LYTHIC DAY1 TESTING REPORTS

ABRASION RESISTANCE – ASTM C779 Summary

Lythic Day1 Troweling Aid and Curing Agent imparts a range of long-term performance benefits to concrete surfaces. In controlled, third party laboratory tests, DAY1 has been shown to produce significant performance improvements in abrasion resistance.

As the name implies, DAY1 is designed to improve concrete from the beginning, and testing has borne out that the sooner it is applied, the greater the benefit. Effects were generally the most dramatic when DAY1 was applied to the surface immediately as concrete was being placed. Lower but significant levels of benefit were recorded when DAY1 is applied as late as 6 hours after placement.

During cement hydration, calcium hydroxide is created as a by-product. DAY1, sprayed on fresh concrete and worked into the surface during finishing, reacts with that newly-made calcium hydroxide and turns it into additional cement paste – calcium-silicate-hydrates, the back-bone of concrete strength and durability – effectively improving the water-cementitious material (w/cm) ratio at the surface. The surface becomes less porous and more abrasion-resistant.

Samples were cast in accordance with ASTM C192 *Standard Practice for making and Curing Concrete Test Specimens in the Laboratory*, and finished with DAY1, using three variations of application-time: immediately after casting, 6 hours after casting, and 24 hours after casting. Samples were cured for 56 days in a temperature- and humidity-controlled environment before testing according to ASTM C779 *Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces,* Procedure C.

Immediate application of DAY1 showed a significant increase in abrasion resistance, especially in the earliest stages of the test when the very top layer of the concrete is being abraded. After one minute, the control and the delayed-application samples all had suffered similar levels of wear, but the immediate-application sample showed 65% less wear. The immediate-application sample took approximately four times as much abrasion to wear through the first 0.02 inches (0.5 mm), as compared to all three other samples.

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May 6, 2012

From: Jon Belkowitz
Intelligent Concrete, LLC
173 Woodcrest Drive
Freehold, NJ 07728

To: David Loe
Lythic Solutions
11304 NE 66th St
Ste 102
Vancouver, WA 98662

Re: Final Report on **LYTHIC SOLUTIONS** Product Evaluation, Abrasion Resistance of Concrete (ASTM C 779, Procedure C)

The intent of this document is to track the abrasion resistance with the LYTHIC SOLUTIONS DAY1For the purposes of information security, the DAY1 sizes and gradations will not be included in this report. All LYTHIC SOLUTIONS DAY1 packages will be referred to by pre-designated DAY1 names.

Materials

A Type I/II OPC (Ordinary Portland Cement) with a Blaine fineness of 3790 cm^2/g was used for this experiment. The cement was mixed with potable water at a water-to-cementitious ratio of 0.44. The fine aggregate used was ASTM C 33 concrete sand and the coarse aggregate was an alluvial 67/57 graded rock. **Table 1** documents the constituents used in each of the mixtures for the conducted experiments. All mixes were batched and mixed at 1.75 cubic feet.

Casting

Concrete samples were cast in accordance to ASTM C 192 - Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory. After mixing, the concrete was cast into 4 inch diameter by 8 inch tall plastic cylinders. The cylinders were filled in two equally sized lifts (by volume). Each lift was consolidated 25 times with a metal mold measuring 3/8 inch in diameter. Tapping the outside of the mold 15 times with an open hand consolidated the lifts further.

The experimental samples were finished with the LYTHIC SOLUTIONS DAY1 Product at the following times from the original casting time:

1. Immediately After casting
2. 6 Hours from casting time
3. 24 Hours from casting time

Curing

The samples were cast and cured for 56-days before the abrasion tests was conducted. The samples were marked according to MIX ID and application time. The samples were cast and cured in a temperature and humidity controlled room until and through the test dates.

Process

The function of abrasion resistance of concrete test is dependent upon the abrasive action of a rapidly rotating ball bearing under load on a wet concrete test surface. Water is used to flush out loose particles from the test path, bringing the ball bearing in contact with sand and stone particles still bonded to the concrete surface, thus providing impact as well as sliding friction. The apparatus consists of a motor-driven, hollow, vertical shaft resting on and turning ball bearings, which rest on the concrete surface. As the ball bearings cut into the concrete surface, depth-of-wear readings can be taken continuously without stopping the test. A digital clock is electrically connected to the drive motor so that both the drive motor and the clock can be started simultaneously. The abrasion tool is composed of eight 18-mm diameter steel balls equally spaced in a retainer ring.

