

September 28, 2010

Memo:

From: Brad Sleeper, General Manager

Re: Abrasion Testing for Lythic SPD Floor finish

Working with concrete cylinder samples provided by Professional Services Industries of Portland, Oregon, Lythic Solutions applied two products, Densifier and SPD Protector to fortify and seal the surface of 3 out of the 4 samples.

It should be noted that the test cylinders were made from different batches of the same strength concrete that were poured for use in break testing for concrete compression strength. As such, the surfaces of these cylinders were not processed with the usual consolidating, surface troweling steps typical of floor slab placement.

Product application was performed as follows:

Surface cleaning with an abrasive screen on a hand held grinder followed by application of Lythic Densifier and Lythic SPD Protector sealer. The surfaces were burnished. Testing was performed along the guidelines of the ASTM C501 protocol using the Tabor Abrazor machine.

The Tabor Abrasor can be used with over a dozen abrasive wheels with as much as 1 kilogram down pressure. This test was done with the most aggressive grinding wheel with the maximum down pressure possible. The results showed the treated samples performed significantly better compared with the untreated control in the early cycles of the test. Two of the three samples continued to outperform the control sample up to the final measurements. Though a third sample did not hold up in performance to the last measurement, its early performance indicates it did benefit from the chemical treatment. Future testing will be done with slab samples poured and processed as typical of concrete floor slabs. We will also consider other abrasive wheels, that will more directly correlate with daily foot and wheel traffic typical of indoor commercial polished concrete floors.

September 28, 2010

Project #0689371-1
Report #0689371-001b
Key Code #8413

Mr. Brad Sleeper
Lythic Solutions
P.O. Box 5028
Vancouver, Washington 98668

Dear Mr. Sleeper:

Re: Abrasion Testing

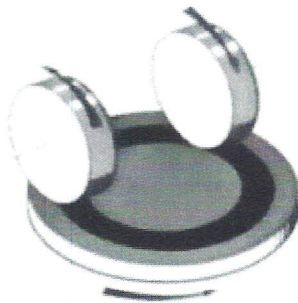
This report documents the results of abrasion testing conducted on samples treated and submitted by Lythic Solutions. All testing and evaluation was conducted by Professional Services Industries, Inc., (PSI) personnel.

Summary

Abrasion testing shows that after 500 cycles samples B and C outperformed samples A and D.

The 1" top section of an aged (over 28 days, minimum 2500 psi strength) 4" test cylinder was cut and submitted to Lythic Solutions for surface treatment. The type of treatment was not disclosed to PSI at the time of testing, however it was identified after testing as shown in the attached letter. Each disc was then installed onto a Taber Abraser (test machine specified in ASTM C501) with a type Calibrade H-22 abrasive wheel¹. The following description of the Taber Abraser is referenced from the Taber Industries website (www.taberindustries.com):

Characteristic rub-wear action is produced by contact of the test sample, turning on a vertical axis, against the sliding rotation of two abrading wheels. The wheels are driven by the sample in opposite directions about a horizontal axis displaced tangentially from the axis of the sample. One abrading wheel rubs the specimen outward toward the periphery and the other, inward toward the center. The resulting abrasion marks form a pattern of crossed arcs over an area approximately 30 square centimeters.



An important feature of the TABER® Abraser (Abrader) is the wheels traverse a complete circle on the specimen surface. This reveals abrasion resistance at all angles relative to the weave or grain of the material.

Each turntable has dual abrading arms that are precision balanced. Independently operated, the abrading arms can be raised (or lowered) to mount or inspect specimens. Each arm is loaded for 250 gram pressure against the specimen with the wheel mounting assembly in place (exclusive of the weight of the wheel). To increase the load to 500 or 1000 grams, a mount for auxiliary weights is located on the outside of the abrading wheel bearing assembly. The location ensures that weights are concentric with the abrading wheel.

