

August 2, 2016

GAIA Enterprises
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Subject: **Report of Evaluation and Testing of Salt Scaling Resistance
GAIA Enterprises Ice Melt and Traction Products
Safe Paw and Traction Magic
TEC Services Project No. TEC 16-1297.01 (Lab ID: 16-607)**

Dear Gaia Enterprises, Inc.:

Testing, Engineering and Consulting Services, Inc. is an AASTHO R18, ANS/ISO/IEC 17025:2005 and Army Corp of Engineers accredited laboratory. TEC Services is pleased to submit this report of our evaluation and testing performed on the Safe Paw and Traction Magic materials. The purpose of our services was to determine if the materials promoted damage to concrete during the ASTM C672-12 salt scaling test. Our report includes test results and microscopic observations. Our services were performed in accordance with the terms and conditions of our Service Agreement dated June 7, 2016. The results of our testing pertain only to the samples tested.

SCALING RESISTANCE TESTING (ASTM C672-12 *modified*)

Test Samples and Procedure:

The SafePaw and Traction Magic materials were applied to the surfaces of three day old concrete test slabs and tested in accordance with ASTM C672-12, *Standard Test Method for Scaling Resistance of Concrete Surfaces Exposed to Deicing Chemicals*. Testing ran for 14 cycles. Photos of the test slabs for both materials taken prior to, during, and after the completion of the testing are provided in **Figures 1 – 6** at the end of our report.

Test Results and Discussion:

The results of our testing are reported in **Table 1** at the end of our report. The results of the testing indicate no surface scaling occurred.

MICROSCOPIC EVALUATION OF SALT SCALING TEST SLABS (ASTM C856-14)

A section was obtained through the tested zone of the two (2) concrete salt scaling samples by sawcutting the samples perpendicular to the top surface (**Figure 7**). The sawcut plane intersected zones of the surface which were and were not tested for scaling resistance. One sawcut surface of each sample was ground flat and polished with progressively finer diamond polishing discs

(Figures 8 & 9). The polished sections had dimensions of approximately 4 inches tall by 6 inches wide. The prepared polished plane sections, polished billets and thin sections were examined in accordance with the applicable sections of ASTM C856, *Standard Practice for Petrographic Examination of Hardened Concrete*, using a digital microscope at magnifications of 20, 30, 50, 100 and 200X. The significant findings of the evaluations are discussed below.

- The concrete within both samples appears to have similar properties: air content, entrained air void quality, paste hardness, paste quality in upper zone of concrete. As a result comparing the test results for each sample is a fair assessment.
- No cracks, indications of freeze-thaw damage or salt scaling were observed beneath the surface of either test slab (Figures 10 – 13).

CLOSING

Testing, Engineering and Consulting Services, Inc. appreciates the opportunity to provide our professional services for this important project. If you have any questions regarding this report, or if we can be of further assistance please contact us at 770-995-8000.

Sincerely,

TESTING, ENGINEERING AND CONSULTING SERVICES, INC.



Brian J. Wolfe, P.E.
Principal Petrographer - Engineer
GA Registration No. 38133



Katelynn B. Garrett
Staff Geologist



Chip P. Sherwood Jr.
Project Manager

Attachments: Table 1: Results of Salt Scaling Resistance Testing

Photo Pages (Photos 1 – 17)

Table 1: Results of Salt Scaling Resistance Testing ASTM C672-12

Test Method	Cycles Completed	Safe Paw Material		Traction Magic Material	
		Avg. Visual Rating	Avg. Scaled Material (lbs/ft ²)	Avg. Visual Rating	Avg. Scaled Material (lbs/ft ²)
ASTM C672 – Salt Scale Resistance	2 Cycles	0	0.0	0	0.0
	4 Cycles	0	0.0	0	0.0
	6 Cycles	0	0.0	0	0.0
	8 Cycles	0	0.0	0	0.0
	10 Cycles	0	0.0	0	0.0
	12 Cycles	0	0.0	0	0.0
	14 Cycles	0	0.0	0	0.0