The machine was mounted firmly and securely on the concrete samples by use of a vacuum hold-down device. A sheet of paper was placed between the test surface and the ball bearings under the load of the motor. The drive shaft was revolved several times by hand; ensure a complete circular mark formed on the paper. If not, the plumbness of the drive shaft was adjusted and the procedure repeated until was circle is obtained. Water was then supplied to the drive shaft. The dial gage was clamped to the supporting shaft to bear on the sliding bracket of the motor and drive shaft. The digital clock was reset to zero. A reference dial micrometer reading was taken immediately following the slight jump of the dial, just after the motor is started. Readings were taken to an accuracy of at least 0.001 in. of the depth of abrasion at least every 50 seconds for a total period of 1200 seconds, or until a maximum depth of 0.1225 in. is reached. An average reading of the pulsating micrometer dial was taken. Three samples were of the concrete to be evaluated.

The test determines the depth of wear for each interval of the test. The comparison of curves showing a plot of depth of wear versus time for each series of concrete surfaces tested indicates the relative abrasion resistance of these different concrete surfaces. A material that is uniform in abrasion resistance will have a curve approximating a half-parabola inclined toward the time axis. A comparison of curves will indicate whether the resistance to abrasion is primarily at the surface or at greater depth. When comparing test results of concrete surfaces of a wide range in abrasion resistance, curves were established with time required (x-axis) to reach a particular depth (y-axis).

Results

The Lythic Solutions DAY1 Product showed a reduction in the abrasive wear, as shown in **Figure 1.** The 56-day results showed the immediate application of the DAY1 resulted in most effective reduction in abrasive wear. As the DAY1 application was delayed, abrasive wear reduction over the control was not as pronounced: 6 hours gave generated a minimal reduction and 24 hours showed an

actual increase of abrasive wear over the control sample, which is interpreted as the DAY1 product having little significant effect, long term, on the abrasion resistance if the application is delayed by a day after concrete placement.

Conclusions

The Lythic Solutions DAY1 applied immediately after concrete placement appears to successfully increase resistance to abrasive wear at the concrete slab surface. By densifying the surface and sub-surface of the concrete slab, the DAY1 effectively increases the strength and toughness of said surface. In all cases, a concrete slab section allowed to cure in a more optimum environment will have a higher resistance to abrasive wear than a concrete slab cured in less than optimum conditions, if all other properties of the slab are equal.

For and behalf of

Intelligent Concrete, LLC

Name: Jon Belkowitz

Title: President

Date: 6 May 2013

For and on behalf of

Intelligent Concrete, LLC

COLORADO REGISTERED P. R. BRYANT 29932 PROFESSIONAL ENGINEER 06 May 13

Name: Paul Bryant

Title: Professional Engineer

Date: 6 May 2013

Table 1 – Constituent Proportions for Mortar Mixtures

LBS PER CUBIC YARD				
MATERIALS (lbs)	**CONTROL**	**IMMED AP**	**6 HR DELAY**	**24 HR DELAY**
Type I/II Cement	708			
67/57 Rock	1757			
Concrete Sand	1168			
Total Water	310			
Air Entrainment (fl.oz/cwt)	0.5			
High Range Water Reducer (fl.oz/cwt)	3.5			

