

Abstract

Parallel strand Lumber (PSL) maybe one of the newest composites in the wood industry which are designed as parts of a building structure such as beam and column. In this study, PSL composite was fabricated by long splinter of reed stem (*Phragmites australis*) and urea melamine formaldehyde adhesive. The variables of this study included: the percentage of nanoparticles in 3 levels, 0, 1 and 1.5 based on the *dry weight* of the adhesive, the press temperature at 3 levels, 160, 180 and 200 ° C, and press time in 3 levels, 15, 20 and 25 minutes. The reed splinter were glued manually using melamine-urea formaldehyde and the boards were made using a laboratory hot pressing. Mechanical tests, including elastic and rupture modulus were carried out in two modes: on the width and thickness of samples. Moreover, shear strength, screw holding resistance, parallel pressure resistance to the fibers and internal adhesion and physical properties including Water adsorption and thickness swelling at 2 and 24 hours were measured. The results showed mechanical properties improved with increasing nanoclay content up to 1.5%, and then mechanical properties decreased with further increase of nanoclay.. In general, the addition of nanoclay improved the physical properties of the specimens, except for the shear strength that decreased. By increasing the press temperature to 180 C° the physical and mechanical properties of the samples were improved. At 200 C° most of the properties showed a decrease and presser time for 20 minutes was also the optimum time to improve the physical and mechanical properties of the boards.

Keywords: Composites, Parallel strand lumber, Physical and Mechanical properties, Stem reed's, *Phragmites australis*. Resins MUF



University of zabol

Graduate School

Faculty of Natural Resources

Wood and Paper Science and Technology

**The Thesis Submitted for the Degree of Master of Science (In Composite
and Products)**

**Manufactur of Parallel Strand Lumber (PSL) made of stem reeds using
MUF resins and effects of nano clay on it's characteristics**

Supervisors:

Dr. Mohammad Shamsian

Dr. Saeed Reza Farokhpayam

Advisors:

Farhad Kool

By:

Mohsen Vahidiparsa

January 2018