

OSB and Marine Plywood: Performance Comparison for use with Light Steel Frame Walls in Brazil

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1 Introduction

The use of light steel frame and wood frame in Brazil is still recent, hence there are few information about the durability of these technologies applied in Brazilian climate conditions. The wood-based boards are used as a part of the light steel or wood frame walls and are designed to contribute to the wall structural behavior (horizontal reinforcement and resistance to suspended pieces). Once the information if such boards meet the DL (design life) set in the Brazilian code of residential building performance is still unknown, this paper analyses the technical characteristics of wood boards, OSB and marine plywood, aiming to gather more information concerning durability of these boards under liquid water action. Thus, tests were carried out on samples of these two boards to evaluate their behavior against liquid water and after accelerated ageing test.

2 Experimental Work

Samples of OSB (11.1 mm thick) and marine plywood (12 mm thick) were tested according to EN standards: density, moisture content, swelling in thickness, bending strength, modulus in bending, dimensional changes, internal bond, and moisture resistance. EN standards were used because there is no Brazilian standard about the subject; in addition, regardless of having their own specific standards, samples of plywood were also tested according to the same OSB standards so that mechanical properties can be compared under the same conditions.

2.1 Results

While Figure 1 shows the wetting and drying behavior of the two boards, Table 1 presents their main properties and Table 2 the results of the tests carried out.

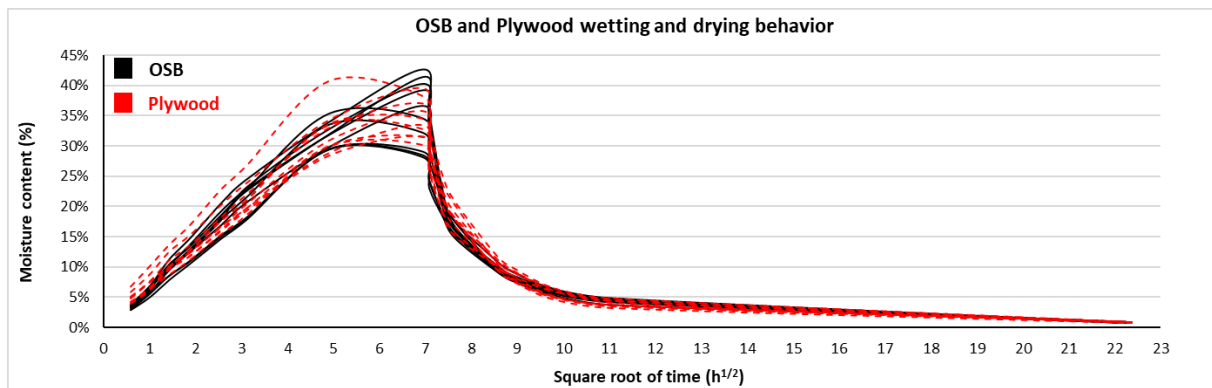


Figure 1. Wetting and drying time of OSB and plywood.

Table 1. OSB and marine plywood properties.

Board type	Density (kg/m ³)	Layers	MC (%)	MOE (N/mm ²)	BS (N/mm ²)
OSB	639.9 ± 24.6	Homogeneous	10.5 ± 0.3	4607 ± 649	32.7 ± 6.4
Plywood	623.9 ± 20.9	Five	10.3 ± 0.4	7039 ± 559	60.3 ± 8.6

MC = moisture content; BS – bending strength; MOE – modulus of elasticity

Table 2. OSB and marine plywood: results of the tests.

Board	Swelling in thickness (%)	MOE retention (%)		BS retention (%)		Dimensional changes (mm/m)	Internal bond (N/mm ²)
		24h under tap water	after cyclic test	24h under tap water	after cyclic test		
OSB	8.3	30	38	44	45	1.5	0.45
Plywood	2.6	80	82	69	85	0.5	1.10

3 Comments

- OSB and plywood showed almost the same water uptake coefficient and also the same drying time, which can indicate quite similar moisture content when under liquid water action.
- In all mechanical tests with liquid water action, OSB showed lower performance when compared to plywood.
- When subjected to different levels of relative humidity, OSB presented higher dimensional changes, which can lead to higher level of cyclic stress along the service life.

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