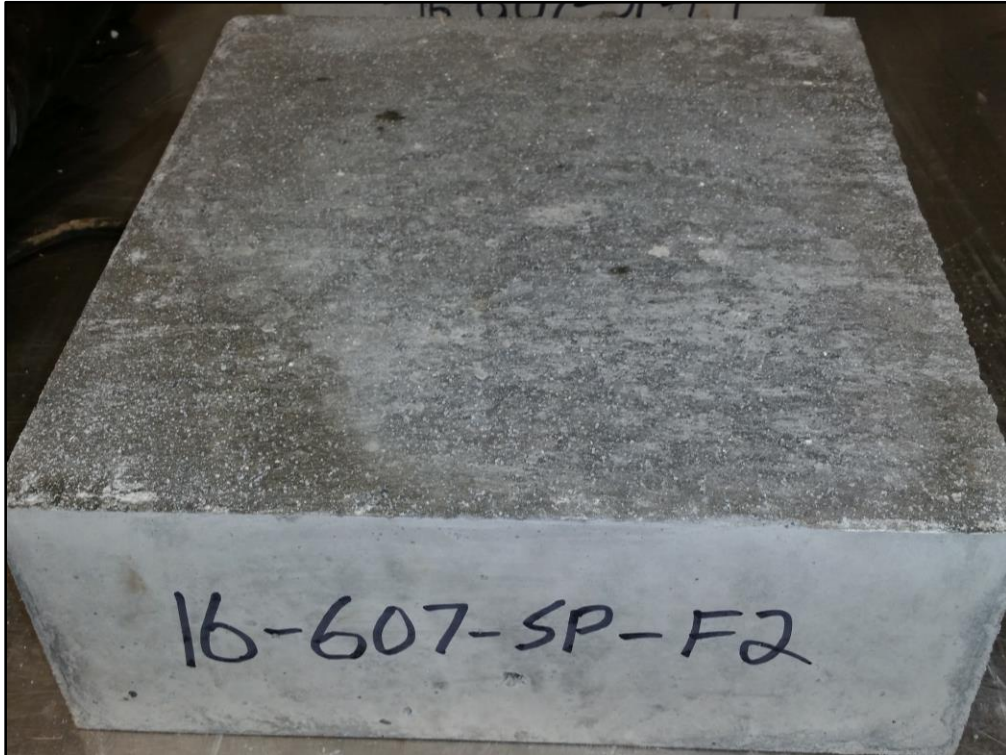


Figure 1. Photo of the Safe Paw sample prior to testing.



Figure 2. Photo of the Safe Paw sample during testing.



Figure 3. Photo of the Safe Paw sample after testing.

