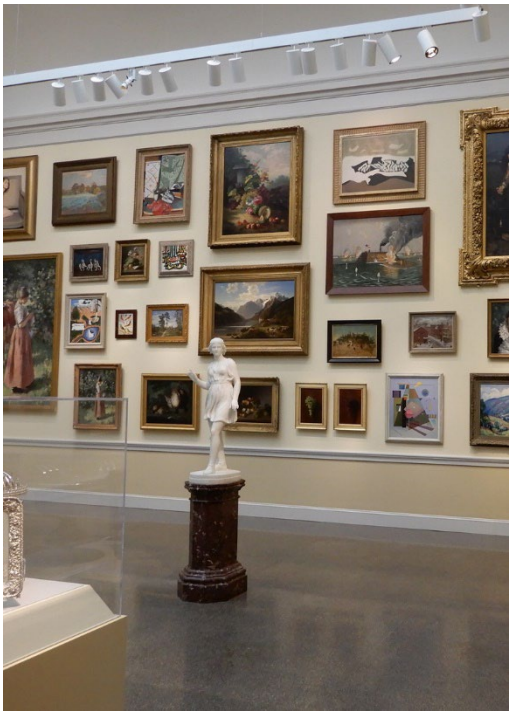
PROJECT PROFILE

Baltimore Museum of Art

Vibration Control during Multi-Phase Internal Construction Projects | Baltimore, MD



CLIENT

Baltimore Museum of Art

BACKGROUND

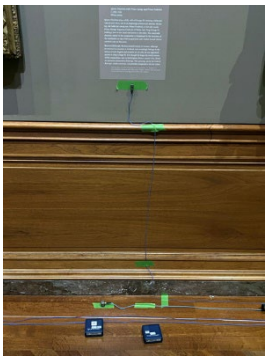
Founded in 1914 with a single painting, the Baltimore Museum of Art (BMA) is now home to 97,000 works, spanning the art of ancient Egypt to the works of today.

Multi-phase renovations for the Center for Prints, Drawings and Photographs and Matisse Studies spanned multiple years. Phase 1 was on the lower level directly below active galleries. Phase 2 was on the third floor directly above and adjacent to galleries and art storage vaults. A subsequent phase involved renovation of lower level art storage rooms below active galleries and a study center directly below art storage rooms.

Protecting the museum's collections from the vibrations caused by the construction was of paramount importance.

WJE ENGINEERS ARCHITECTS MATERIALS SCIENTISTS

The Baltimore Museum of Art retained WJE as a vibration control expert to develop guidance for protection of its collections during multiple phases of renovation within the existing museum. Several components of the planned construction included work that would generate significant ground- and structure-borne vibrations close to art collection areas. Renovations for Phases 1 and 2 of the BMA's Center for Prints, Drawings, and Photographs and Matisse Studies spanned multiple years, and renovations for lower-level vaults and another study center occurred later.



SOLUTION

Using a vibration control methodology developed and refined through work on dozens of museum projects, WJE vibration engineers performed work in three stages: before, at the start of, and during construction—all tailored to the museum's specific needs under each project.

Before construction, we conducted vibration testing by instrumenting the collection areas with arrays of vibration sensors while the contractor performed controlled trial activities with selected vibratory equipment. Data were used to develop detailed vibration control and monitoring plans for each project, including stand-off distances for critical equipment and minimum requirements and guidance to mitigate vibration transmission.

At the start of construction, vibration trials were conducted to verify vibration transmission for equipment not tested earlier. During construction, vibration monitoring was performed along "safe lines" between the construction and art collection areas. Monitors were programmed to send notifications of any above-threshold vibrations so that work could stop, the data reviewed, and methods changed if appropriate before construction resumed.

Our expert execution of vibration control provided for advance planning by the museum, accurate bidding by the contractors, and unencumbered