

# **Slate–cork laminate enhanced with silicone for habitat industry application**

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## **Abstract-**

**This study investigates the feasibility of using a composite material comprising slate reinforced with cork sheets for architectural purposes like facades and wall coverings. The research involves the comprehensive characterisation of both slate and cork materials along with the evaluation of the silicone adhesive used in their bonding process, specifically Sikasil®&nbsp;HT from SIKA®. It was found that both slate and cork exhibited low wettability, which was enhanced through cold plasma treatment. Subsequently, a composite sandwich structure was fabricated and subjected to impact testing in a drop tower, along with fire resistance evaluations. The fire tests revealed that when subjected to a flame of 900 °C for 15 min, the slate alone heated rapidly, reaching 500 °C within 3 min on the side opposite to the flame. However, the sandwich structure reached 260 °C on the cork side (opposite to the flame) at 7.5 min, maintaining this temperature until the deterioration or detachment of the cork between 11 and 12 min. This provided insulation and delayed ignition. The sandwich structure maintained its fire resistance due to the insulating properties of cork and the superior thermal resistance of silicone compared to other adhesives up to 260 °C. Overall, the results suggest the potential suitability of this sandwich structure for architectural applications. Its favourable adhesion properties and acceptable fire resistance indicate that it could serve as a viable alternative for construction materials in architectural contexts.**

**Index Terms-** slate; cork; silicone; laminate; sandwich structure; impact test; fire resistance

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