

Minimization of Air bubbles during Furniture manufacturing process

Pankaj Godbole¹, Lokesh Meshram², Rushabh Bansod³, Kapil Khandekar⁴, Dhammadip Khandekar⁵,
Siddharth Ghosh⁶

^{1,2,3,4,5,6} Dept of ME, JDCOEM, Nagpur, Maharashtra, India

Abstract— The presence of water in wooden elements is an important factor in the understanding of the evolution of this material used for a structure. This happens because wood has the ability to change its volume due to climate variations; it can shrink or it can double its size depending on the season. This can influence the mechanical properties of the wooden piece and introduce in the structure deformations and changes in sectional efforts that can be very dangerous.

INTRODUCTION

The presentation of the project assignment is on the Minimisation of Air bubbles during Furniture manufacturing process. That is the major issue of Manufacturing Industries. The focus of this project is decreasing the air bubbles on manufacturing process. The air bubbles is generated during moisture and moisture is come from whether climate changes. Si the project is basically based on industry based project.

The project contains the collection of data from reasearch paper of different authors on the same problem of minimisation of air bubbles during furniture. There are numbers of authors which are focusing on issue and finding solutions of it. So, process is to fix the issue by using such technique.

LITERATURE REVIEW

[1] Mohammad Farajollah Pour, Hamidreza Edalat, Mohammad Valizadeh Kiamahalleh, Kazem Doost Hoseini he has conducted experimental investigation of Microwave-assisted laminated veneer lumber (LVL): Investigation on the effect of preheating time and moisture content on resin penetration and bonding quality. to determine Investigation on the effect of preheating time and moisture content on resin penetration and bonding quality. For that he has performed Microwave applicator apparatus, LVLs

manufacturing, Resin penetration, Evaluation of bonding quality. It was found that the high bonding strength LVL assisted by MW preheating developed in this study is feasible to be used as material in high humid/exterior conditions for general or construction applications.

[2] A.A. Chiniforush, H. Valipour, A. Akbarnezhad he has conducted experimental investigation of Water vapor diffusivity of engineered wood: Effect of temperature and moisture content. To determine diffusion coefficient for different engineered wood products are determined. For that he has performed Cup method, Sorption method, Mass transfer coefficient, Empirical equation for effect of moisture content and temperature. It was found that the consistent with the results of tests conducted on small size clear wood specimens, Surface emissivity for softwood species in longitudinal and transverse direction are in the same range; however, for the hardwood species, the longitudinal surface emissivity are significantly greater than transverse.

[3] Siti Machmudah, Dimas Tiar Wicaksono, Mary Happy, Sugeng Winardi, Wahyudiono, Hideki Kanda, Motonobu Gotoe he has conducted experimental investigation of the Water removal from wood biomass by liquefied dimethyl ether for enhancing heating value, To determine Water removal from wood biomass by liquefied dimethyl ether for enhancing heating value. For that he has performed the DME dewatering apparatus for the laboratory-scale experiment that was used to remove water from the wood chip biomasses. the DME dewatering apparatus for the laboratory-scale experiment that was used to remove water from the wood chip biomasses. It was found that. The heating value of the wood biomasses increased after dewatering. Based on these results, DME dewatering

is suitable for water removal from wood chip biomass to enhance energy source quality.

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[5] Pavlo Bekhta, Emilia-Adela Salca he has conducted experimental investigation of Influence of veneer densification on the shear strength and temperature behavior inside the plywood during hot press. To determine the temperature behavior inside the densified veneer plywood was analyze. For that he has performed Veneer densification, Plywood preparation, Core temperature measurement, Shear strength measurement. It was found that the useful for industrial applications to optimize the plywood production. Information on temperature changes inside veneer package during hot pressing can contribute to the improvement of plywood quality.

[6] Ismail Aydin, Gursel Colakoglu, Semra Colak, he has conducted experimental investigation of Effects of moisture content on formaldehyde emission and mechanical properties of plywood. To determine effects of moisture content on formaldehyde emission and mechanical properties of plywood. For that he has performed Manufacturing of plywood panels method. It was found that the best bonding results were obtained with veneers having 4–6% moisture content, While the lowest mechanical properties were found for plywood panels manufactured from veneers having 16–18% moisture content.

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typical winter conditions of Montreal (10 C and 45 %RH outdoor). For the cases using wood paneling. It was found that the increase of ventilation rate the indoor humidity variation decreases. Hence, the moisture buffering effect is also reduced.

[8] Suratsavadee K. Korkua, Siraporn Sakphrom he has conducted experimental investigation of Low-cost capacitive sensor for detecting palm-wood moisture content in real-time. To determine the low-cost capacitive sensor for detecting palm-wood moisture content in real-time for that he has performed Methods of measuring MC in wood, Drying-out methods, Electrical moisture-meter method. It was found that The researchers tested the moisture readings of palm-wood with different MCs between 5%–20% to verify the accuracy of the method for measuring the MC by detecting capacitance values.

