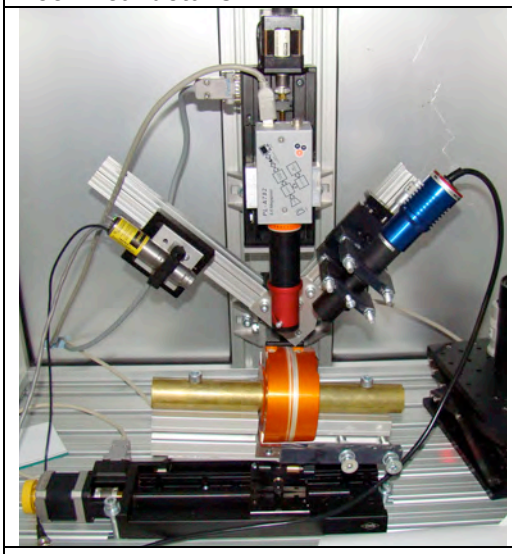
Consiglio Nazionale delle Ricerche

IVALSA
TREES AND TIMBER INSTITUTE

surface smoothness

SWORFISH project

Technical details

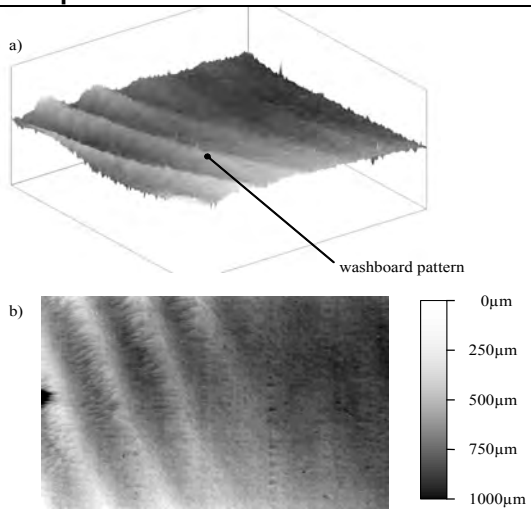


profilometer; 3D roughness scanner
Type: custom
Producer: IVALSA/CNR (Jakub Sandak)
Measurement principle: triangulation
Detector: Pixelink PL-A782, 6Mpixel color, CMOS camera
Lenses: bi-telecentric (Optoengineering)
Source of light:

- Laser (ultrathin line, red)
- Shadow pattern (white LED, 3W, telecentric

Motion control system: four axis
shadow box
customizable

Example of results



The raw result of measurement is a series of light sections scrutinized by the camera on the base of laser/shadow images (optical triangulation). It is possible to reproduce the surface if the sample is moved under the scanner. After proper data post processing it is possible to scrutinize a 3D map of the surface irregularities.

Some surface characteristics that can be evaluated are:

- surface topography
- cutting edge profile
- scratches and/or injection (hardness)
- 3D shape reproduction

Technique description
Measurement of surface topography is traditionally performed be means of the contact stylus. Such method has important limitations (tip pressure, radius of the tip, concave angle and possibility of plastic deformations of surface). The alternative might be optical methods, including triangulation. The device is an experimental platform suitable for testing different source of light, detection optics and image processing algorithms.

Comments
The instrument is a prototype, under continuous development at IVALSA/CNR.

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