# Cardboard architecture: innovation and sustainability reshape public buildings



Cardboard, a material we frequently encounter in everyday life primarily as packaging, has been steadily gaining recognition as a viable building material with remarkable potential. Producing approximately 72 million tonnes annually worldwide, cardboard’s role in architecture extends far beyond mere packaging. Historical evidence traces the use of cardboard-like materials in construction back to 8th-century China, where partition screens in homes incorporated similar fibrous elements. More tangible examples date back over 150 years, with Adt’s prefabricated cardboard houses showcased at the 1867 Paris World Exhibition marking an early milestone. Fast forward to the late 20th century, and the pioneering efforts of Japanese architect Shigeru Ban stand out prominently. Ban’s innovative use of cardboard tubes in his designs began with exhibition spaces and culminated in significant structures like the Library of a Poet in Japan (1991)—widely regarded as the first permanent building to integrate paper-based tubes structurally. His Paper Church in Kobe, erected after the 1995 Great Hanshin earthquake using 58 cardboard tubes, demonstrated the material’s strength and versatility to the architectural world.

The material’s environmental credentials also play a key role in its rising appeal. Unlike conventional construction materials such as steel or cement, cardboard offers a significantly lower carbon footprint, an aspect that aligns well with sustainable building aims. This ethos is embodied in recent projects like the Red Cross On The Street building in Granada, Spain, completed by Tomás García Píriz Studio in 2024. This building consciously reveals and celebrates cardboard, combined with MDF to create a strong, load-bearing structure that is easy to assemble and cost-effective. The design employs cardboard in various functional ways—serving as a false ceiling, acoustic trap, ventilation conduit, and as partitioning within open spaces. Its natural appearance, reminiscent of wood, lends warmth to the interior environment, making it inviting and accessible—both critical qualities for a humanitarian organisation’s headquarters. The building’s extensive floor-to-ceiling windows not only flood the interior with Andalusian sunlight but also make the headquarters prominent and approachable to passersby, underscoring the charity’s ethos of inclusivity and openness.

Architectural innovations with cardboard are not limited to this project. The Wikkelhouse in Amsterdam, developed by Fiction Factory, exemplifies modular prefabricated dwellings constructed from 24 layers of cardboard adhered with eco-friendly glue. These lightweight, recyclable modules are engineered to perform well structurally and thermally while being fully recyclable, showcasing cardboard’s capacity to meet diverse building demands sustainably. Similarly, the Christchurch Cardboard Cathedral, envisaged and realised by Shigeru Ban after the 2011 New Zealand earthquake, utilises 98 treated cardboard tubes and shipping containers to create a durable, fire-retardant, and water-resistant structure. Projects like these highlight how cardboard is evolving from an industrial byproduct into a sophisticated architectural element. Ban’s further works, including the Paper Dome in Taiwan, reinforce the material's adaptability in crisis architecture, where rapid, cost-effective, and sustainable construction is vital.

The rise of cardboard architecture also intersects with broader social and economic challenges, particularly for nonprofit organisations. The Red Cross’s choice of cardboard for its headquarters is not just an aesthetic or environmental statement but also a strategic move in an era when many charities face dwindling public donations. Research from the Charities Aid Foundation indicates a decline in donation rates in regions like Britain, driven by factors including economic pressures and eroding public trust. This makes the physical visibility and approachability of charity headquarters more crucial than ever. Prominent, engaging buildings on busy streets act as steady, non-verbal adverts to the community, fostering awareness and connection even passively. The Red Cross project, by virtue of its bold design and sustainable ethos, effectively repositions charitable architecture as a tool for both practical function and public engagement.

In summary, the evolution of cardboard from humble packaging to a serious contender in architectural innovation combines heritage, sustainability, and social significance. Its versatility—from historical paper structures to modern modular homes and crisis response buildings—demonstrates the material's unique ability to address contemporary architectural challenges. Projects like the Red Cross On The Street building not only advance sustainable design principles but also represent an essential connection between architecture and societal values, ensuring that buildings can communicate purpose and foster community engagement beyond their structural roles.

