

NUMERICAL AND LABORATORY TESTING OF TWO TYPES OF STEMS - SIDA HERMAPHRODITA AND MISCANTHUS GIGANTEUS

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The paper presents an attempt of laboratory testing and numerical modeling of two types of plant stems - Sida Hermaphrodita and Miscanthus Giganteus. The subject arose in need of providing more efficient systems for energetic plants harvesting. Computational FEM modeling was proposed to improve the process of cutting.

First step was determining the way of creating a general model for each of tested stems. Because of high nonlinearity of natural geometry some graphical and FEM methods for achieving approximate cross-section properties were proposed.

Second step was determining a modulus of elasticity. There was proposed the measurement of three values: cantilever beam deflection, natural frequency of cantilever beam and beam deflection in three point bending test. Correlation between all of these methods was presented with quite good agreement achieved.

All of laboratory tests were compared with results calculated for simplified FEM model. General assumptions and recommendations for creating numerical models of each stems basing on laboratory testing were given.

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