

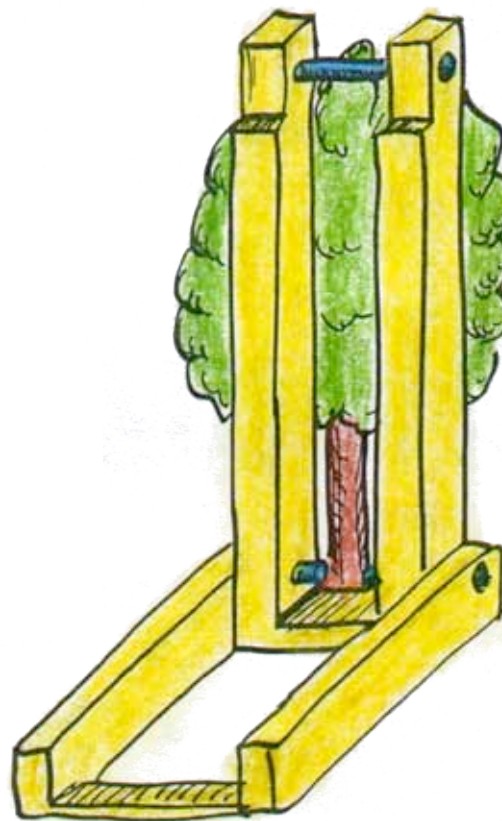
HEIGHT MEASUREMENT TOOL



Pauli the bear explains the

Measurement Tool

for measuring tree height and slenderness



Measurement Tool
made in Germany

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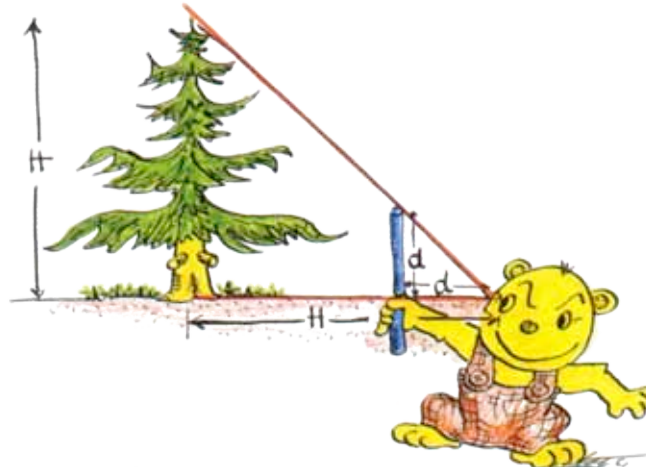
SHORT INTRODUCTION

If the trees become more and more top heavy, then they will fail, sometimes even when very little wind – rain load is involved. Field studies on several continents showed that solitary trees without light competitors have a favourite H/D ratio, which lies between $H/D = 20-35$. The failure rate increases if the H/D ratio becomes larger than $H/D = 50$ approximately. First, the trees are bend by the wind and then pulled down by the weight.

ATTENTION: The height of the tree alone is not the problem, however the height/ diameter ratio, which is the slenderness of the tree.

For Example: Very old and high Sequoia trees have a very good height/diameter ratio of approximately $H/D = 30$, because the base is very thick!

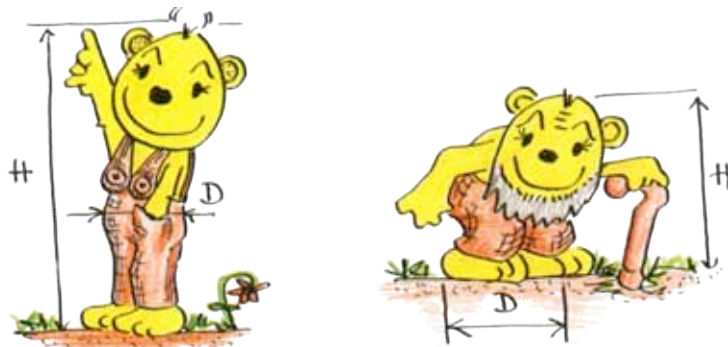
PAULI SHOWS HOW THE HEIGHT HAS BEEN MEASURED IN THE PAST WITH A STICK:



THE MITCHELL- FORMULA

In Central Europe, the diameter of a trunk is proportional to the age of a tree, which is based on the Mitchell- Formula (Age of tree = Circumference of trunk in cm/2.5). This formula is based on an average annual ring width of approximately 4 mm. One recognizes clearly that the oldest trees with the largest diameter have the smallest H/D ratio.