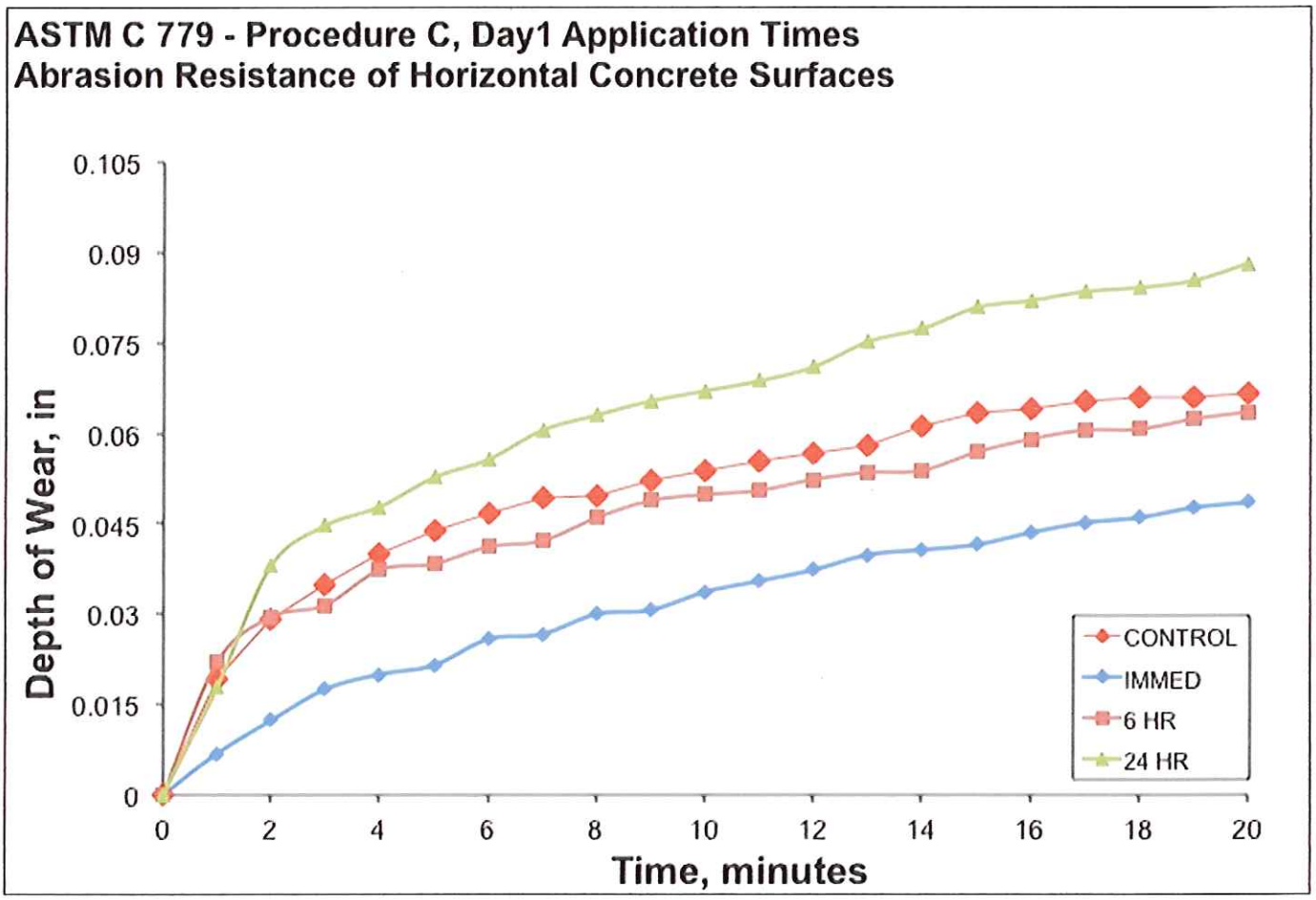

Figure 1 –56 Day Abrasion Measurements

LYTHIC DAY1 TESTING REPORTS

SET TIME/WORKABILITY TIME

Lythic Day1 Troweling Aid and Curing Agent imparts a range of performance benefits to concrete surfaces. In tests performed under field conditions, DAY1 was shown to extend finishing workability time without weakening the surface. This gives finishers a better chance to achieve a smooth and well-consolidated surface even under adverse weather conditions. It yields better surfaces, and minimizes the risk of moisture-loss related surface defects including checking, crazing, and scaling.

During cement hydration, calcium hydroxide is created as a by-product. DAY1, sprayed on fresh concrete and worked into the surface during finishing, reacts with that newly-made calcium hydroxide and turns it into additional cement paste – calcium-silicate-hydrates, the back-bone of concrete strength and durability – effectively lowering the water-cementitious material (w/cm) ratio at the surface. The surface becomes less porous. DAY1 slows moisture loss, helping avoid premature set, and extending workability without the addition of excessive amounts of water.

Controlled tests performed under field conditions were conducted to determine the impact of DAY1 on finishing workability-time[1]. Three fresh 10' x 10' slabs of concrete from the same mix were placed side by side on plastic sheeting over an outdoor asphalt parking lot. The mix was designed to set rapidly, and the ambient conditions (low humidity, moderate wind, direct sun) could be expected to induce premature set.
The slabs were bull-floated and power troweled in three variations:

- **Control:** concrete was finished in the condition it was delivered from the truck, with no water or other troweling aid added.
- **Water:** Finisher was allowed to add water whenever he felt the need, and have as much water as requested.

1

In concrete that is chemically homogenous through its depth (e.g. not treated with a topical additive), initial set-time and finishing workability-time are essentially the same. DAY1 alters the chemistry of the surface layer but does not make changes deeper in the slab, so the treated surface behaves differently than the rest of the slab. The top ¼" has been found to remain workable even after the slab below it has reached initial set. Finishing workability-time with DAY1 is therefore different from initial set-time as it is usually defined and laboratory-tested.

