Case Study: Comparative Measurement of a Terrace-Slab Crack

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1. Executive Summary

This case study examines how the measured length of a single structural crack changes depending on the measurement technique used. The crack, located in a terrace slab, was assessed using three manual methods: a straight tape measurement, a thread-and-pin path measurement, and a pin-to-pin segment measurement. The manual results were then intended to be compared against the prediction produced by the Snapclaim assessment tool. The study shows that the chosen method materially affects the recorded length, and that methods which follow the crack's curvature give larger values than a straight-line reading.

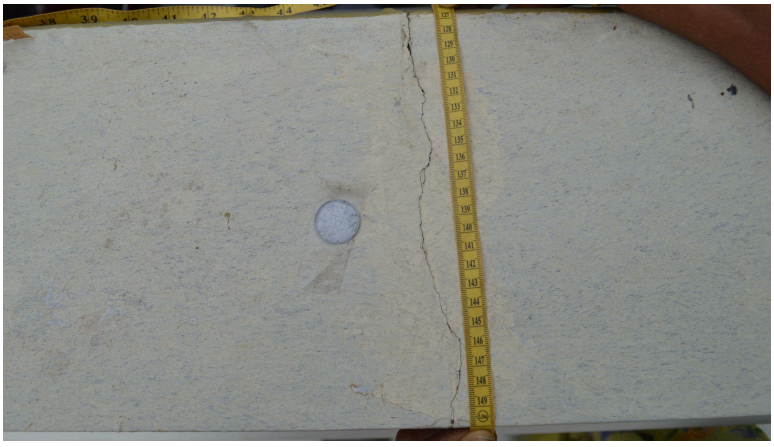
2. Background and Objective

Crack length is a basic input to damage assessment and repair estimation. Cracks are rarely straight, so a single end-to-end reading can understate the true length of the crack path. The objective of this study was to measure the same crack by three different manual methods and to evaluate how closely each agrees with the length predicted by Snapclaim.

