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## ПРОЧНОСТЬ ДРЕВЕСИНЫ, МОДИФИЦИРОВАННОЙ ПОЛИМЕРНОЙ КОМПОЗИЦИЕЙ С НАНОСТРУКТУРНЫМ НАПОЛНИТЕЛЕМ

**Аннотация.** Увеличение прочностных свойств деревянных конструкций является важной задачей. Древесина может иметь множество дефектов, связанных с природным строением (пороки) или полученных во время эксплуатации (загнивание, усушка и т.д.). Для повышения прочности древесины и, следовательно, несущей способности конструкций на ее основе, используют как традиционные методы (усиление металлом, бетоном или железобетоном), так и перспективные в настоящее время методы модификации полимерными составами, в том числе с наноструктурным наполнителем.

В настоящей работе выполнено исследование по определению прочности образцов модифицированной древесины на сжатие вдоль волокон. Были рассмотрены четыре различные смолы и два наполнителя – углеродные нанотрубки и карбоксилированные углеродные нанотрубки, которые добавлялись в связующее в разных процентных соотношениях (от 0 до 1,1 %). В качестве модификации была применена технология импрегнирования низковязкой полимерной композиции в тело древесины с использованием импульсного воздействия избыточного давления по режиму 10-5-10-5-10 мин.

Модифицированные образцы испытывались при кратковременном действии нагрузок до разрушения. Результатами испытания на образцах определена возможность повышения прочности и снижения деформативности деревянных конструкций, модифицированных полимерной композицией на основе смолы с добавлением наноструктурного наполнителя.

**Ключевые слова:** строительство, древесина, модификация, полимер, прочность.

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## STRENGTH OF WOOD MODIFIED WITH POLYMER COMPOSITION WITH NANOSTRUCTURED FILLER

**Abstract.** Increasing the strength properties of wooden structures is an important task. Wood can have many defects associated with the natural structure (defects) or obtained during operation (rotting, shrinkage, etc.). To increase the strength of wood and, consequently, the bearing capacity of structures based on it, both traditional methods (reinforcement with metal, concrete or reinforced concrete) and currently promising methods of modification with polymer compositions, including those with nanostructured filler, are used.

In this work, a study was carried out to determine the compressive strength of modified wood samples along the fibers. Four different resins and two fillers were considered - carbon nanotubes and carboxylated carbon nanotubes, which were added to the binder in different percentages (from 0 to 1.1%). As a modification, the technology of impregnating a low-viscosity polymer composition into the wood body was applied using pulsed overpressure according to the 10-5-10-5-10 min mode.

Modified specimens were tested under short-term loads until failure. The results of testing on samples determined the possibility of increasing the strength and deformability of a wooden structure modified with a resin-based polymer composition with the addition of a nanostructured filler.

**Keywords:** building, wood, modification, polymer, strength.

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