

Case 10.7 Anchoring quality of granite panels evaluated by s'MASH Impulse Response, Madison Avenue 520, New York, USA

One panel on an 80-story tall building cladded with granite panels had fallen off and killed a person on the sidewalk below. The New York Port Authority required all panels on the building to be tested for anchoring quality, evaluated by Non-Destructive Testing (NDT).



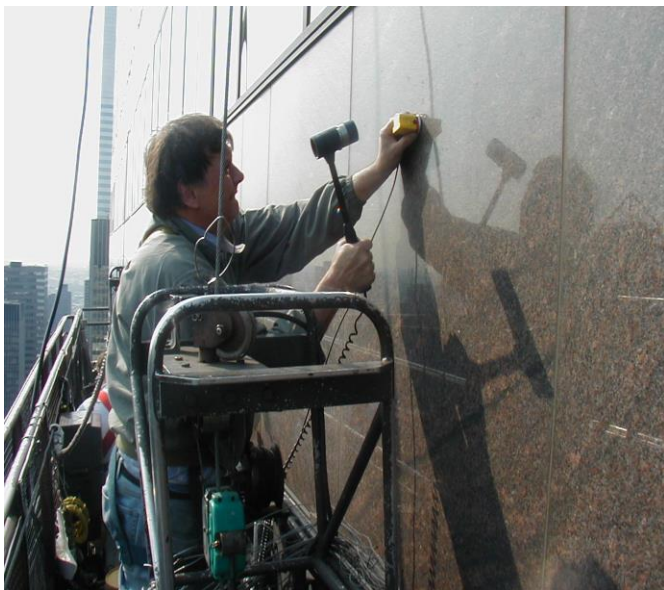
During construction of the high rise the granite panels had been fastened to a steel frame by means of 6 epoxy anchors. Holes had been drilled into the panels to half depth of the thickness, the anchors epoxied in the holes and subsequently fastened to the steel frame after which the frame sections were hoisted into position and fastened to the main steel structure.

The s'MASH Impulse Response system ¹⁾ was selected for the NDT evaluation as this system had been used before successfully on distressed terra cotta cladding on the Wrigley Building downtown Chicago. s'MASH tests were conducted from the 4th to the 13th floor around the entire perimeter. Internal delaminations and splitting within the terra cotta panels were detected by s'MASH, confirmed by coring.

In the actual case from New York the s'MASH was used on all panels along the perimeter and the anchoring evaluated by the s'MASH mobility plot.

Each granite panel was tested at 6 locations close to the position of the anchors. In sections at the 50th floor very high mobility was observed. Subsequently the gypsum walls inside the offices were dismantled to get access to the steel frame containing the anchors for inspection.

It was discovered that these anchors were not epoxied correctly in the granite panels, several of them were not epoxied at all.



All defect anchors were replaced by well epoxied anchors and the panels re-tested after hardening of the epoxy.

¹⁾Germann Instruments: "s'MASH Impulse Response Testing", Copenhagen, Denmark, November 1st, 2021