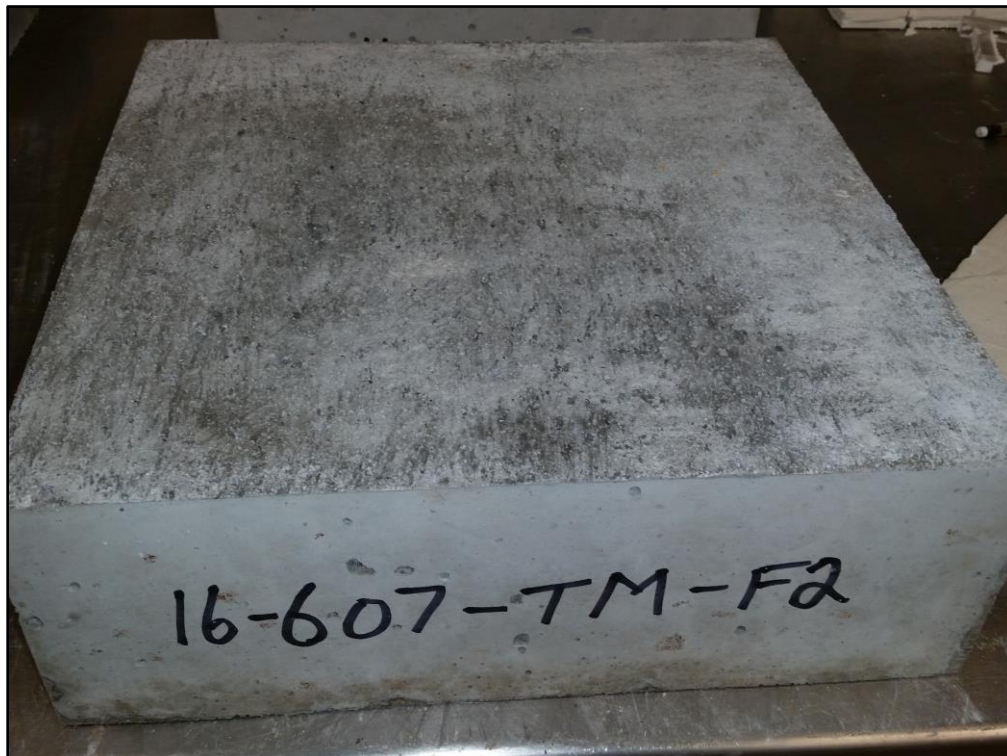


Figure 4. Photo of the Traction Magic sample prior to testing.



Figure 5. Photo of the Traction Magic sample during testing.



Figure 6. Photo of the Traction Magic sample after testing.

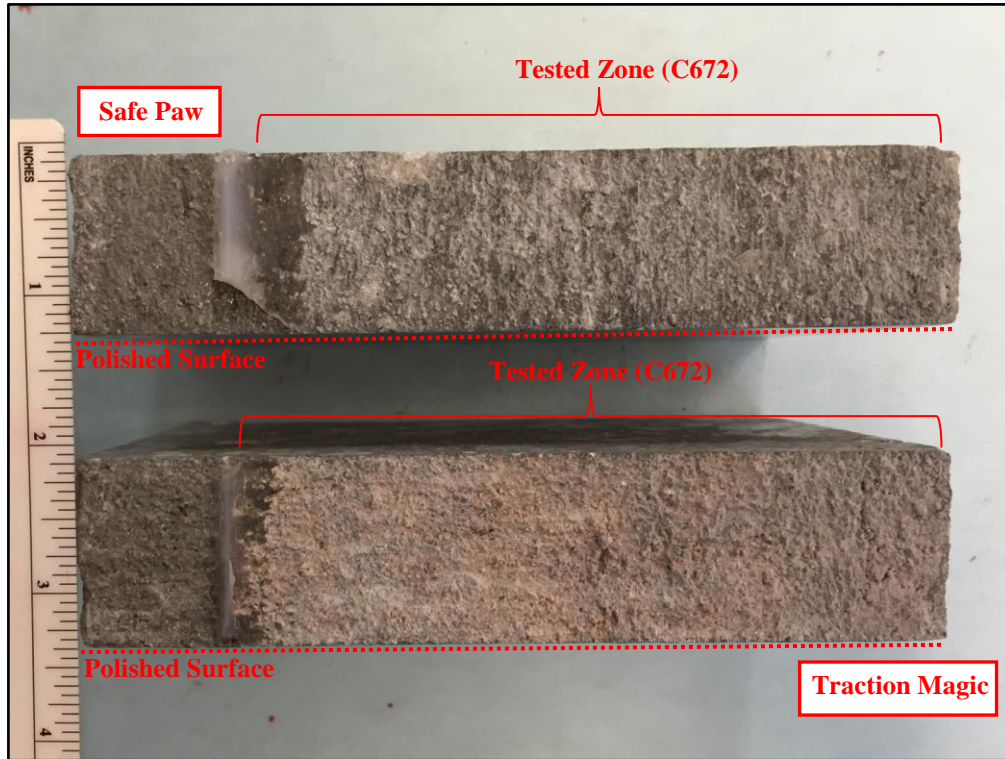


Figure 7. Photo of top surface of polished sections after sawcutting.

