# WJE

# Woolworth Building

Terra Cotta and Masonry Facade Restoration | New York, NY







**CLIENT**

The Ehrenkrantz Group

**BACKGROUND**

The Woolworth Building is a fifty-eight-story office tower designed by Cass Gilbert and completed in 1913. It was the tallest building in the world until 1931. The structure is considered a historically significant landmark and is listed in the National Register of Historic Places.

More than sixty years after its construction, the terra cotta facade was becoming increasingly unstable, as chunks of the building began to fall into a courtyard below. On behalf of the F.W. Woolworth Company, WJE was retained by The Ehrenkrantz Group to serve as masonry consultant to perform all field and laboratory testing.



**SOLUTION**

WJE's multidisciplinary team performed a comprehensive series of field and laboratory studies and determined three main factors to be causes for rapid deterioration of the terra cotta. Spalling of the terra cotta glazing was due to thermal incompatibility of the glaze and clay body. WJE confirmed that no provisions had been made to accommodate moisture and thermal expansion due to extremely high compressive forces in the terra cotta. The team also verified corrosion of embedded steel elements as a result of water entering the walls, which in turn caused more distress.

To alleviate the mounting compressive forces, WJE architects and engineers carefully cut out selected horizontal expansion joints and re-anchored mildly deteriorated terra cotta units. Then, 26,000 severely deteriorated terra cotta units were replaced with architectural precast concrete.

As technical consultant, WJE developed and utilized several groundbreaking investigative methods, including strain relief testing, to diagnose causes of distress. Repair of the terra cotta at the Woolworth Building remains one of the most noteworthy building envelope rehabilitations ever undertaken—in terms of both the magnitude of the project and the importance of the building.

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