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# INFLUENCE OF DIFFERENT MACHINING ON THE SURFACE ROUGHNESS OF BEECH WOOD SAMPLES



# Introduction:

## Wood surface roughness depends:

- Anatomical structure
  - species (coniferous, deciduous)
  - texture (radial, tangent, cross)
- Processing (machining) parameters:
  - cutting depth
  - feed rate
  - blade angle
  - blade radius
  - cutting speed

## Introduction:

Preparing test probes bonding surface in industrial conditions by:

- Planing
- Sanding

The bonding strength of adhesives is influenced by the surface roughness of the joining parts!

## Materials and methods:

### 1. Preparing samples:

Wood species: Common beech (*Fagus sylvatica* L.)

Surface texture: Radial grain

### 2. Machining samples:

First group: Pheripheral milling (planing)

Second group: Automatic milling and wide belt sanding

### 3. Measuring surface roughness in laboratory with electro-mechanical profiler



## Peripheral milling (planing) „Weining Powermat 600”

- Milling head had four blades
- Feed speed: 10, 15, 20, 25, and 30 m·min<sup>-1</sup>
- The depth of milling 1.00 mm
- Head diameter:  $\Phi = 125$  mm
- Head frequency: 8000 min<sup>-1</sup>



## Automatic milling and wide belt sanding „Viet Opera 6”

- Milling head had 180 spirally twisted inserts
- Feed speed: 10 m·min<sup>-1</sup>
- The depth of milling 1,5 mm
- Head diameter:  $\Phi = 250$  mm
- Granulation of P80 with pressure of 6 kg/cm<sup>2</sup>



## Measuring surface roughness:

Electro-mechanical profiler: *Mitutoyo SJ-500*

According to the ISO 4287:1997

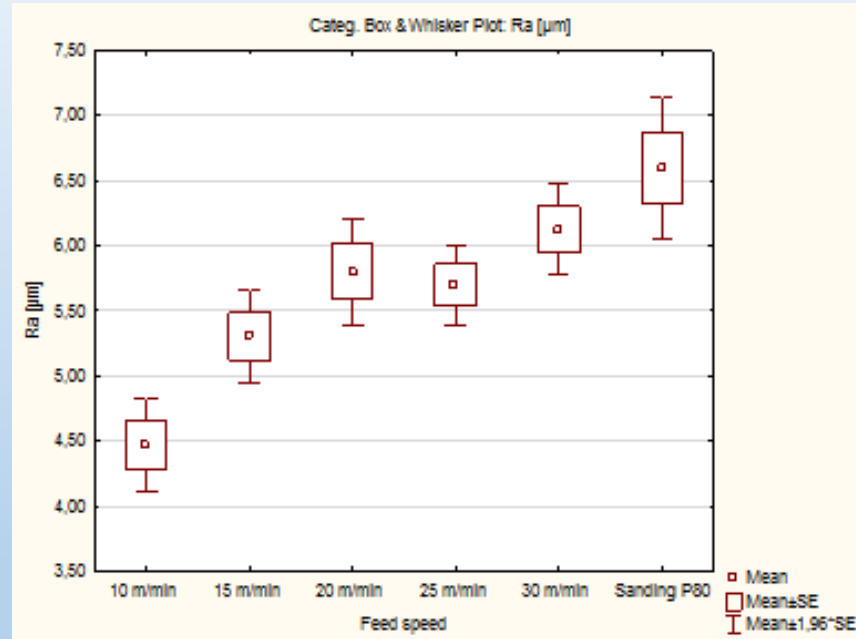
Stylus tip radius: 10  $\mu\text{m}$

Stylus angle: 90 °

For each feed rate - 30 samples!



# Results:



## Tukey Honestly Significant Difference test results

Tukey HSD test; Variable: Ra [ $\mu\text{m}$ ]						
Feed speed	[1] M=4,4703	[2] M=5,3037	[3] M=5,3037	[4] M=5,6990	[5] M=6,1207	[6] M=6,5973
10 m/min [1]		0,038856	0,000057	0,000229	0,000020	0,000020
15 m/min [2]	0,038856		0,494089	0,731005	0,045891	0,000091
20 m/min [3]	0,000057	0,494089		0,999179	0,871891	0,056869
25 m/min [4]	0,000229	0,731005	0,999179		0,673050	0,019241
30 m/min [5]	0,000020	0,045891	0,871891	0,673050		0,544892
Sanding P80 [6]	0,000020	0,000091	0,056869	0,019241	0,544892	

\*marked effects are significant at  $p < 0,05000$





Thank you for your attention!