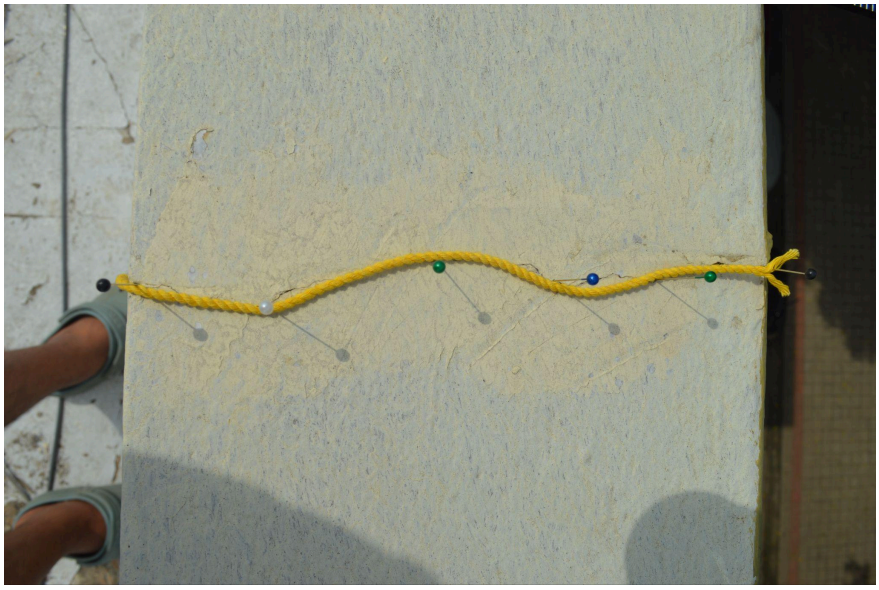
3. Methodology

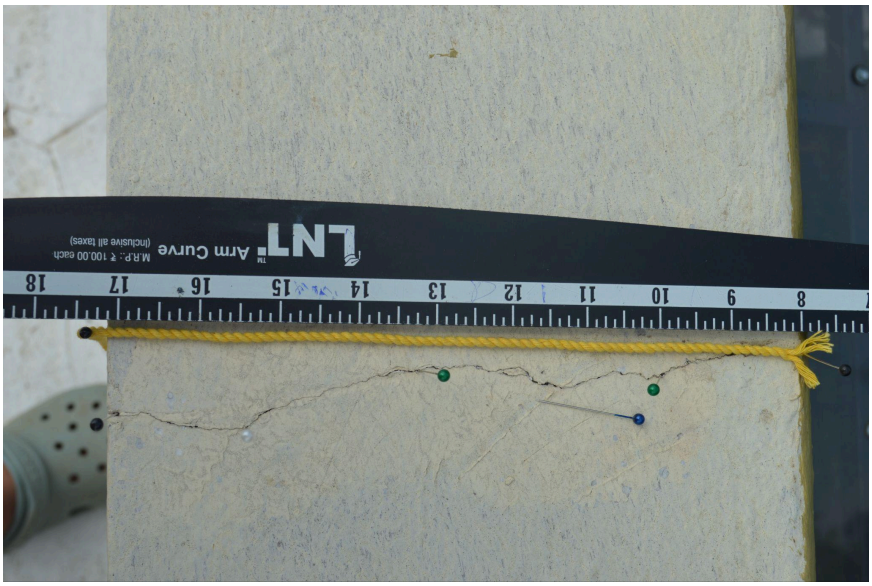
The vertical crack on the terrace slab was photographed with a coin placed in frame as a scale reference. It was then measured using the following three methods.

Method 1: Straight tape measurement. A standard measuring tape was laid across the crack and only the end-to-end length was recorded. The curves of the crack were not accounted for.

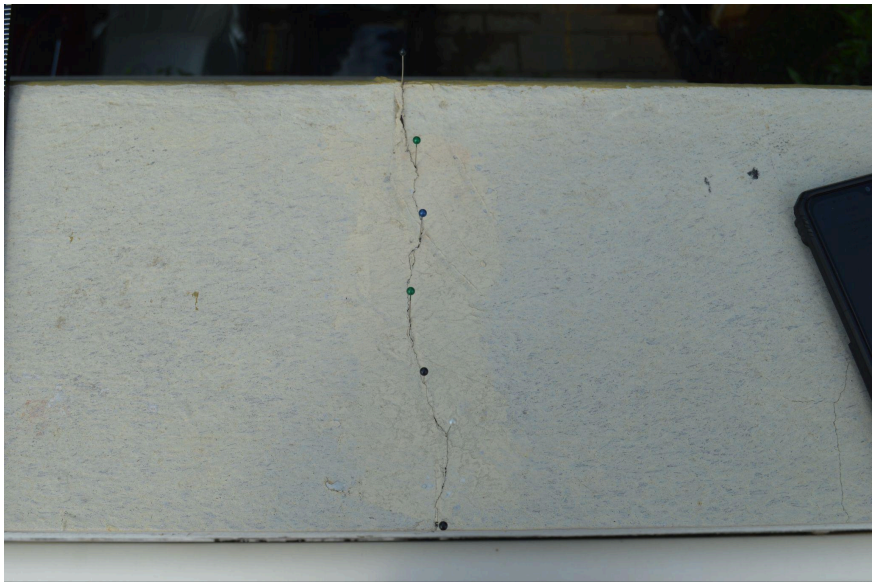


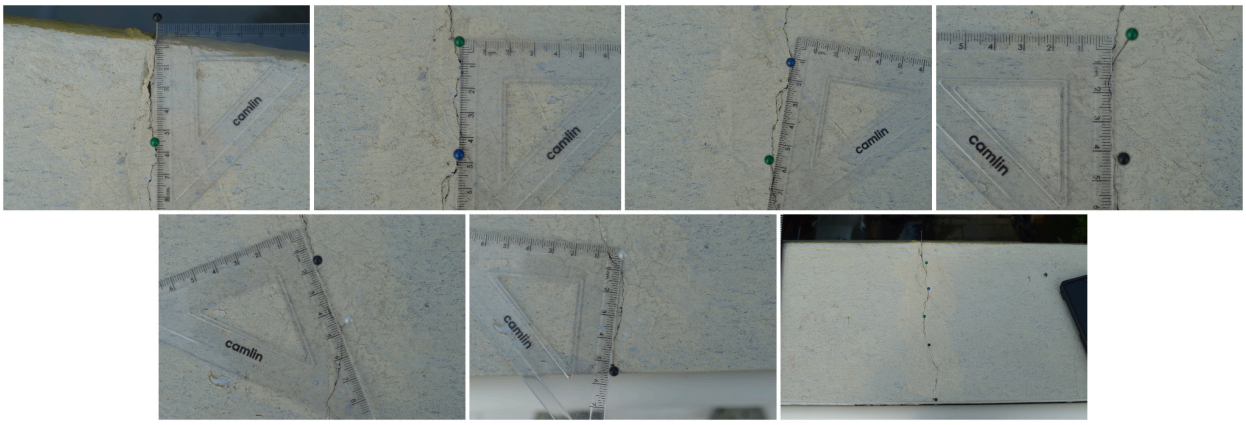
Method 2: Thread-and-pin path measurement. Pins were placed along the crack and a thread was run around them so that it followed the crack path. The thread was then straightened and measured against a tape, giving the path length.





