Assessment of the suitability and durability of a recycled polymer product as a building component

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The aim of this work is to assess the influence of natural environmental conditions (temperature, time, humidity, microorganisms, UV radiation) on the modification of the properties of rubber composites. The study evaluates the suitability and durability of recycled polymer products by investigating changes in tensile strength, hardness and fire performance under natural ageing conditions. Recycled polymers offer environmental benefits, but their long-term properties require careful assessment for practical applications. Samples were exposed to natural weathering for a specified period and mechanical properties were measured periodically. Tensile strength was evaluated to determine structural integrity, hardness to assess surface durability and fire properties to ensure compliance with safety regulations. The results showed an initial slight increase in tensile strength and hardness. With increasing length of exposure, the composite started to degrade gradually which was reflected by a decrease in the monitored parameters. The fire resistance proved to be insufficient as the composite exhibited poor fire safety in both horizontal and vertical directions, but this can be improved by the addition of fire retardants. The study concluded that although recycled polymers show promising durability, specific formulations may require improvements to maintain mechanical properties over time.

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