For Example: A young PAULI is larger and slimmer than an old PAULI!



APPLICATION I: HEIGHT MEASUREMENT

The horizontal part of the tool will be carefully set on the bone just below your eye. The vertical part has to be parallel to the trunk to be measured, even if that is leaning (Fig. 1). If you see the tree fitting in between the upper and the lower metal rods, the distance from you to the tree base is equal to the height of the tree (Fig. 2).

Fig.1
Principle of the height measurement

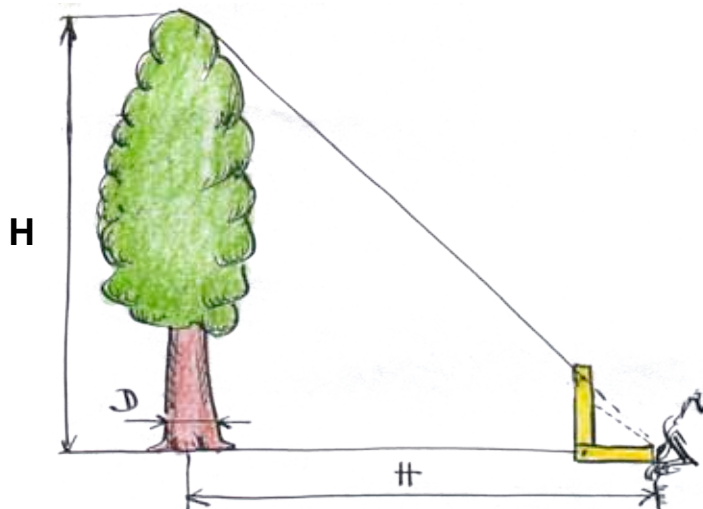
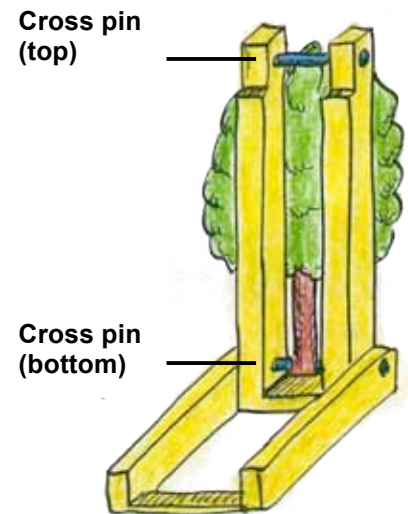


Fig. 2



APPLICATION II: ($H/D = 50$ -CHECK)

If you see the tree fitting in between the upper and lower metal rods you can check now how well the trunk (above the buttresses) fits between the ends of the two lower metal rods (Fig. 3). If the trunk does not fit in between the pins, its H/D ratio is smaller than 50. If it just fits it is equal 50 and if the trunk fits very well between the pins, than H/D ratio is larger than 50 (Fig. 4).

Fig. 3

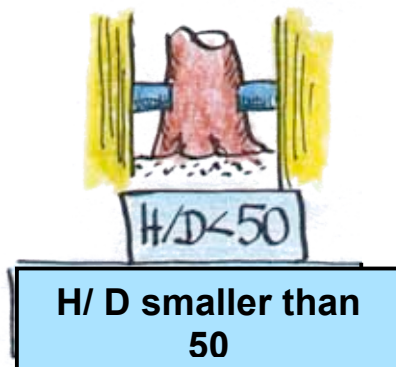
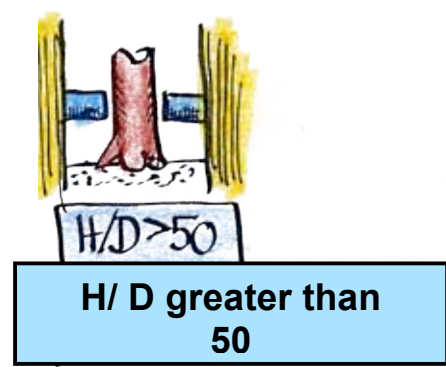


Fig. 4

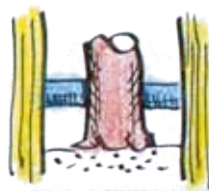


APPLICATION III: (H/D- MEASUREMENT)

Here you go closer to the tree with the tool until you see the base of the trunk (above the root buttresses) just fitting in between the two ends of the lower pins (Fig. 5). Now you can read the approximate H/ D ratio at that mark on the vertical part of the tool, which is level with the tree top (Fig. 6).

