Mechanical properties of sawn timber (Pinus Sylvestris L.) influenced by logs quality class

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The classification of logs in the forest is the first stage in the evaluation of wood's technical quality and serves as the point of departure for subsequent tasks needed to trade and evaluate wood. For ages, wood quality was assessed without the use of advanced technologies, and only by visual inspection (Berglund *et al.* 2015). In reality, many properties of wood are mutually correlated, which makes it possible to perform quite simple field tests to select the logs with desired quality properties, which will later translate into a high efficiency of sawn timber (Tsehaye *et al.* 2000; Roos *et al.* 2001).

The classification of round logs in Poland is carried out on the basis of the PN-92/D-95017 standard. According to the standard, large dimension coniferous wood can be classified into 4 quality classes: A, B, C, and D. The A class is the best quality, while D corresponds to the lowest quality. Class D is practically useless for industrial processing and is never ordered by lumber mills in Poland. The main aim of research was to investigate the influence of quality class of pine logs (A, B and C) on the physical and mechanical properties of timber produced from these logs.

The research material consisted of pine timber from the Silesian Forestry Region in Poland. The sawn timber was made of log quality classes of A, B, and C, from raw materials with the age of around 124 years and 25 m of height. There were 210 pieces of timber in the batch under research.

The study has shown that the quality class of pine logs has only a limited degree of influence on the physical and mechanical properties of timber produced from those logs. Timber elements made of A and B, high quality class logs do not present any statistically significant differences as far as their physical and mechanical parameters are concerned. In the case of timber made of logs from higher quality classes, higher values were obtained for coefficient of determination characterizing the interdependence between given physical and mechanical parameters: timber density, dynamic modulus of elasticity, global modulus of elasticity, and static bending strength. In the case of timber obtained from low quality logs, the coefficient of determination was proportionally lower.

**Keywords:** pine timber, dynamic modulus of elasticity, global modulus of elasticity, static bending strength

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