Method 3: Pin-to-pin segment measurement. The distance between each consecutive pair of pins along the crack was measured individually using a set square and scale, and the segments were summed to give a more accurate path length.





4. Results

Method	What was measured	Recorded value	Notes
1. Straight tape, length only	Straight span of the vertical terrace-slab crack (tape reading from about 127 cm to 149.5–150 cm)	227 mm (range 225–230 mm)	Recorded as the paired ground-truth reference for this case.
2. Thread on pins, then measured	Path length of a crack read against a tape	238.8 mm (9.4 in), ±4 mm	Read twice and confirmed. Taken from a different, horizontal crack with no coin in frame, so it is not directly comparable to the terrace-slab crack.
3. Pin-to-pin distances	Six straight spans between pins along the crack	274 mm (27.4 cm)	Individual spans: 5.2, 4.8, 4.5, 4.2, 2.9 and 5.8 cm.

Pin-to-pin segment lengths (Method 3)

Segment	Length (cm)
1	5.2
2	4.8
3	4.5
4	4.2
5	2.9
6	5.8
Total	27.4 (274 mm)

Snapclaim predicted length: 232 mm

Figures

- Figure 1: Terrace-slab crack with coin reference and tape across the crack.
- Figure 2: Thread-and-pin measurement of the crack path.
- Figure 3: Thread measurement read against a ruler.
- Figure 4: Pin-to-pin segment measurements with a set square.
- Figure 5: Table of the six pin-to-pin spans (picture number and approximate crack length).

5. Analysis and Discussion

The straight tape reading (227 mm) is the shortest value because it ignores the meandering of the crack. The pin-to-pin method (274 mm) follows the crack path most closely and is expected to be the most accurate of the three for a curved crack. The thread-and-pin value (238.8 mm) falls between the two, but it was taken from a different crack and should be treated as an indicative result only.

The author observed that the manual values were close to the length predicted by Snapclaim, within a 5% error margin. This agreement should be confirmed by inserting the Snapclaim value in Section 4 and calculating the percentage difference for each method. Note that the straight-tape and pin-to-pin values differ from each other by roughly 20%, so they cannot both fall within 5% of the same prediction.

6. Limitations

- The thread-and-pin measurement was not performed on the same crack as the other two methods.
- Only one crack was fully measured, so the sample is too small to generalise.
- The tape and thread readings carry a reading tolerance of a few millimetres.
- Pin placement affects the pin-to-pin result, since more closely spaced pins capture more of the curvature.

7. Conclusion and Recommendations

Measurement method has a clear effect on the recorded crack length. For curved cracks, a path-following method such as pin-to-pin segmentation should be preferred over a straight tape reading. To complete the validation against Snapclaim, the thread-and-pin measurement should be repeated on the terrace-slab crack and the Snapclaim prediction added so that the percentage error of each method can be reported.

Proof of snapclaim measurment:
https://snapclaim.pages.dev/reports/snapclaim-SC-D8ECE64B.pdf

2 · MEASUREMENTS

Item	Value	Evidence	Status
Crack length	232 mm	R005	CONFIRMED
Crack width	3.2 mm	R006	CONFIRMED
Surface affected	0.73 %	R002	CONFIRMED
Area	7.48 cm^2	R004	CONFIRMED
Severity	significant	R007	CONFIRMED