

Recycled mortars for building construction

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Credit: Fuente/pixabay

A study carried out by researchers from the School of Building at Universidad Politécnica de Madrid (UPM) has shown how mineral wool waste can be a suitable alternative to the reinforced fibers currently used in building materials.

Besides, they improved mechanical and thermal properties of the added products, avoiding their storage in landfills. The result is a new cement

mortar that reuses insulating materials and reduces the use of sand, what it helps implement the criteria of circular economy in the [construction sector](#).

Building construction generates a serious environmental problem so the resulting construction and demolition waste (CDW) can be used to replace part of the raw [building materials](#). In particular, mineral wool waste from the insulation of homes has increased in recent years due to the increment in thermal and acoustic requirements. Up to 0.2 percent of the volume of all CDW generated are mineral wool, accounting for 60 percent of the insulating materials used in construction. It is also estimated that in 2020, more than 2.5 million mineral wool waste will be generated in the EU-28 zone, characterized by its difficult reuse, low recycling rate and forms of recovery.

A team of UPM researchers has been studying for years how to recycle from construction materials to build houses. In this way, they found out that both the chemical structure and the microstructure of mortars that add recycled fibers are similar to the mortars without such fibers. That is, there is no significant change caused by the adding fibers that affect the functionality of the [mortar](#) so this recycled material would be suitable for [construction](#).



Wool fibers waste and fracture energy test of mortars reinforced with mineral wool fibers waste. Credit: Carolina Piña Ramírez

They also verified that the properties of the recycled fibers are not affected although they come from a landfill. Additionally, "it has been scientifically proved the mortars incorporating recycled mineral wool wastes are lighter so they could improve their insulating properties," says Mercedes del Río, an expert involved in this project.

In a previous study, they concluded the obtained compounds have [mechanical properties](#) similar to other commercial compounds used today, and they also have an improved flexural strength due to the adding of this waste. Such resistance is also similar to those that incorporate commercial polymeric fibers however, the commercial fibers are not sustainable since they need a large amount of energy for their manufacturing.

In their latest work, the UPM researchers, in collaboration with the Bialystok University of Technology, proposed to reduce the aggregate –sand– used for the production of cement mortars by waste to the maximum, since the sand is the most demanded natural resource worldwide, followed by water and ahead of fossil fuels.

Carolina Piña, the main researcher of this study, explains "it is possible to replace up to 50 percent of the volume of the sand using these sustainable mortars, which means a large amount of raw material savings and high-volume recycling of mineral wool."

The results obtained point out that the use of [mineral wool](#) fibers in cement mortars reduces the [environmental impact](#) because they reduce the use of aggregate and revalue this waste that currently ends up in a landfill.

More information: Carolina Piña Ramírez et al. Analysis of the mechanical behaviour of the cement mortars with additives of mineral wool fibres from recycling of CDW, *Construction and Building Materials* (2019). [DOI: 10.1016/j.conbuildmat.2019.03.062](https://doi.org/10.1016/j.conbuildmat.2019.03.062)

Carolina Piña Ramírez et al. Feasibility of the use of mineral wool fibres recovered from CDW for the reinforcement of conglomerates by study of their porosity, *Construction and Building Materials* (2018). [DOI: 10.1016/j.conbuildmat.2018.10.026](https://doi.org/10.1016/j.conbuildmat.2018.10.026)

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