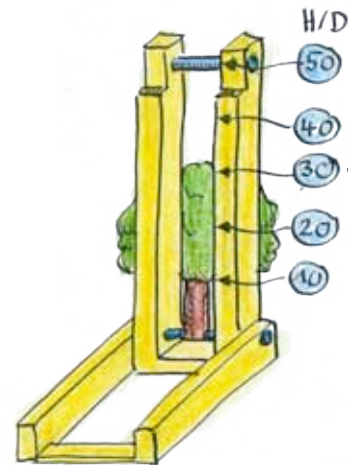
Example: $H/D = 30$

Fig. 5



Trunk fits accurately between the pins

Fig. 6

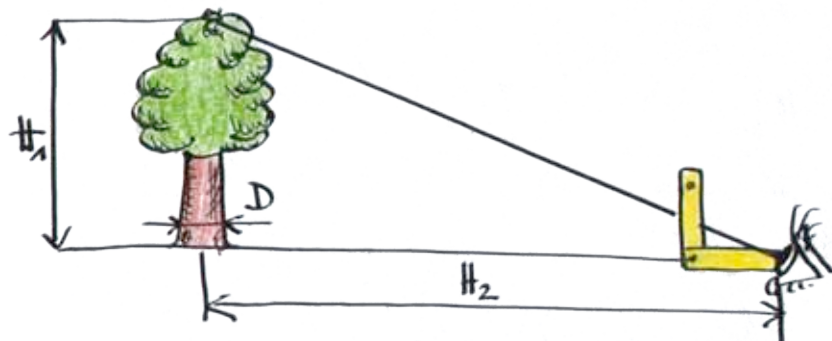


Example:
 $H/D = 30$

ATTENTION: If you use the tool this way, the trees height is not equal to the distance from your eye to the tree base anymore! (Fig. 7)

Not equal: $H_1 \neq H_2$

Fig. 7



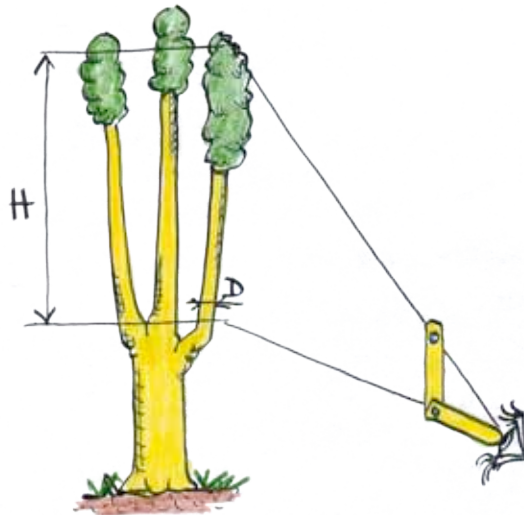
$H_1 \neq H_2$

= NO EQUALITY!

MEASURING SLENDERNESS OF VERTICAL BRANCHES

In addition, vertical branches can be assessed using this method.
Please note: The measured part of the tree has to be parallel to the upright part of the Measurement Tool (Fig. 8).

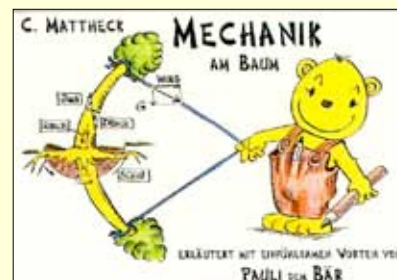
Fig. 8



Not all parts of the drawings are in the same scale! -



More about the biomechanics of trees you will find in the book with funny drawings:



“TREE MECHANICS“
explained with sensitive words by
PAULI the Bear.
CLAUS MATTHECK

The book is available by IML.

Licensers:

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