




Inherent Wood Properties

Moisture  Deformation

A Wooden Bermuda Triangle?

Johannes Welling



Caribbean Bermuda Triangle





Bermuda Triangle

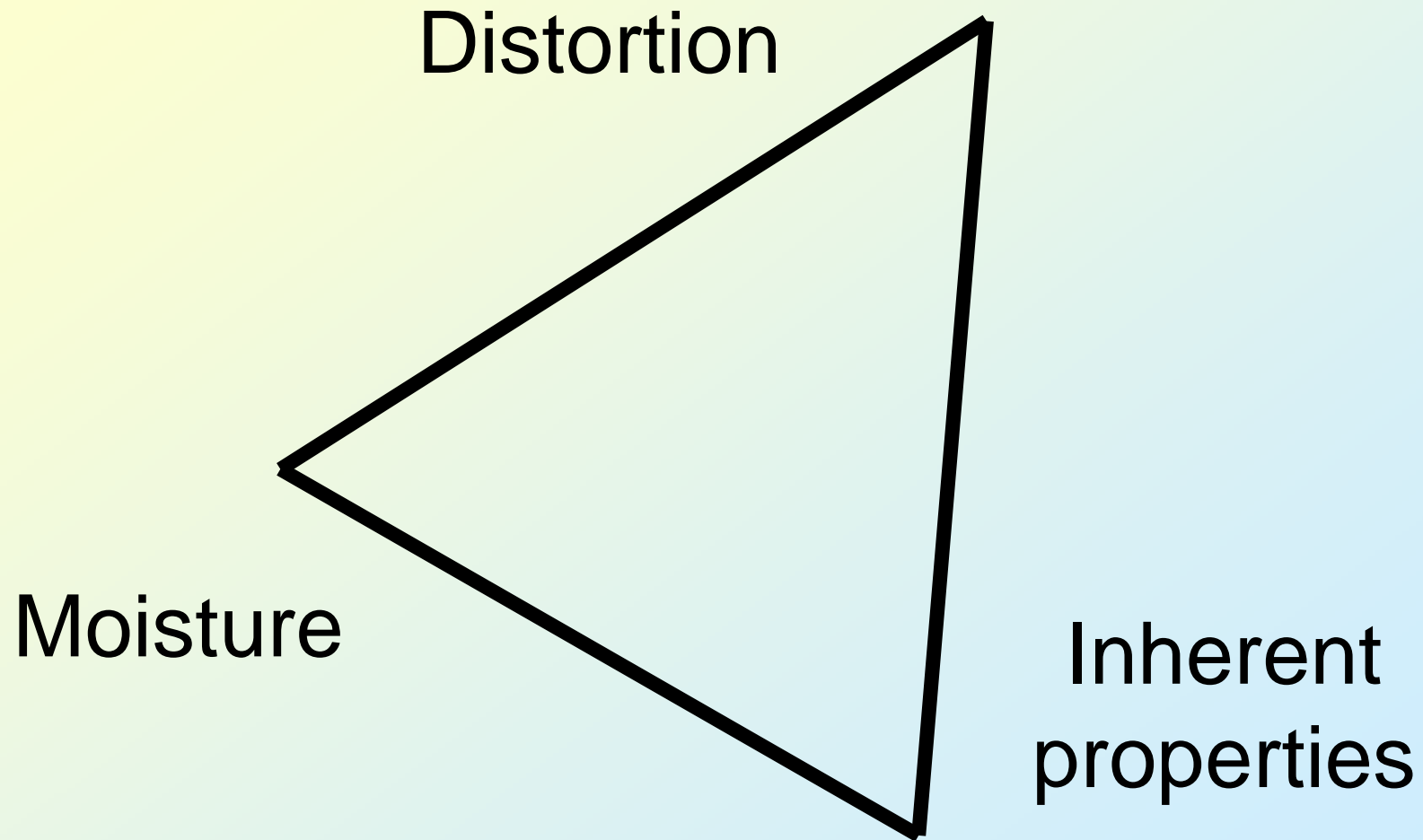


In the Bermuda Triangle a number of aircraft and surface vessels are alleged to have disappeared in mysterious circumstances which fall beyond the boundaries of human error, pirates, equipment failure, or natural disasters.