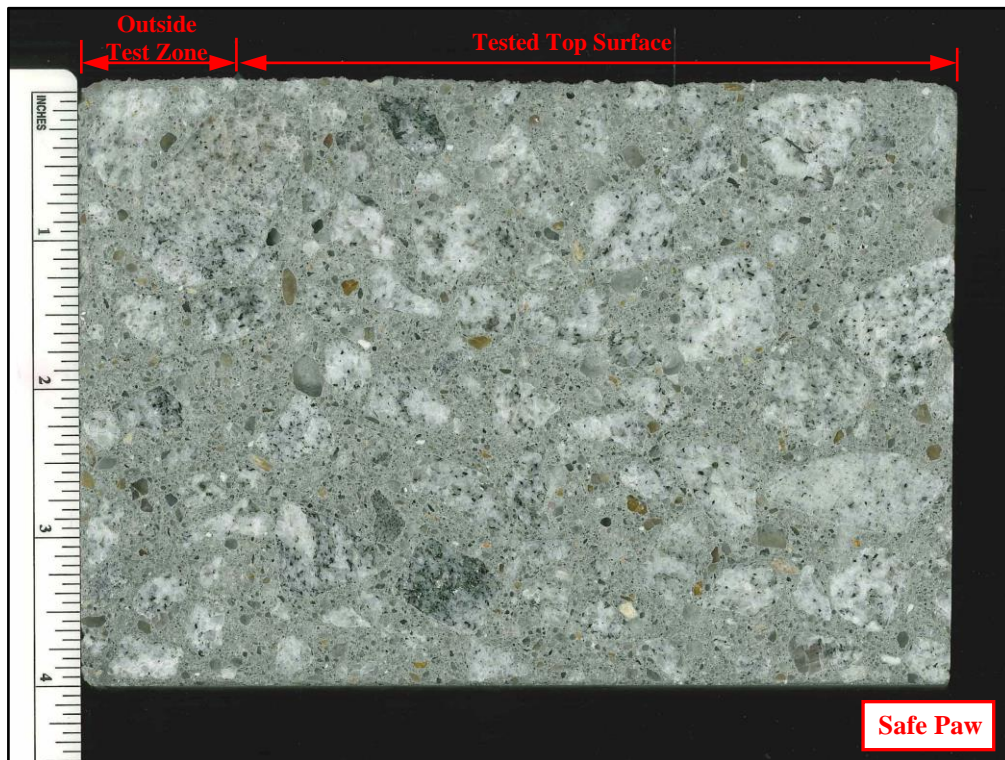


Figure 8. Scanned image of polished section of Safe Paw scaling resistance test slab.

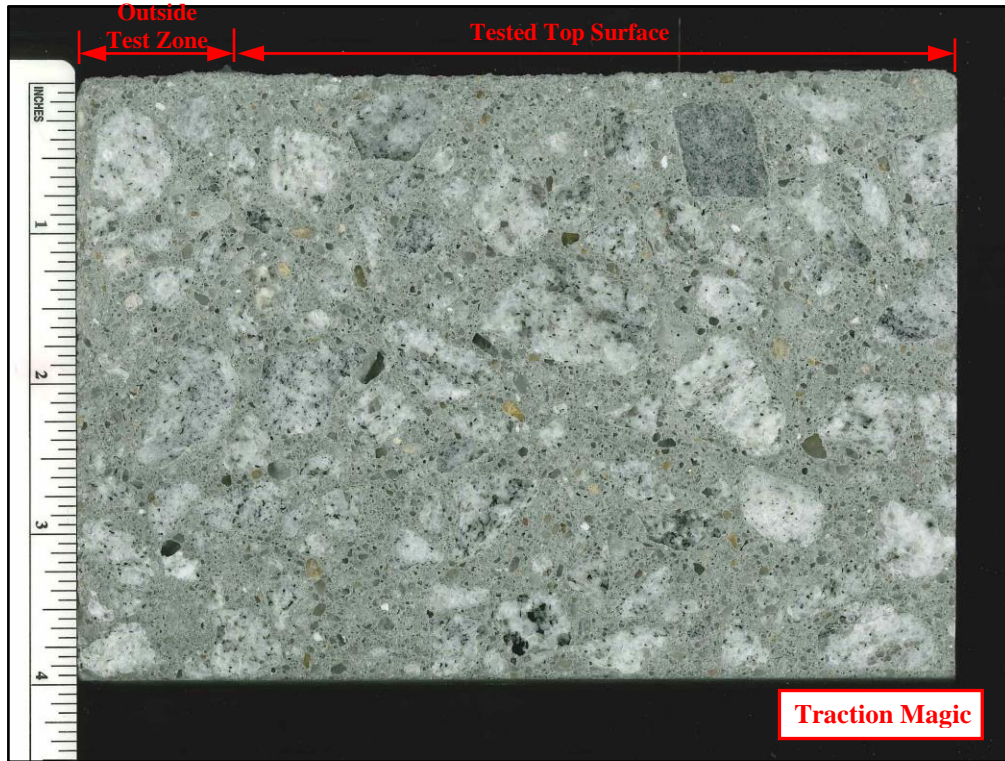


Figure 9. Scanned image of polished section of Traction Magic scaling resistance test slab.

