



CASE STUDY

This best practice highlights how the Duomo di Piacenza retrofit demonstrates a sustainable approach to heritage conservation by reducing the use of reinforced concrete and reintroducing traditional timber structures. Through the replacement of high-impact materials with natural, low-carbon alternatives, the intervention reduced environmental impact while improving seismic safety and restoring the building’s original structural logic.



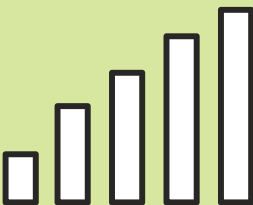
Introduction of the project and its sustainability- related goals

Green Concrete Technology
and Materials Used



Environmental benefits

Economic and Social Impact



Interviews & lessons learnt



**DUOMO di Piacenza
Cattedrale di Santa Maria
Assunta e Santa Giustina**

Piazza Duomo – Piacenza
(ITALY)



Introduction to Piacenza Cathedra restoration

The seismic upgrading of the Duomo di Piacenza demonstrates how sustainability principles can be applied to historic heritage conservation.

Built in the Romanesque period, the Cathedral is one of the most important monuments of Piacenza.

Post-war interventions (1955–1970) introduced **reinforced concrete beams** and hollow clay–concrete slabs, **increasing structural loads and altering the building’s original structural balance**.

The recent intervention aimed to restore structural coherence while reducing environmental impact.



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KEY FACTS

Location: Piacenza, Italy

Construction time: 330 days

Investment: €1.86 million

Project authority: Italian Ministry of Culture

Funding: PNRR – NextGenerationEU

Green Concrete Technology and Materials Used

From Concrete to Timber

The core action was the replacement of reinforced concrete elements with traditional timber structures, restoring the cathedral's original structural logic.



Main Works

- Removal of hollow clay-concrete roof slab (central nave)
- Demolition of overloaded roof in the north transept
- Removal of reinforced concrete beams above the dome drum
- Installation of new timber trusses following the original layout
- Reconstruction of the roof with wooden boards and clay tiles

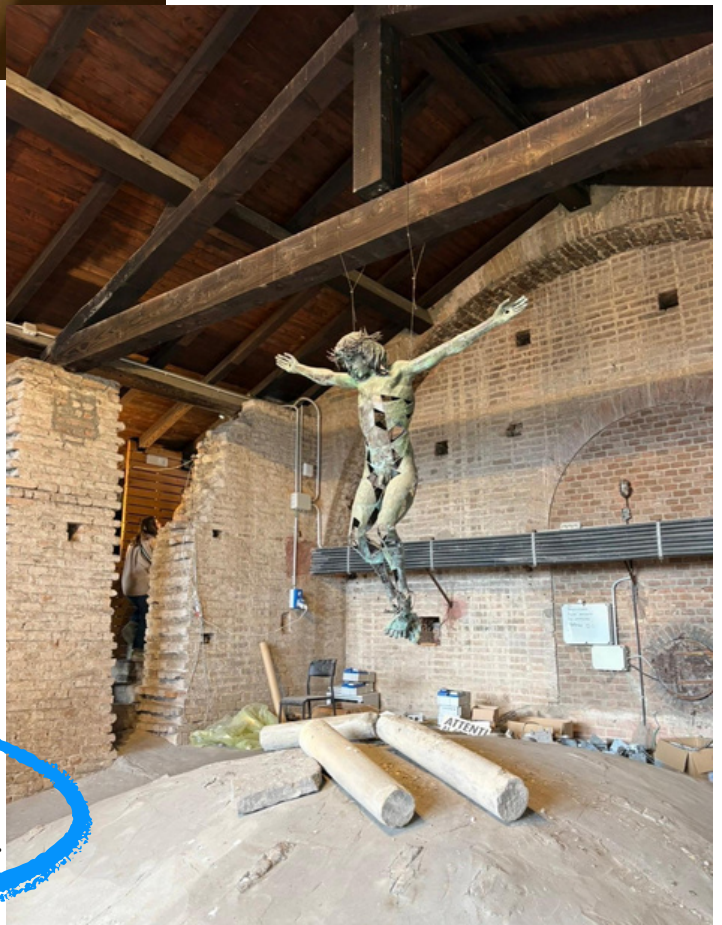


Additional Improvements

- Five new timber floors in the bell tower
- Structural tie-rod reinforcements

Construction of a new access staircase

The intervention preserved the historic architectural morphology while improving safety.



Environmental benefits

The replacement of reinforced concrete beams with timber trusses generated substantial environmental benefits

Lower Carbon Footprint

Cement production accounts for 7–8% of global CO₂ emissions. By removing reinforced concrete elements and avoiding new cement production, the project achieved:



Reduced embodied carbon



Lower environmental impact of materials



Decreased overall embodied energy

Timber has a favorable carbon balance: trees absorb CO₂ during growth, and this carbon remains stored in the material throughout its service life

Structural Lightening

Timber is much lighter than reinforced concrete. This resulted in:



Reduced loads on the dome drum



Improved seismic behaviour



Lower stress on historic masonry walls



Reduced Future Energy Consumption

Timber roofing systems offer improved thermo-hygrometric regulation compared to hollow clay–concrete slabs. This contributes to:



Greater indoor microclimatic stability.



Reduced thermal dispersion



Lower long-term energy demand for climate control.

Economic and Social Impact

The intervention has generated positive socio-economic outcomes:



Engagement of specialized craftsmen in timber restoration.



Development of expertise in sustainable heritage retrofitting.



Enhancement of one of the city’s primary cultural attractions, welcoming over 100,000 visitors annually.



Ensuring the Cathedral’s structural safety and sustainability meant not only preserving a religious monument, but strengthening a central element of urban identity and the cultural economy of the historic center

Interviews and lessons learnt

Do you want to learn more directly from the experts who realised the project? Watch the interview [here!](#)



Lessons learnt



A Replicable Model for Sustainable Construction

The intervention at the Duomo di Piacenza demonstrated that sustainability principles apply not only to new buildings, but also to historic restoration projects.

Within the HESTIA framework, this case became a concrete example of:

- Reducing reliance on traditional cement with interventions in line with historical construction techniques.
- Replacing high-impact materials with natural, low-carbon alternatives.
- Integrating seismic safety, heritage conservation, and ecological transition.

The completed project achieved its intended objectives: seismic improvement, structural load reduction, decreased environmental footprint, and restored historical coherence.

The Duomo di Piacenza thus stands today not only as a symbol of Romanesque architecture, but also as a testament to a new approach to construction—lighter, more responsible, and more sustainable.



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