

## Abstract

In this article the possibility of making high density compressed woods with the dimensions of 20×20cm from the fine abrasive dust of chipboards is studied. The variable factors of this evaluation include six factors and they are the temperature of the press, the amount of sprayed water, the density of board, pressure of the press, the way of spraying water on the fine abrasive dust and the press time. Mechanical qualities(internal bonding, rupture resistance and module of elasticity) and physical qualities of the constructed boards, water absorption(WA) and thickness swelling(TS), in this article were identified by Europe standard(EN). The collected data were putted in SPSS software and they were analyzed by the factorial statistical method. The obtained averages were analyzed by Donken method. According to the obtained results, the constructed boards under the press temperature of 180 centigrade, press pressure of 21kg/CM<sup>2</sup>, board density of 0.95g/CM<sup>3</sup>, amount of sprayed water on the level of 18 percent and press Time 9min had the internal bonding of(2/72 Mpa), rupture strength of(35/12 Mpa) and the elasticity module of(8038 Mpa). The highest amount of dimension stability belong to the boards which were constructed under the press temperature of 180centigrade, press pressure of 21kg/CM<sup>2</sup>, board density of 1g/CM<sup>3</sup>, amount of sprayed water on the level of 18percent and the spraying method of water on the fine abrasive dust in a stirred form, which for 2 hours of water absorption is equal with 52/71percent and for the 2 hours of thickness swelling is equal with 17/67. By applying the techniques of infrared spectroscopy(FT-IR) and nuclear magnetic resonance(<sup>13</sup>C NMR), of the applied changes on the chemical combinations of the abrasive dust of the chipboards were analyzed by the heat scalage analyze(TGA), of the amount of the damage upon the chipboard abrasive dust after applying the heat press was analyzed and by the xerography with the electronic microscope(SEM), the chemical structure of chipboard abrasive dust were studied. The results indicate that the nano and resin ingredient of urea formaldehyde that exist in chipboard abrasive dust form a strong reaction with water and other existing materials in abrasive dust by applying heat press. This kind of heat press increase the resistance of this high density compressed woods. Also, by applying heat press the existing lignin in the abrasive dust became soft and form an covalence link with carbohydrate. This factor lead to the construction of boards by the abrasive dust of chipboards which have a high amount of mechanical and physical standards(cold and hot water resistance). Therefore, by considering the obtained results from the examinations, it became clear that the effects of analyzed variables on the modulated mechanical and physical qualities is meaningful at the reliance level of 95percent, and it achieve all the Europe standards. Therefore, there exist the possibility of creating high density compressed woods by using the fine abrasive dust and ignoring the use of glues.

Keywords: High density compressed wood, fine abrasive dust, TGA, FT-IR, SEM,  $^{13}\text{C}$  NMR internal bonding.



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**The Thesis Submitted for the Degree of Master of Science  
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**Manufacture of high density compressed wood using fine  
Abrasive dust particle board without adhesive**

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