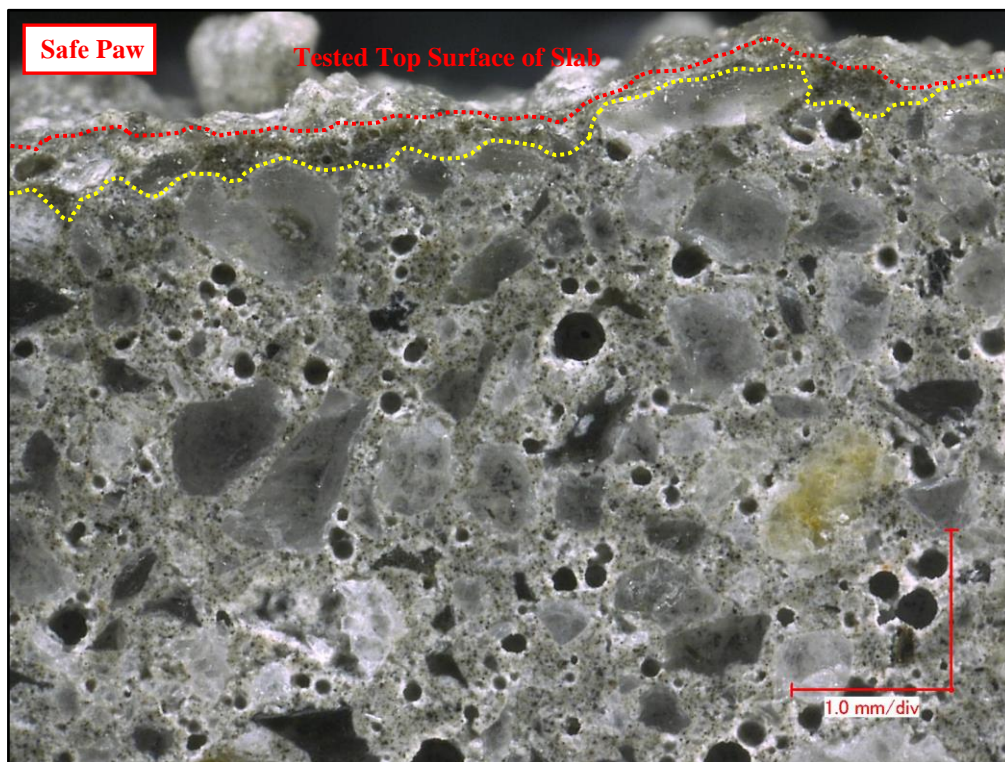


Figure 10. No cracks in concrete beneath the tested top surface (dotted red line) of the Soft Paw test slab. The yellow dotted line indicates the approximate absorption depth of the salt scaling solution.