[9] Kanotha Kamau-Devers, Sabbie A. Miller he has conducted experimental investigation of Using a micromechanical viscoelastic creep model to capture multi-phase deterioration in bio-based wood polymer composites exposed to moisture. To determine Using a micromechanical viscoelastic creep model to capture multi-phase deterioration in bio-based wood polymer composites exposed to moisture. For that he has performed Specimen preparation, Moisture conditioning, Experimental characterization of creep deformation, Experimental characterization of mechanical properties It was found that. Deterioration of the materials sustained from water sorption was captured through changes in mechanical and morphological data, SEM images, and creep deformation.

[10] Maximilian Autengruber, Markus Lukacevic, Christof Grostlinger, Josef Eberhardsteiner, Josef Füssl he has conducted experimental investigation of Numerical assessment of wood moisture content-based assignments to service classes in EC5 and a prediction concept for moisture-induced stresses solely using relative humidity data. To determine Numerical assessment of wood moisture content-based assignments to service classes in EC5 and a Reliability of Moisture Reference Year (MRY) selection methods for hygrothermal performance analysis of wood-frame walls under historical and future climates prediction concept for moisture-induced stresses solely using relative humidity data. For that he has performed Mathematical model for

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[12] Zhengbin He, Jing Qian, Lijie Qu, Zhenyu Wang, Songlin Yi, he has conducted experimental investigation of Simulation of moisture transfer during wood vacuum drying. To determine Simulation of moisture transfer during wood vacuum drying. For that he has performed Wood vacuum drying, Moisture and heat transfer in wood samples during vacuum drying process. It was found that the wood moisture content and drying rate decrease as drying time increases. It took about 768 min to dry wood from moisture of 0.51–0.12, Wood temperature increases along with the drying time and becomes constant at about 60 min.

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[14] Seong Jin Chang, Yujin Kang, Beom Yeol Yun, Sungwoong Yang, Sumin Kim, he has conducted experimental investigation of Assessment of effect of climate change on hygrothermal performance of cross-laminated timber building envelope with modular construction. To determine Assessment of effect of climate change on hygrothermal performance of cross-laminated timber building envelope with modular construction. For that he has performed the method of Setup of mock-up experiment with ply-lam CLT, Validation of WUFI simulation, Evaluation of moisture problems in ply-lam CLT walls. It was found that the future climate would increase the moisture content of the insulation. This would not only cause moisture problems in the insulating materials but also degrade the thermal insulation performance of the wall; this would increase the building energy consumption.

[15] Kristen M. Hess a, Chelsea M. Heveran he has conducted experimental investigation of A computational approach to design moisture-resistant wood polymer composites. To determine A computational approach to design moisture-resistant wood polymer composites. For that he has performed the method of the environmental conditioning, Flexural mechanical properties of environmentally conditioned WPC, Tensile strength of the polymer constituent, Elastic modulus of the fiber and polymer constituents using nanoindentation. It was found that it is used to computationally predict the effect of moisture-induced damage on WPCs. The validated model was used as an analysis tool to assess the suitability of the WPC tested herein for target applications as relative humidity increases.

[16] Kristen M. Hess, Wil V. Sruhar III He has conducted experimental investigation of Activating relaxation-controlled diffusion mechanisms for tailored moisture resistance of gelatin-based bioadhesives for engineered wood products. To determine Activating relaxation-controlled diffusion mechanisms for tailored moisture resistance of gelatin-based bioadhesives for engineered wood products. For that he has performed the method of Gelatin film preparation, Theoretical modeling. It was found that the The experimental sorption curves and volumetric measurements showed that as the g/w concentration increased, the rates of water uptake, volumetric swelling, and maximum moisture contents (MMCs) of the gelatin bioadhesive resins decreased,

Laminated gelatin wood veneer (GWV) composites initially exhibited improved flexural mechanical properties in comparison to OSB and plywood and maintained these flexural properties in moderate humidity (75–80% RH) conditions for 14 days.

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[18] Sami Matthews, Amir Esmael Toghyani, Sami-Seppo Ovaska he has conducted experimental investigation of the Role of moisture on press formed products made of Wood Plastic Composites. To determine Role of moisture on press formed products made of Wood Plastic Composites. For that he has performed method of the thermoplastic Matrix. It was found that the reheated material sheets indicated significantly higher water absorption rate and weight gain of 19% due to porous and rough surface caused by boiled of volatile compounds during reheating. It is not recommendable to reheat the WPC material sheets in order to get more polymers to the material surface due to more porous surface negating the effect.

[19] Chen Huang, Yinghei Chui, Meng Gong, Felisa Chana he has conducted experimental investigation of the Mechanical behaviour of wood compressed in radial direction: Part II. Influence of temperature and moisture content. To determine the influence of pressing temperature and moisture content on the mechanical properties of wood compressed in radial direction. For that he has performed the method of Jack pine, Balsam poplar. It was found that the increase in either pressing temperature or moisture content of wood generally caused a decrease in the mechanical properties for both species.

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RESULTS

The collection of data from reasearch paper of different authors on the same problem of minimisation of air bubbles during furniture manufacturing. There are numbers of authors which are focusing on issue and finding solutions are as follows:

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