

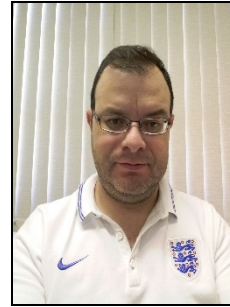
## DURABILITY OF REACTION TO FIRE PERFORMANCE OF WOOD BASED PANELS THROUGH ACCELERATED AGING CYCLES



**Luís Manuel R. de  
Mesquita\***  
Professor  
IPB-Bragança



**Lucas Coimbra  
Ferle**  
Estudante  
IPB-Bragança



**Gerson H. Dos  
Santos**  
Professor  
UTFPR-Paraná

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### 1. INTRODUCTION

Wood is being used by humans since the early civilizations, and was one of the most important materials used the building construction. In recent years, due to ecological and environmental policies and restrictions in Europe, wood, wood products and wood structural elements have being positioned as a green raw material, Ecologically Sustainable and renewable material with a positive impact in the buildings carbon dioxide emissions in comparison to other construction materials, such as steel, concrete and bricks.

Being a hygroscopic material, wood thermal and mechanical properties, and aesthetic appearance, are affected by its surrounding environment, regarding temperature, humidity and direct or indirect solar radiation in outdoor and indoor appliances. Structural wood products when exposed to excessive moisture variations can lead to swelling or shrinkage causing warping and cracking of the element reducing its mechanical properties, stability and durability.

Wood is considered a flammable material, and although it has an intrinsic/natural fire protection, charring to decrease the heating rate, from the European standard fire classification of construction products and building elements, EN13501-1 [1], untreated wood is usually classified as being of class D, with lower density products in class E. This classification system considers the reaction to fire performance, smoke production and flaming droplets/particles. When fire retardant treatments are applied wood products can reach C and B class levels.

Fire retardants applied in the products surface or by pressure impregnation may considerably improve the fire properties of wood and wood products, but the long term durability of this

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\*Luís Mesquita – Dep. de Mecânica Aplicada, Instituto Politécnico de Bragança. Campus Santa Apolónia, 5301-857 Bragança.

Telef.: +351 273 303061, Fax: +351 273 303116, E-mail: lmesquita@ipb.pt

protection is not fully known. It is expected that, mainly in exterior applications but also in interior humid conditions, the fire retardant efficiency may reduce due to its hygroscopicity [2] and water solubility of the chemicals used.

## 2. REACTION TO FIRE PERFORMANCE OF WOOD BASED PANELS

The standard EN16755, [3], specifies a new classification testing for Durability of Reaction to Fire performance (DRF) based mainly on the Nordtest standard NT Fire 054 [4]. This classification is based on the intended use, considering interior dry and humid applications and exterior applications.

To evaluate the performance and durability of fire retarded wood based panels, concerning mechanical and reaction to fire behaviour, a study was done considering the long term behaviour of wood products with and without fire retardant products after being submitted to accelerated aging and compared to non-aged wood products. This work presents a set of experimental tests performed towards the mechanical and fire reaction characterization of different wood based panels with and without fire retardant products, as presented in the next Figure.

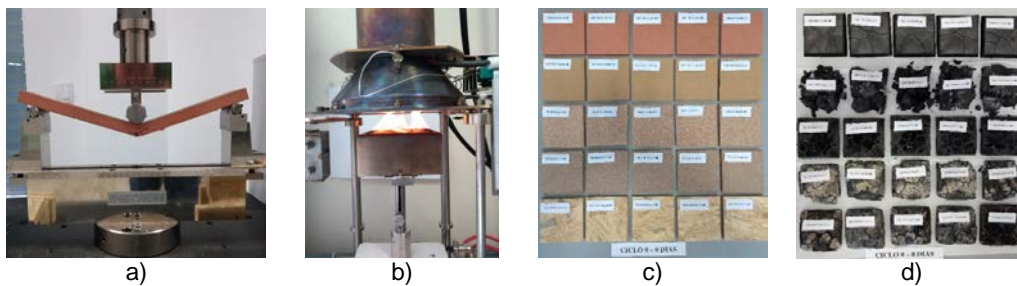


Figure 1: a) Three point bending test. b) Cone calorimeter test. c) Samples before fire reaction test. d) Samples after fire reaction test.

## ACKNOWLEDGMENTS

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## 3. REFERENCES

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