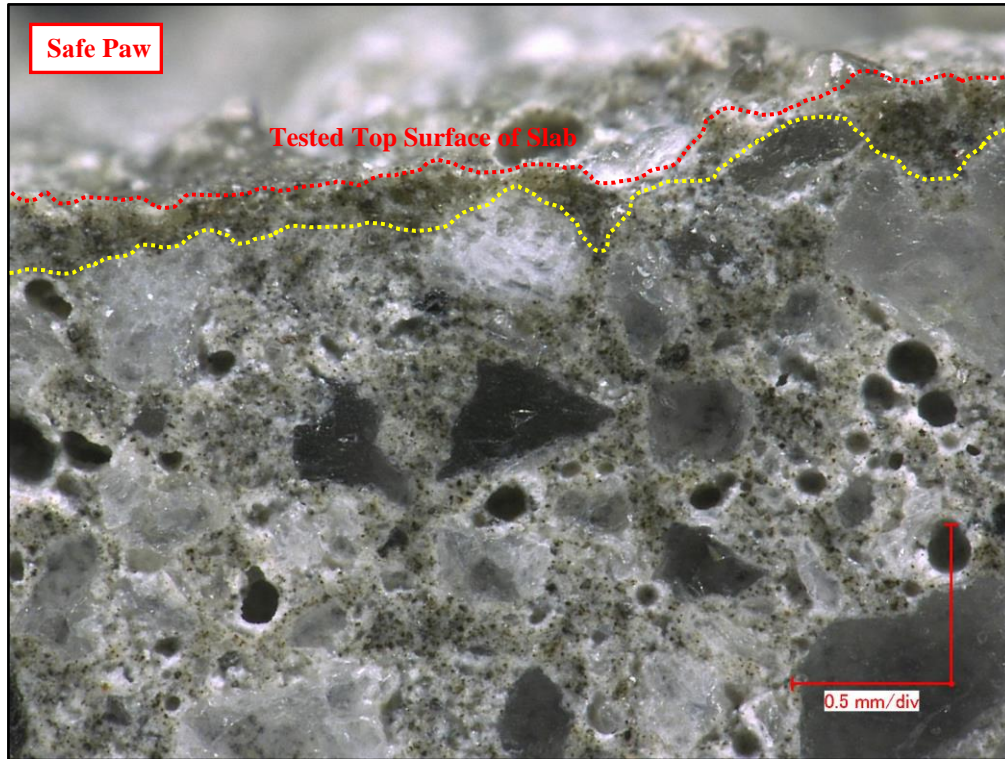


Figure 11. No cracks in concrete beneath the tested top surface (dotted red line) of the Safe Paw test slab. The yellow dotted line indicates the approximate absorption depth of the salt scaling solution.



Figure 12. No cracks in concrete beneath the tested top surface (dotted red line) of the Traction Magic test slab. The yellow dotted line is the approximate absorption depth of the salt scaling solution.

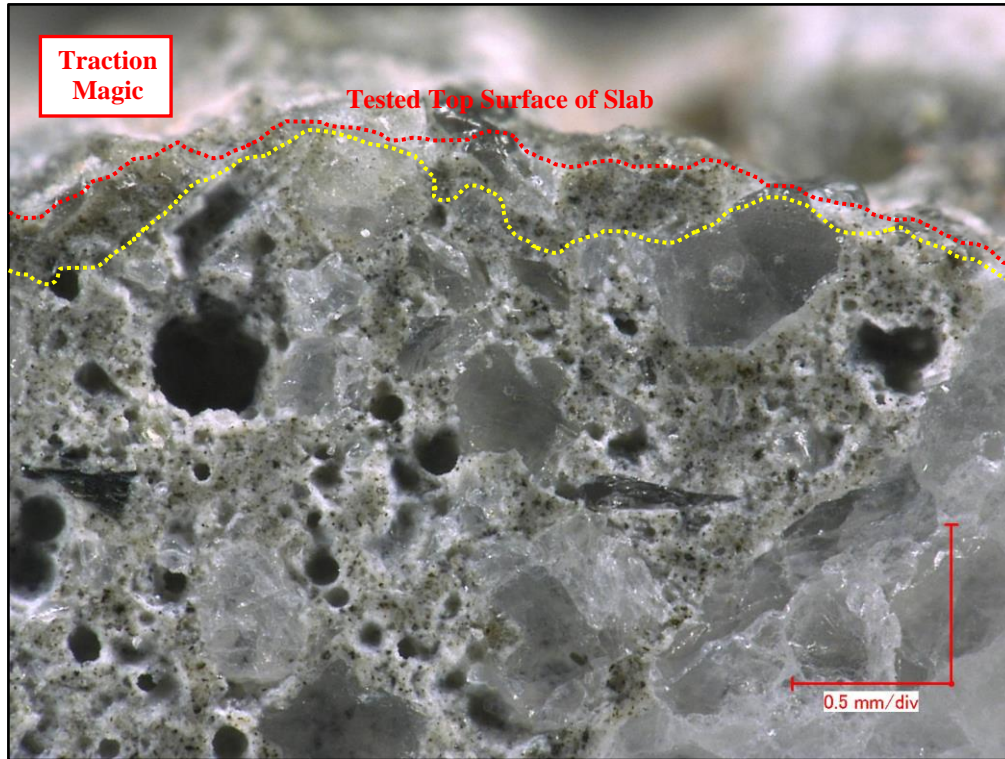


Figure 13. No cracks in concrete beneath the tested top surface (dotted red line) of the Traction Magic test slab. The yellow dotted line is the approximate absorption depth of the salt scaling solution.

