



Početna stranica  
Abecedni popis časopisa

Časopisi po područjima  
Prirodne znanosti  
Tehničke znanosti  
Biomedicina i zdravstvo  
Biotehničke znanosti  
Društvene znanosti  
Humanističke znanosti

Uredništva  
Prijava novog časopisa



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Izvorni znanstveni članak

### Selected properties of spruce dust generated from sanding operations

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#### Sažetak

This paper presents the research of selected properties of spruce dust generated from experimental sanding by a hand belt sander with two sanding models - along the wood fibres and perpendicular to the wood fibres in the radial direction. The experiment was carried out for the purpose of obtaining the basic characteristics of wood sanding dust – granularity, size and shape of individually formed particles, and bulk properties (bulk density, bulk angle, and tilt angle) that are important for suction, which is connected with the quality of living and working environments. The particles smaller than 100 micrometers are unsuitable for both environments, since they do not sediment in space at all or only partly, and they are characterized as airborne dust. The most harmful particles for humans are those smaller than 2.5 µm as they reach the lung alveoli. When sanding wood the finest particles are formed and therefore it is important to know the basic characteristics of sanding dust in order to deal with these problems effectively. On the basis of the mesh sieve analysis, we can state that in sanding perpendicular to the wood fibres the share of particles smaller than 100 µm is 76.94 % on average and along the wood fibres it is only 56.01 %. The structure, shape and size of particles were investigated by microscope. When using the longitudinal model of sanding, the fibrous elements were formed for the most part. When using the perpendicular model, isometric particles were predominantly formed in smaller fractions and particles of fibrous shape in larger fractions. The smallest particles were found in the following samples. When the perpendicular model of sanding was used, we have found the smallest particle in the investigated samples with the diameter of 1.68 µm, and when the longitudinal model of sanding was used, the particle with the diameter of 1.75 µm. Bulk density of spruce dust from the longitudinal model of sanding is 77.77 kg · m<sup>-3</sup>, while dust from the perpendicular model of sanding is 116.68 kg · m<sup>-3</sup>. Tilt angle of spruce dust in a longitudinal direction of sanding is 33.4°, and in a perpendicular direction it is 37.4°. Bulk angle for the perpendicular model of sanding is 48.7°, and for longitudinal model of sanding it is 48.3°. The obtained results have confirmed that the model of sanding at which wood dust was formed is a significant factor affecting properties of wood bulk material.

#### Ključne riječi

sanding; spruce dust; granularity; bulk properties

[\[Hrvatski\]](#)

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[Srce](#)



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[Upute za pretraživanje](#)

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[Registracija novih korisnika](#)

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[Zaboravili ste lozinku?](#)