



CALL FOR PARTICIPANTS

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A Laser Scanning Interlaboratory Study on Selected ACI 117 Tolerance Compliance Verification

Keywords: Laser scan, concrete tolerance, precision

Objective

- **Previous Study:** In 2018, there was a laser scan study to determine target coordinates from scanner organized by the American Society of Concrete Contractors (ASCC). Eight parties participated in that study at a job site in Walnut Creek, CA, USA. One of the conclusions based on all the data collected from that study was that it is appropriate to use a laser scanner for specification compliance when measuring a vertical tolerance of 5/8 in. or more and a horizontal tolerance of 1 in. or more. With the 3 best participants' data, the vertical tolerance to be verified with the scanner can be as low as about 1/4 in., and horizontal tolerance can be as low as 1/2 in. following best practices.
- **Objective 1:** Revisit a similar procedure after six years with the hardware advancing and collect data for a precision statement following ASTM E691-23
- **Objective 2:** Data from this study will be applied to a few selected ACI 117-10 tolerances (listed below) with the consideration of the human interpretation of the data (i.e. when an operator checks a slab edge with a 1/2 in. chamfer from the point cloud, he or she might not be able to extract the actual edge of the slab when there is not a set-up position close to the edge, thus the result will lead to a false reading. Another example is that some operators use sophisticated software to generate "best fit" linework to idealize the edge that does not reflect the true edge, etc.)

Participants

10 qualified candidates (single or multiple individuals from each party) from different geographic regions

Location

A job site in the San Francisco Bay Area, CA, USA with recently poured elevated slab and vertical concrete elements.

Time

Two days on a weekend (Saturday and Sunday) in July, 2024

What do you get from this study

- An article will be published on Concrete International Magazine in September or later issues of 2024, and/or other journals;
- All participants and companies will be given credits for the article;
- Help the concrete industry with the use of laser scanning technology by providing more precision statement data;

- An opportunity for experience and best practice exchange to optimize and maximize laser scanning useage on your projects.

Selected applicable ACI 117-10 (reapproved 2015) tolerances

- 4.1 Deviation from Plumb
- 4.2 Deviation from location
- 4.4 Deviation from elevation

ASTM standard

ASTM E691-23 Standard Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

Study Outline (test day)

Step 1: Mark the test areas (10 points on slab edges, bottom of columns/walls, top of columns/walls, openings, example as shown on the photo below);

Step 2: Provide four survey controls (grid intersection points and elevations) surveyed from a total station;

Step 3: A total station will be used as baseline measurements on these 10 spots;

Step 4: A CAD file will be provided as the design location and elevation (shared the same coordinate as the survey controls provided on-site) for participants to decide the concrete element deviation from the design (plumb, location, or elevation) on the 10 test spots;

Step 5: All 10 participants will be given 1-2 hours to capture the required testing areas and controls (reproducibility requirement);

Step 6: Each participant will perform scans twice on the same testing areas (time slot will be Saturday morning, Saturday afternoon, Sunday morning, and Sunday afternoon) (repeatability minimum requirement);

Step 7: All participants are required to report results on an Excel data sheet template (to be developed) within 10 days after the study.