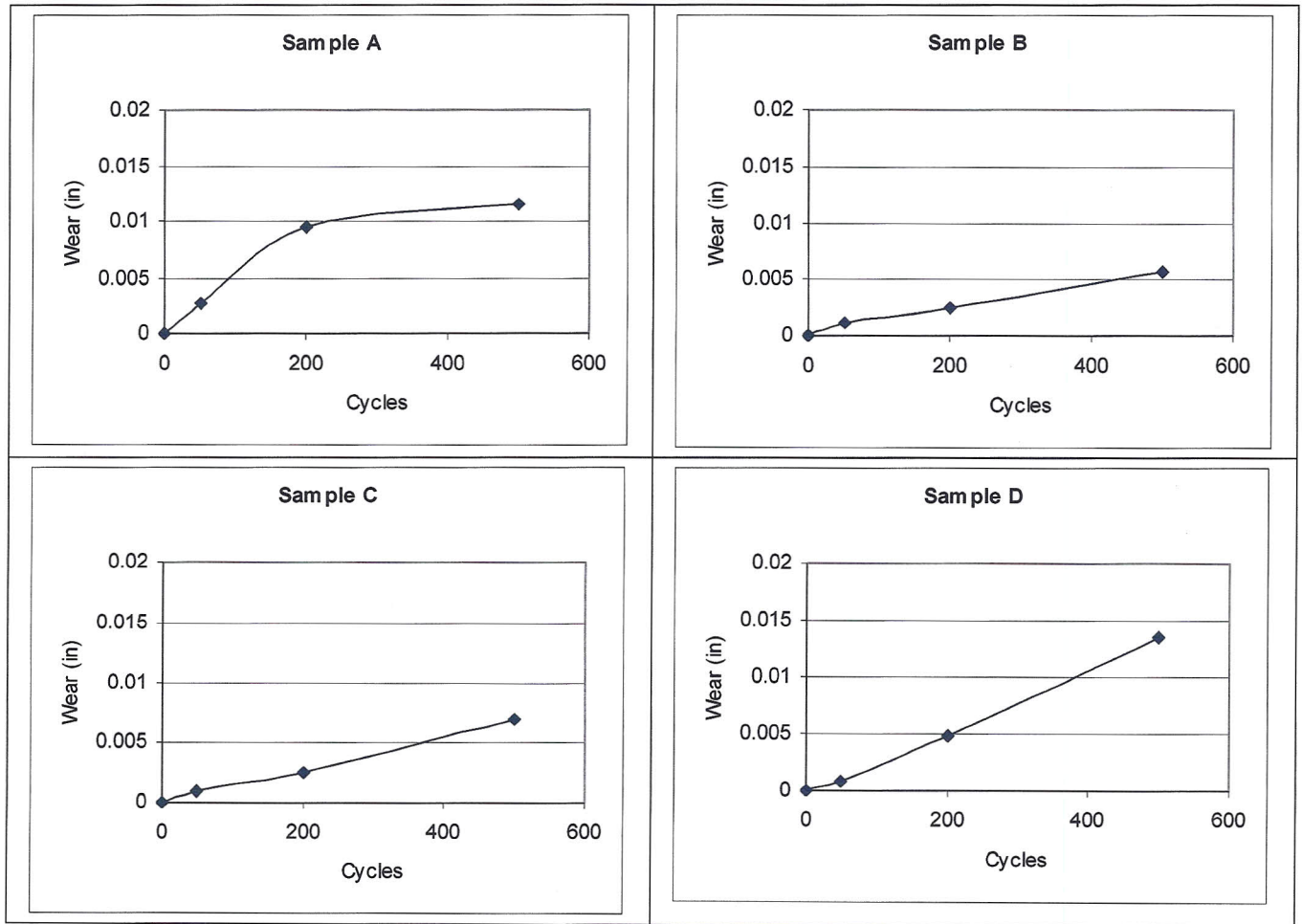
The load used per wheel for testing was 1000 grams (2.2 pounds). ASTM C501 specifies that wear measurements are recorded by loss of weight. However, it was found that wear measurements by measuring depth was more suitable for this testing program. Four (4) locations along the abrading path were measured with a micrometer and averaged. Results are shown in Tables 1 and 2 below:

Note 1: The non-resilient wheel is composed of vitrified (clay) and silicon carbide or aluminum oxide abrasive particles. Abrasive description is "very coarse".