Reference: Wikipedia



Wooden Bermuda Triangle





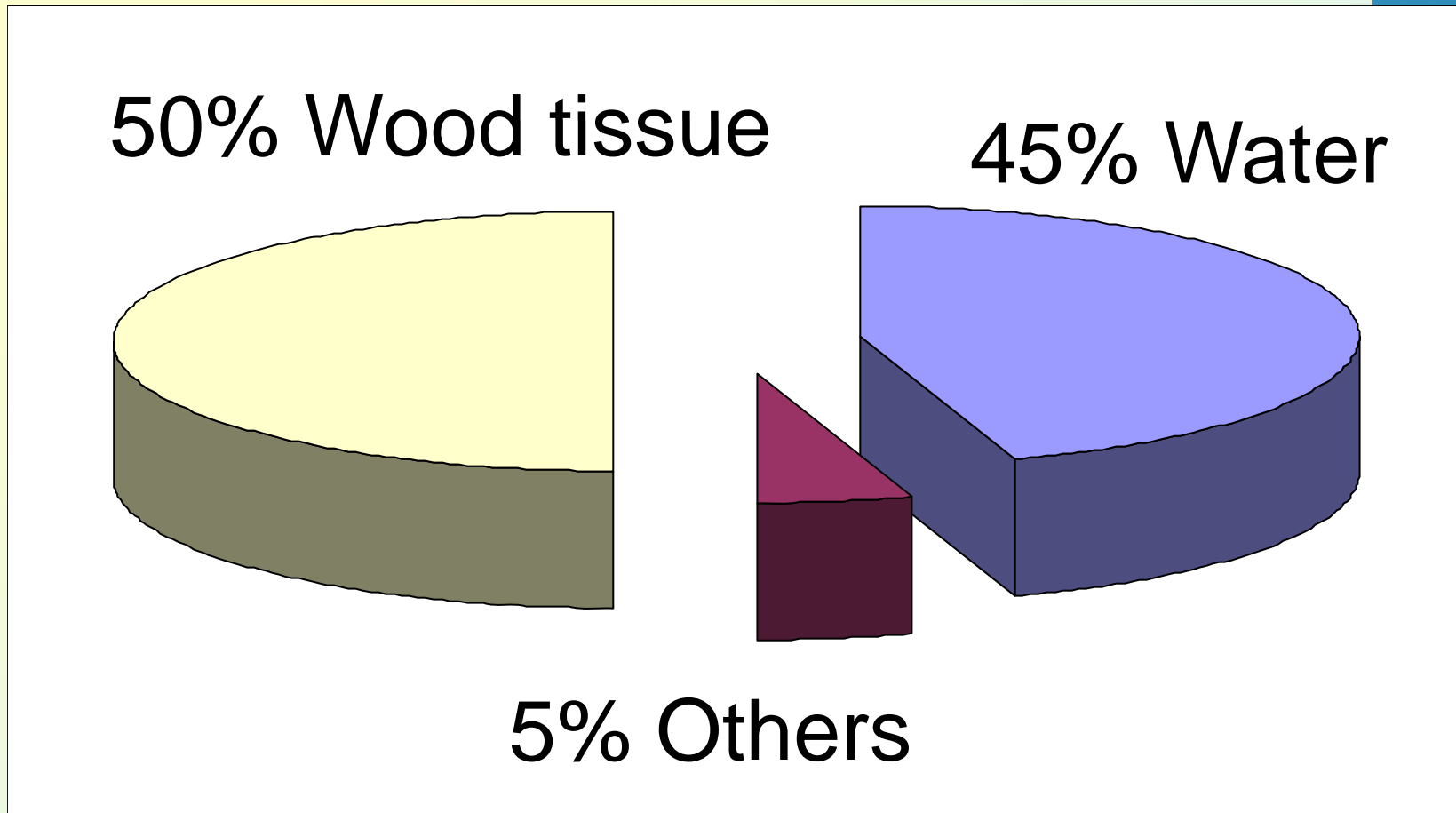
Wooden Bermuda Triangle



For reasons, which seem to be paranormal, and under suspension of the laws of physics, deformations in wood occur in conjunction with inherent properties while moisture content changes.

Reference: Platitude from sawmillers' fairy tales

What is a tree?



- Transport of water



- Storage of water and nutrients



- Load bearing



- Disposal of metabolic residues





What is wood?