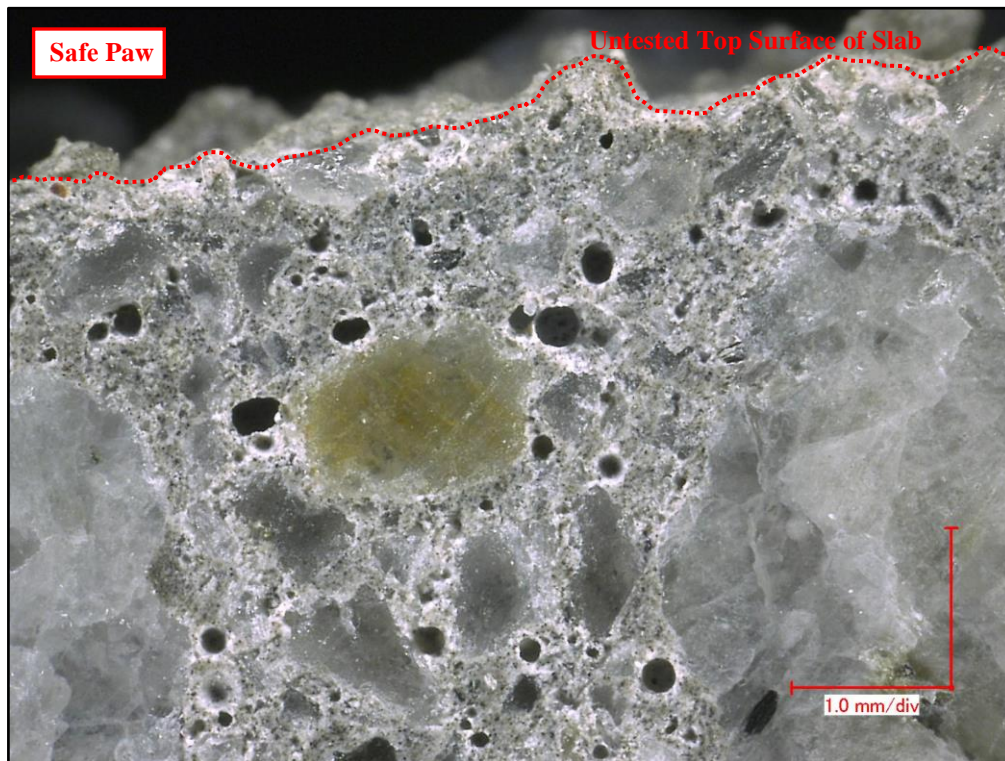


Figure 14. No cracks in concrete beneath the untested top surface (dotted red line) of the Safe Paw test slab. No relatively darker paste is present beneath top surface.



Figure 15. No cracks in concrete beneath the untested top surface (dotted red line) of the Safe Paw test slab. No relatively darker paste is present beneath top surface.

