outermost billets at the other end.
- ***Stack height***
  Stack height is the perpendicular height from the bottom of the stack to the centre of the highest billet at the top of the stack. Average stack height is the average value of a series of height measurements taken along the length of the stack. A minimum of 3-4 measurements should be taken at regular intervals along both faces of the stack or at every two metres.

Measuring Timber Stacks

Equipment required

Measurement tape (30m), measuring stick, fixed area grid (quadrant), record sheets, stationary, scientific calculator.

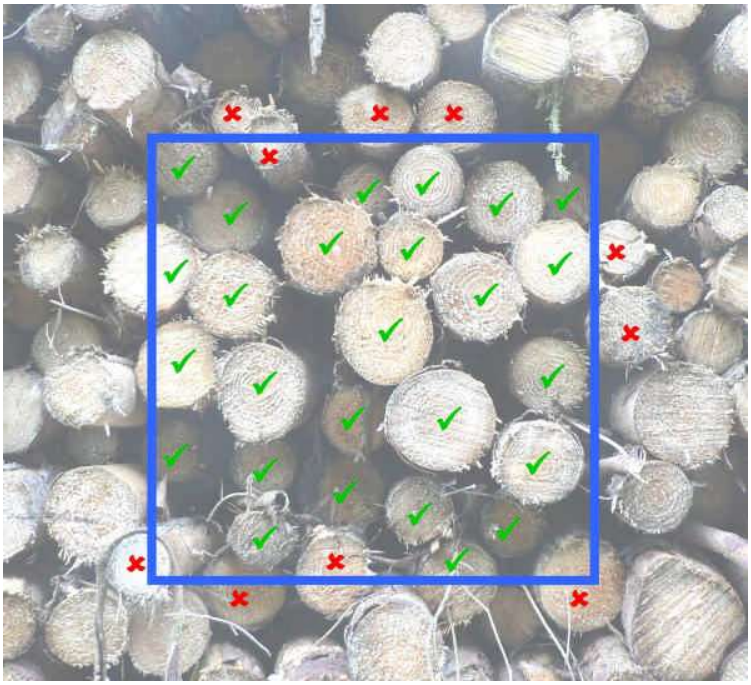
1. **Get Gross Volume of the Stack**

*stack width * stack length * average stack height* = **gross stack volume** (m^3)
However, keep in mind that this volume estimate also includes open spaces between the logs. We therefore need to use a conversion factor to convert gross volume (timber volume plus open spaces) to net volume (volume of timber only).

2. **Calculate the Conversion Factor**

There are two options:

1. Can be calculated using an area grid (quadrant).
2. Use the industry standard conversion factor.



Option 1 – using a quadrant:
A known area grid (usually 0.7m * 0.7m = $0.49m^2$) is placed on a face of a stack (represented in blue here). Using a DBH tape, measure and record the diameter of all billets that are in the grid. For those only half in, count only every 2^{nd} one.
At least five samples should be taken across the face of the stack at regular intervals.
Divide the total surface area of this known sample grid by the surface area of the billets in the sample. To do so, we use the following formula:

*(Sum of ((Diameter)^2 * 0.00007854 * no of billets in each diameter class)) / no. of samples taken / surface area of the quadrant* = **Conversion Factor**.

Option 2 – use the standard conversion factor:
0.7 is the most commonly used conversion factor in the forest industry.

3. **Apply Conversion Factor to Gross Volume => Net Stack Volume**

*gross stack volume * conversion factor* = **Net Stack Volume** (m^3)

For contact details and further information: see www.teagasc.ie/forestry