

Acoustic Properties of Scots Pine wood and Genetic Background

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Abstract: The range of the Scots Pine (*Pinus sylvestris* L.) mainly covers the European continent and Asia. The mechanical and physical properties of wood predispose this species to a wide range of applications. One of them is sound absorption, which is used in the production of windows, doors or floors. Wood conducts sound which also makes it an ideal material for building musical instruments.

The paper contains results of research on technical quality of wood of selected genetic background of Scots pine growing on experimental plot located in central Poland in LZD Rogów. Wood for the study came from the north-eastern and south-western parts of Poland and from the south and north of the country. The research material was obtained from 100 trees aged 52 years from the mixed broadleaved forest habitat (FMBF). 659 samples of 20 × 20 × 300 mm in size were used for the study.

The scope of the work included the performance and statistical analysis of the results of acoustic properties of wood. The ultrasonic method was used to investigate the acoustic properties of wood. The samples were subjected to ultrasonic testing using the UMT-1 material tester from UNIPAN, working with specialist software for visualisation and analysis of measurement signals UMT-LINK.

On the basis of the ultrasonic transit time measurements, the following were calculated: the speed of propagation of the acoustic wave in wood c [m/s], the dynamic modulus of elasticity along fibres E [MPa], the acoustic resistance of wood Z [kN*s/m³] and the sound attenuation T [m⁴/s*kg].

The best values of the analysed acoustic properties were determined for wood from the Nowy Targ—mountain origin. It is characterised by good attenuation, insulation and low acoustic resistance, which predisposes this wood to applications such as: frame walls, building elements or acoustic screens.

Keywords: *Pinus sylvestris* L.; Scots Pine; acoustic properties; genetic origin; acoustic wave