Table 1: Abrasion Wear Results

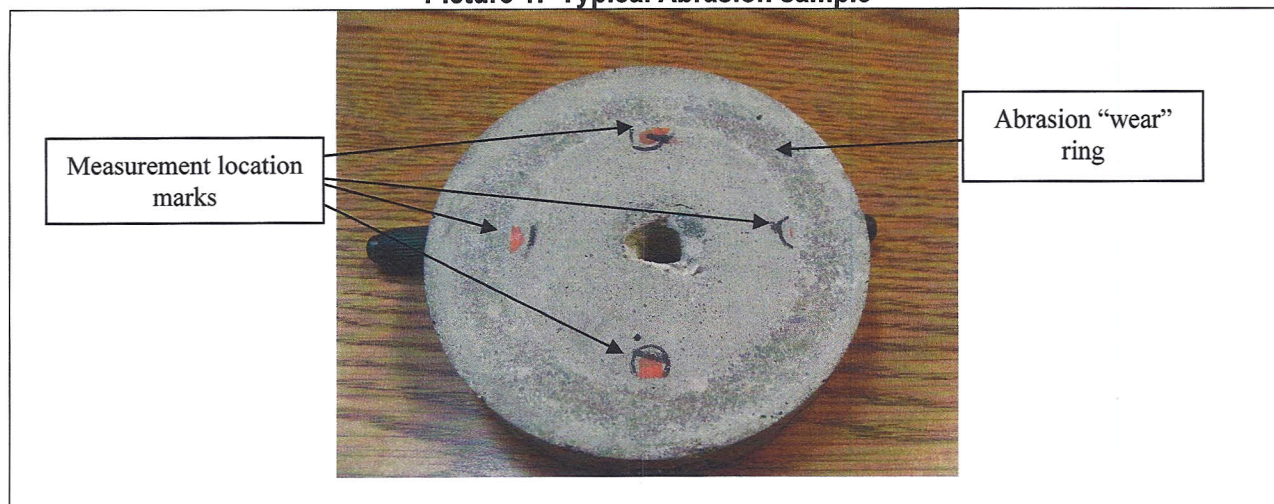
Cycles Completed	Average Measured Wear (in)			
	Sample A	Sample B	Sample C	Sample D
50	0.003	0.001	0.001	0.001
200	0.010	0.003	0.002	0.005
500	0.012	0.006	0.007	0.014

Table 2: Abrasion Wear Results



Testing shows that Sample A exhibits greater initial wear as compared to the other samples up to 200 cycles. At 500 cycles Sample D shows greater wear, followed by Sample A, Sample C, and finally Sample B. Samples B and C show similar abrasion wear up to 500 cycles.

Picture 1: Typical Abrasion sample



We appreciate the opportunity to be of service for this evaluation, and look forward to assisting you in the future. Please don't hesitate to call us at 800 783-6985 or 503 289-1778 if you have any questions.

Sincerely,

Marcel de Hoog
Project Engineer
Mechanical Testing Services
503 978-4734
marcel.dehoog@psiusa.com

Denis Dmitriyev
Engineering Technician
Mechanical Testing Services
503 978-4741
denis.dmitriyev@psiusa.com

attachments: Lythic letter

Services performed for this project have been conducted with that level of care and skill ordinarily exercised by members of the profession currently practicing in this area under similar budget and time restraints. No warranty, expressed or implied, is made. The included test results apply only to the specific samples tested and may not represent the entire product. This report was prepared pursuant to the contract PSI has with Lythic Solutions. That contractual relationship included an exchange of information about the project that was unique and between PSI and its client and serves as the basis upon which this report was prepared. Because of the importance of the communication between PSI and its client, reliance or any use of this report by anyone other than Lythic Solutions, for whom it was prepared, is prohibited and therefore not foreseeable to PSI. Reliance or use by any such third party without explicit authorization in the report does not make said third party a third party beneficiary to PSI's contract with Lythic Solutions. Any such unauthorized reliance on or use of this report, including any of its information or conclusions, will be at the third party's risk. For the same reasons, no warranties or representations, expressed or implied in this report, are made to any such third party. Reports may not be reproduced, except in full, without written permission of PSI.



Marcel de Hoog
Department Manager
Mechanical Services
PSI – Portland
6032 North Cutter Circle
Suite 480
Portland, Oregon 97217

October 15, 2010

Marcel,

For the purposes of filling out your report, I am reporting how we treated the samples PSI tested, and in the case of the samples tested for stain penetration and etching, what we did afterwards to remove the residue and revive the shine.

Sample Prep: Concrete samples for the C501 test were cleaned and lightly abraded with a sanding screen. Lythic Densifier was applied as needed to keep the surface wet for 15 minutes. After drying the top was burnished with a coarse fiber pad and Lythic SPD protector was applied. 24 hours later the surface was burnished. Testing was done after a full cure in 3 days.

Sample Prep for stain and etching tests were processed with diamond tooling to an 800 polish. They were chemically treated with Lythic Densifier and Lythic SPD Protector.

Follow up to stain and etching test was burnishing with a diamond impregnated fiber pad that removed chemical residues and restored shine.

These are all the steps that we took to process the samples tested by PSI.

Brad Sleeper
Lythic Solutions