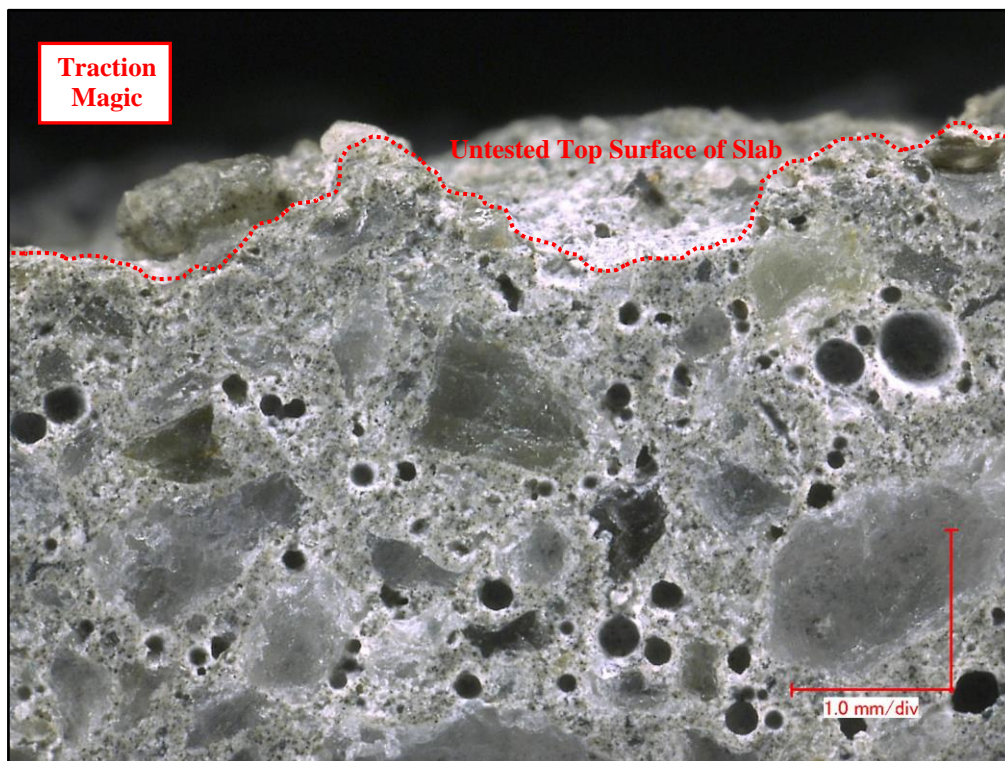


Figure 16. No cracks in concrete beneath the untested top surface (dotted red line) of the Traction Magic test slab. No relatively darker paste is present beneath top surface.

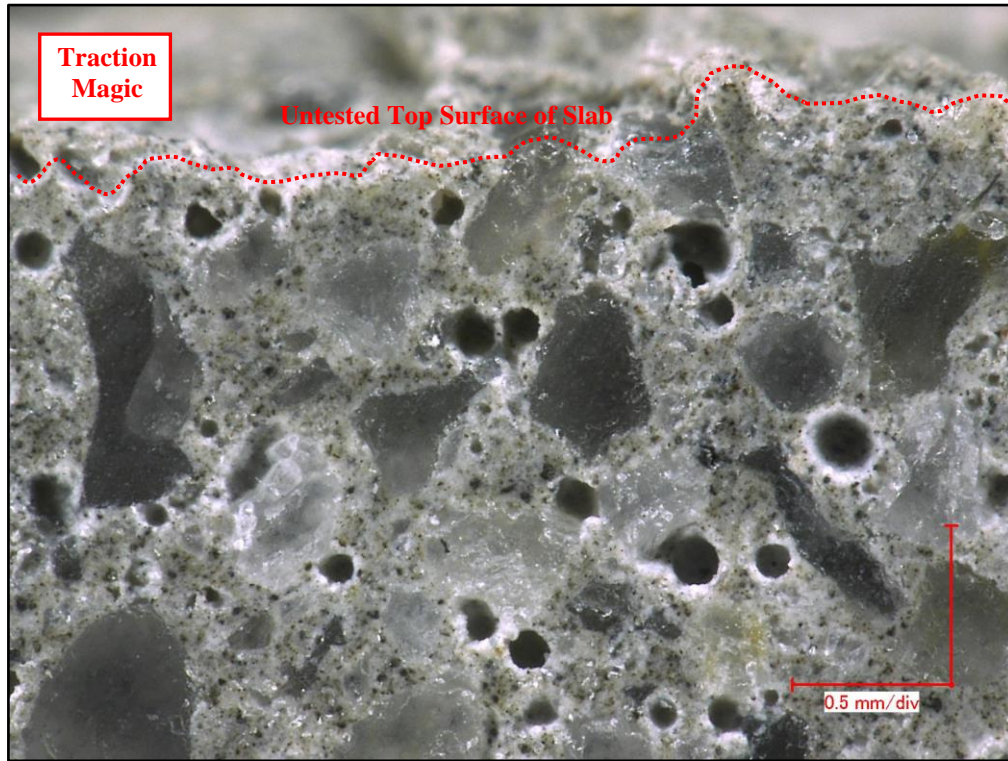


Figure 17. No cracks in concrete beneath the untested top surface (dotted red line) of the Traction Magic test slab. No relatively darker paste is present beneath top surface.