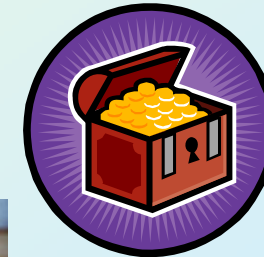
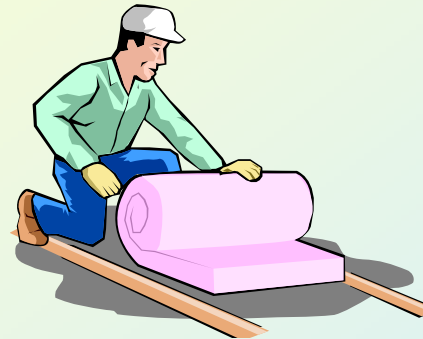
- **A tree builds wood tissue in reaction to its living conditions and ambient environment**
- **In wood, the history of a tree becomes manifested**
 - **Growing conditions** → **ring width**
 - **Site conditions (hillside situation, competition for light/water)** → **compression wood, sudden ring width change**
 - **Reaction to physical injuries** → **resin pockets**
 - **Tree habitus, branches** → **local slop of grain, various types of knots**
 - **Parentage/evolution/genetics** → **grain angle**
 - **Extreme weather conditions** → **ring shake, frost shakes**



What do we expect from wood in use?



- High strength
- Good insulation
- Dimensional stability
- Durability
- Good looking





What else?



We want it straight!

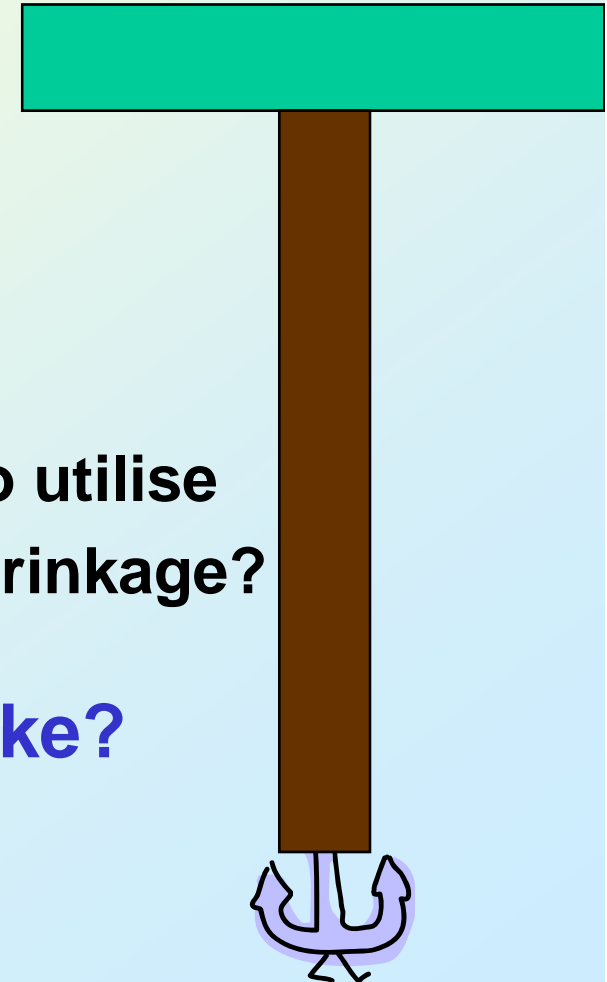


If we could design a tree, how would it look like?



- **Straight fibre, no slope of grain**
- **No branches to avoid the knots**
- **No earlywood/latewood to get homogeneous density**
- **No radial/tangential anisotropy**
- **No roots, because they are difficult to utilise**
- **Low moisture content to minimise shrinkage?**

→ **How would such a tree look like?**





We better accept, what nature offers to us



EDG Seminar in Bled 2009

Johannes Welling



But, if we do so, we have to accept that there are:

- **Knots**
- **Slope of grain**
- **Compression/tension wood**
- **High moisture content**
- **Rings with different width**
- **Earlywood and latewood, tissue with density variation**
- **Resin pockets and all the other defects**

