# CARDBOARD CONFINED RAMMED EARTH SYSTEM

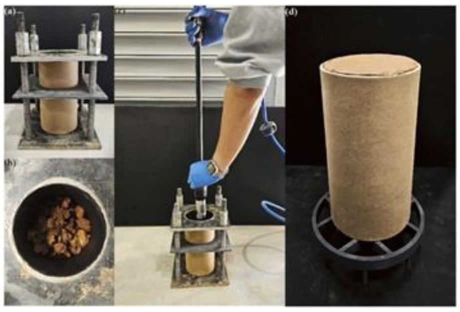
# AN ALTERNATIVE MATERIAL FOR CONSTRUCTION IN AUSTRALIA

*July 2026*

Researchers at RMIT University in Australia have developed a new building material with about one quarter of concrete's carbon footprint, while reducing waste going to landfill. This innovative material, called *cardboard-confined rammed earth*, is composed entirely of cardboard, water and soil, making it reusable and recyclable.

In Australia, more than 2.2 million tons of cardboard and paper are sent to landfill each year. Meanwhile, cement and concrete production account for about 8% of annual global emissions.

Cardboard has previously been used in temporary structures and disaster shelters, such as Shigeru Ban's iconic Cardboard Cathedral in Christchurch, New Zealand. Inspired by such designs, the RMIT University team has, for the first time, combined the durability of rammed earth with the versatility of cardboard.

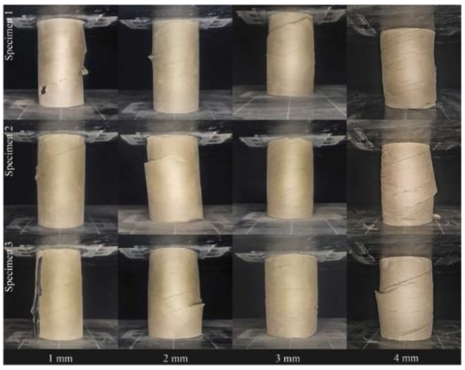


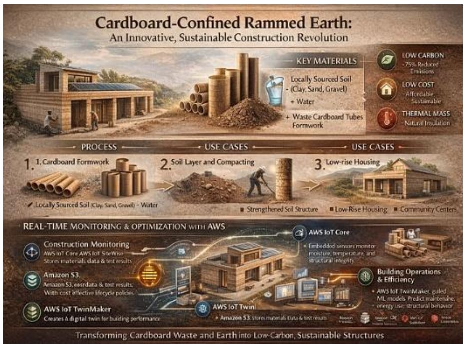
Lead author of the RMIT team of engineers, Dr Jiaming Ma underlines in the article published on the RMIT website the main features of the innovation and its practical benefits. "The development of cardboard-confined rammed earth marked a significant advancement toward a more sustainable construction industry. Modern rammed earth construction compacts soil with added cement for strength. Cement use is excessive given the natural thickness of rammed earth walls. But cardboard-confined rammed earth, developed at RMIT University, eliminates the need for cement and boasts one quarter of the carbon footprint at under one third of the cost, compared to concrete. By simply using cardboard, soil and water, we can make walls robust enough to support low-rise buildings. This innovation could revolutionize building design and construction, using locally sourced materials that are easier to recycle. It also reflects the global revival of earth-based construction fueled by net zero goals and interest in local sustainable materials."

The cardboard-confined rammed earth can be made on the construction site by compacting the soil and water mixture inside the cardboard formwork, either manually or with machines. Instead of hauling in tonnes of bricks, steel and concrete, builders would only need to bring lightweight cardboard, as nearly all the material can be obtained on site. It would significantly cut transport costs, simplify logistics and reduce upfront material demands. Cardboard-confined rammed earth could be an effective solution for construction in remote areas, such as regional Australia, where red soils, ideal for rammed earth construction, are plentiful. Rammed earth buildings are ideal in hot climates because their high thermal mass naturally regulates indoor temperatures and humidity, reducing the need for mechanical cooling and cutting carbon emissions. The article also presents the studies published by the authors in Science Direct that illustrate the innovation in depth.

Future research should focus on enhancing the durability and weather resistance of *cardboard-confined rammed earth* (CCRE) and exploring its applicability in a broader range of structural contexts. The team of the RMIT University informs that it is ready to partner with various industries to further develop this new material so it can be used widely. Companies looking to partner with RMIT researchers can contact research.partnerships@rmit.edu.au.

International journals specializing in sustainable construction have highlighted this important contribution of RMIT University with numerous articles in view of the development of production processes for cardboard-confined rammed earth that can be used in various contexts.




**To know more**

Article in RMIT University website

Cardboard-confined rammed earth towards sustainable construction in ScienceDirect

CFRP-confined rammed earth towards high-performance earth construction in ScienceDirect

Article in materialdistrict.com

Article in dezeen.com

Article in dezeen.com

Article in cleanthesky.com

Article in constructiononline.com

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