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Gypsum Composites with CDW as Raw Material

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Abstract : On average, Europe generates around 890 million tons of construction and demolition waste (CDW) per year and only 50% of these CDW are recycled. This is far from the objectives determined in the European Directive for 2020 and aware of this situation, the European Countries are implementing national policies to prevent the waste that can be avoidable and to promote measures to increase recycling and recovering. In Spain, one of these measures has been the development of a CDW recycling guide for the manufacture of mortar, concrete, bricks and lightweight aggregates. However, there is still not enough information on the possibility of incorporating CDW materials in the manufacture of gypsum products. In view of the foregoing, the Universidad Politécnica de Madrid is creating a database with information on the possibility of incorporating CDW materials in the manufacture of gypsum products. The objective of this study is to improve this database by analysing the feasibility of incorporating two different CDW in a gypsum matrix: ceramic waste bricks (perforated brick and double hollow brick), and extruded polystyrene (XPS) waste. Results show that it is possible to incorporate up to 25% of ceramic waste and 4% of XPS waste over the weight of gypsum in a gypsum matrix. Furhtermore, with the addition of ceramic waste an 8% of surface hardness increase and a 25% of capillary water absorption reduction can be obtained. On the other hand, with the addition of XPS, a 26% reduction of density and a 37% improvement of thermal conductivity can be obtained.

Keywords : CDW, waste materials, ceramic waste, XPS, construction materials, gypsum
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