

WildFireHousePR – New Fireproof Dwellings for WildFire

Summary

The main focus of this project is to protect new dwellings from wildfires, using the concept of a fireproof envelope facade, with existent commercial non-combustible materials. The risk of wildland fires in Portugal has increased in last 10 years due to climate change and the unguarded plantation of the forest (eucalyptus and pine). In 2017, two of the largest wildland fires (WLF) recorded in the history of Portugal (Pedrógão Grande and 15 de Outubro), had a major impact not only on the forest areas (burning 45.000ha+241.000ha respectively), but also on the communities, with a death toll of 114. Following these fires, new legislation was created, only concerning measures related to the wildland-urban interface (WUI) (forest cleaning, vegetation height, distance from vegetation to dwellings, etc.). But interestingly, no extra measure or care was taken, regarding the characteristics of the dwellings or the protection of the people caught by the fires. However, the analysis of expert opinions and questioners, clearly showed that the dwellings that had burned, had constructive typologies without any passive anti-fire protection. The disregard of this aspect, led to the burned houses being rebuilt in the same way as the original, which means that they are likely to burn again in the next WLF.

This important blank in protection measures of new dwellings against WLF, led to the development of this project that aims to fill this gap in knowledge. To solve this problem, fireproof construction guidelines (FCG) with incombustible

materials are assembled and tested, for windows, doors, roofs and exterior walls.

The main objective of this project, is to study the efficiency of the FCG with incombustible materials (existing on the market), after a WLF as occurred, regarding that the dwellings don't suffer any damage, when hit by a WLF. To analyse the efficiency of FCG in post fire conditions, regarding its fire resistance and reaction, these will be subjected to thermal standard fire tests.

The main objectives are:

- Perform a fire experimental campaign for specimens and reduce models, for incombustible materials and fireproof constructive solutions, using standard fire curves [5], in order to check the level of fire resistance and reaction of the initial chosen solutions.
- Execute parametric numerical fire campaign, in order to extrapolate the results of goal 1) to other structural or geometric arrangements, maintaining the level of fire resistance of the previous experimental campaign.
- The Proposal of a construction manual, to be distributed by the municipalities, in residential areas with a high risk of WLF, informing the population about the construction fireproof solutions to be adopted to protect their homes from an external fire, depending on their exposure conditions.



Figure 1. Cork fireproof protection system for windows and doors.



Project Reference

PTDC/ECI-CON/2240/2020

Leading Institution

IST-ID – Associação do Instituto Superior Técnico para a Investigação e Desenvolvimento (Portugal)

Partners

-

CERIS Principal Investigator

Fernando Branco
(fernando.branco@tecnico.ulisboa.pt)

Mário Arruda
(mario.rui.arruda@tecnico.ulisboa.pt)

CERIS Research Team

João Firmo, João Ramôa Correia, Mário Garrido, Carlos Tiago, Mário Sá

Funding

FCT – Fundação para a Ciência e a Tecnologia

Period

2021-2024

Total

248 897.50€

CERIS

248 897.50€

Project Website

whp.tecnico.ulisboa.pt