

## Video of Concrete X-rays, Drilling Prevents \$1M Loss

**Project Owner:** *Anonymous*

**Project:** *Anchoring steel solar panel canopy frames to top of an existing 8-story concrete parking structure.*

**Cost of video:** *\$5,500*

**Time saved:** *2-3 months of administrative and project manager time*

**Money saved:** *\$1 million+*

Retrofitting a canopy of solar panels atop an 8-story parking garage poses some structural and logistical challenges. The canopies will be subject to high wind shear, and the steel frames holding them will need to carry a larger load than they would in a ground installation.

To bolt down the frame anchors, 48 holes will be carefully drilled into the existing concrete slab so as not to compromise the existing structural steel and post-tension cables.

Workers use conventional 2D x-rays to locate all of the steel and post-tension cables, taping out a map of the underlying elements. The frame and solar panels are installed, and the building's structural engineer is called out to inspect.

In a meeting with the engineer, the project manager learns that due to poor communication in the handoff from design to construction, the project was built from a set of drawings that were not finalized for construction.

Although the engineer thinks the calculations are correct, he is concerned the holes could not have been drilled without compromising the building's integrity.



Despite the project manager's description of how the drilling process was carried out, the engineer refuses to accept liability for the work. He requests 3D x-rays to verify structural integrity.

Only one company in the country does 3D x-rays, and they quote a price of \$600,000. They also require evacuation of a one-block radius. No one with a pacemaker can be within two blocks, and no planes can fly overhead. The total price for such an operation would approach \$1 million, not including liquidated damages.

Fortunately, the project manager had been systematically using custom video on demand throughout the job for safety and verification of workmanship. The video also provided a visual record showing the location of all the steel and post-tension cables for future maintenance purposes.

Although skeptical at first, once the engineer had seen extensive, detailed video of the x-raying, mapping and drilling procedures on the project's website, he was convinced that the work had been done properly.

Roughly \$5,500 worth of video prevented a loss of over a million dollars, and a delay in commissioning.



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1757 East Bayshore Road, Suite 21 Redwood City, CA 94063 Phone: 650.701.1230 [www.builderseye.com](http://www.builderseye.com)