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* Paragraph 1 – [[1]](https://architizer.com/blog/inspiration/stories/cardboard-architecture-heavy-lifting/), [[4]](https://www.curbed.com/article/shigeru-ban-complete-works-cardboard-tube-crisis-architecture.html), [[6]](https://www.archdaily.com/913567/cardboard-from-industrial-workhouse-to-shigeru-bans-master-material)
* Paragraph 2 – [[1]](https://architizer.com/blog/inspiration/stories/cardboard-architecture-heavy-lifting/)
* Paragraph 3 – [[2]](https://www.architectmagazine.com/technology/products/consider-the-possibilities-of-cardboard_o), [[5]](https://www.arch2o.com/innovative-corrugated-cardboard-buildings/)
* Paragraph 4 – [[3]](https://www.architectureanddesign.com.au/features/list/5-amazing-examples-of-cardboard-architecture-inclu/), [[7]](https://www.architects.zone/paper-architecture/), [[4]](https://www.curbed.com/article/shigeru-ban-complete-works-cardboard-tube-crisis-architecture.html), [[6]](https://www.archdaily.com/913567/cardboard-from-industrial-workhouse-to-shigeru-bans-master-material)
* Paragraph 5 – [[1]](https://architizer.com/blog/inspiration/stories/cardboard-architecture-heavy-lifting/)
* Paragraph 6 – [[1]](https://architizer.com/blog/inspiration/stories/cardboard-architecture-heavy-lifting/), [[4]](https://www.curbed.com/article/shigeru-ban-complete-works-cardboard-tube-crisis-architecture.html), [[6]](https://www.archdaily.com/913567/cardboard-from-industrial-workhouse-to-shigeru-bans-master-material)

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## Bibliography

1. <https://architizer.com/blog/inspiration/stories/cardboard-architecture-heavy-lifting/> - Please view link - unable to able to access data
2. <https://www.architectmagazine.com/technology/products/consider-the-possibilities-of-cardboard_o> - This article explores the innovative use of cardboard in architecture, highlighting projects like the Wikkelhouse by Fiction Factory in Amsterdam. The Wikkelhouse is a modular prefabricated dwelling system made primarily of bio-based products, featuring composite exterior panels made of 24 layers of cardboard adhered with eco-friendly glue. Each module is lightweight, performs well in structural and thermal tests, and is fully recyclable, showcasing the potential of cardboard as a sustainable building material.
3. <https://www.architectureanddesign.com.au/features/list/5-amazing-examples-of-cardboard-architecture-inclu/> - This article presents five remarkable examples of cardboard architecture, including the Christchurch Cardboard Cathedral by Shigeru Ban. Constructed after the 2011 earthquake, the cathedral features an A-frame design with 98 cardboard tubes and 8 shipping containers. The structure is treated to be water-resistant and fire-retardant, demonstrating the durability and sustainability of cardboard in building design.
4. <https://www.curbed.com/article/shigeru-ban-complete-works-cardboard-tube-crisis-architecture.html> - This article revisits the work of Japanese architect Shigeru Ban, renowned for his use of cardboard tubes in architecture. It highlights projects like the Paper Church in Kobe, Japan, built in 1995 after the Great Hanshin earthquake. The church was constructed using 58 cardboard tubes in an elliptical pattern, showcasing the versatility and strength of cardboard as a building material.
5. <https://www.arch2o.com/innovative-corrugated-cardboard-buildings/> - This article discusses innovative applications of corrugated cardboard in architecture, featuring the Wikkelhouse by Fiction Factory in the Netherlands. The Wikkelhouse is a modular dwelling system made of 24 layers of corrugated board, bound together by adhesives and covered in foil for protection against rain. Each module is lightweight, recyclable, and can be combined to form larger dwellings, exemplifying the potential of cardboard in sustainable building design.
6. <https://www.archdaily.com/913567/cardboard-from-industrial-workhouse-to-shigeru-bans-master-material> - This article examines the transformation of cardboard from an industrial byproduct to a primary material in architecture, focusing on Shigeru Ban's work. Ban has utilized cardboard tubes in various projects, including the Paper Dome in Taiwan, a temporary church constructed using paper tubes as structural elements. The article highlights the material's versatility and sustainability in architectural applications.
7. <https://www.architects.zone/paper-architecture/> - This article explores the concept of paper architecture, featuring the Cardboard Cathedral in Christchurch, New Zealand. Built after the 2011 earthquake, the cathedral is constructed using 98 cardboard tubes and 8 shipping containers. The structure is treated to be water-resistant and fire-retardant, demonstrating the durability and sustainability of cardboard in building design.