

Macrocategoria: Materiali e Pavimentazioni

Titolo articolo: Deflection and Friction Performance of Waste-Wooden Block Pavements

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Abstract: The use of waste wood for road light pavements is essential for environmental and economic sustainability. The paper investigates the mechanical performance of pavements built with waste wood elements discarded from Sardinia manufacture (Italy). Without structural value, mainly Sardinian wood is used for combustion and heating due to the characteristics of dimensional irregularity, non-homogeneity, and the presence of defects. Even small urban and forest furniture comes from foreign markets. Landscape reasons, emissions reduction, and environmental integration with the local context could encourage its use if reliable techniques are available. The study first analyzed the structural response of a portion of pavement made with waste wood bricks (pine and Eucalyptus). Subsequently, a Finite Element simulation of the pavement has been validated with the tests' results. The experimental pavement was created with Interlocked Block Pavement (IBP) technique, using brick elements $13 \times 6 \times 10$ cm. The behavior of the pavement was analyzed in situ with dynamic deflection tests using the Falling Weight Deflectometer test (FWD). Further tests performed in the laboratory investigated the friction of the wood pavement surface. The simulation results show that the wooden pavement elements do not differ substantially from the classic concrete IBP and HMA cracked pavement. The mean deflections are greater than 19%, while the vertical stress on the foundation layer is equivalent. As with the classic concrete IBP, the results largely depend on the bearing capacity of the substrate and the degree of interlocking. Friction tests show good values with mean values of $53 \div 64$ BPN. The most significant values were observed in the elements eucalyptus. The direction of the wood fibers also influences the results: about 3 points in the case of pine and over 7 points in the case of Eucalyptus. The study shows how the use of wood for the pavement with elements is sustainable and practicable due to the minor and low-traffic roads while also guaranteeing permeability and low-cost maintenance.

Keywords: Forest road; FWD alternative application; Reuse of waste wood; Wood element pavement; Wood pavement.