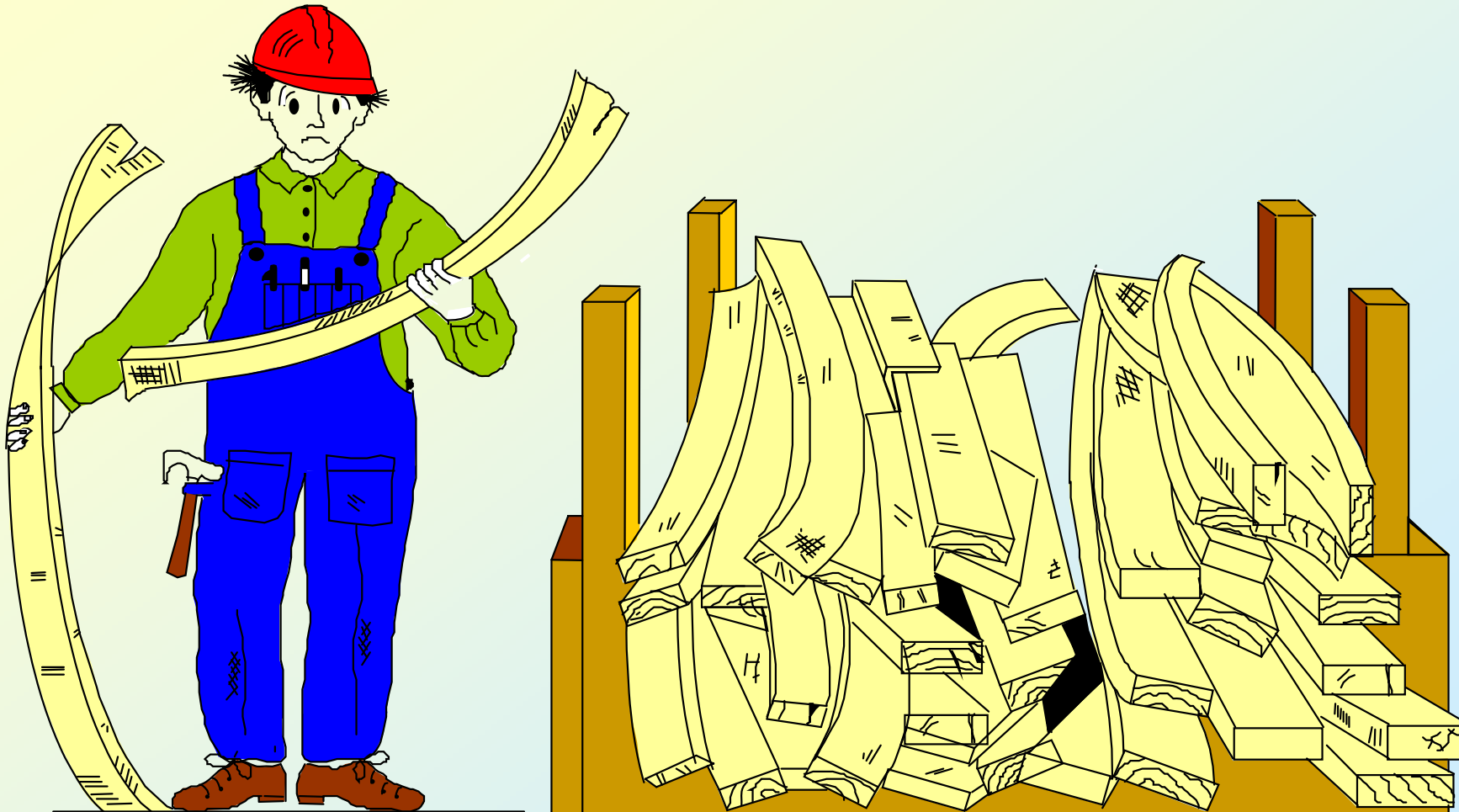


How can we produce good products from non-uniform trees?

- **Inform people about methods on how to**
 - **Inspect inherent properties of trees and sawn timber**
 - **Sort and grade material so that it fits to specific end uses**
 - **Dry and measure moisture content properly to avoid overdrying and unnecessary dimensional change and deformations**
- **Additional measures:**
 - **split wood into small pieces with uniform properties and produce new engineered products with desired properties**





How can we help this poor guy who got lost in the Wooden Bermuda Triangle?





Task list



- **Propose a COST Action dealing with quality issues**
- **Make European experts work together towards improving quality**
- **Open up new info channels to get knowledge and innovation transferred to practitioners** 
- **Organise seminars and workshops**
- **Translate and publish results** 
- **Use the internet to inform scientific community and practitioners**



What about the wooden Bermuda Triangle?



- **There is no mystery behind distortion**
- **For all types of distortion a physical explanation can be given**
- **We should not try to correct nature, because most probably we will fail**
- **We should accept nature's ability to adapt to almost any ambiental condition and try to make the best out of it**
- **We have very powerful means, namely**
 - **Scanning for inherent properties**
 - **Sorting and grading to reduce natural variability**
 - **Measuring MC and high quality drying**



- **We even have created COST E53 and we are on a good way to finish it**
- **So, let's try to get rid of sawmiller's fairy tail, which says, that users of timber have to accept distortion and defects in timber because they are built-in.**
- **We better should proclaim that distortion and defects have not be accepted because the propensity for their development can be detected beforehand**
- **With sorting, grading and proper drying, we do have efficient methods for improving quality of sawn timber**

→ So, let's just do it!