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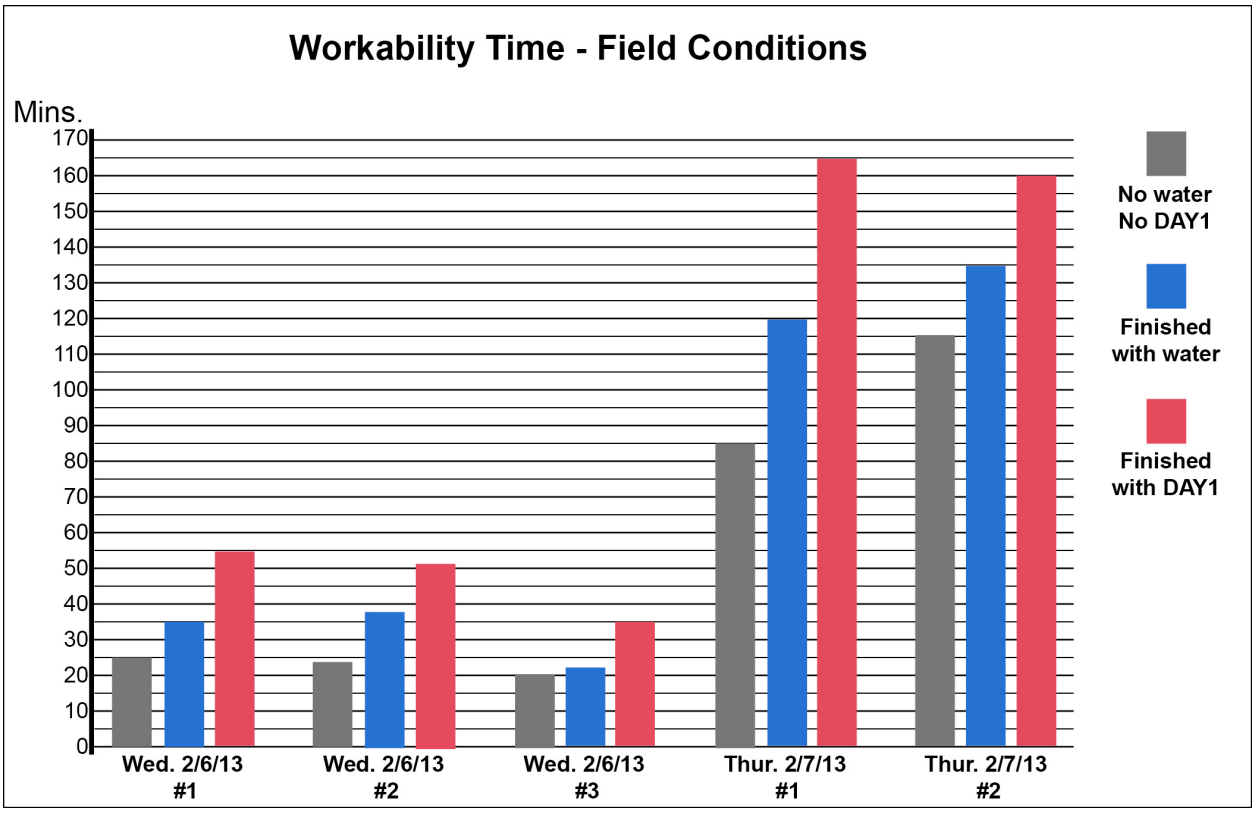
- **DAY1:** Finisher was allowed to add DAY1 whenever he felt the need, and have as much DAY1 as requested, but no water.

Workability was timed. The end of workability was judged subjectively by the professional finishers working the trowels. Five of these three-slab trials were performed over a period of two days.

- **DAY1** increased workability time by an average 62% vs. the **Control**.
- **DAY1** Increased workability time by an average 41% vs. the **Water-Finished Slab**.

	Dry	Water	Day1	% gain vs Dry	% gain vs Water
Wed. 2/6/13 #1 *Mix includes plasticizer (Glenium 30/30)*					
Placed	9:15	9:15	9:15		
Finished or Lost	9:40	9:50	10:10		
Working Time	:25	:35	:55	**80%**	**57%**
Wed. 2/6/13 #2 *Mix includes plasticizer (Glenium 30/30)*					
Placed	11:07	11:07	11:07		
Finished or Lost	11:30	11:45	11:58		
Working Time	:23	:38	:51	**122%**	**34%**
Wed. 2/6/13 #3					
Placed	13:15	13:15 PM	13:15 PM		
Finished or Lost	13:35	13:37	13:50		
Working Time	:20	:22	:35	**75%**	**59%**
Thurs, 2/7/13 #1					
Placed	8:15	8:15	8:15		
Finished or Lost	9:40	10:15	11:00		
Working Time (mins)	85	120	165	**92%**	**38%**
Thurs, 2/7/13 #2					
Placed	11:05	11:05	11:05		
Finished or Lost	13:00	1:20 PM	13:45		
Working Time (mins)	115	135	160	**39%**	**19%**


Workability Time - Field Conditions
Mins.
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
Wed. 2/6/13 #1
Wed. 2/6/13 #2
Wed. 2/6/13 #3
Thur. 2/7/13 #1
Thur. 2/7/13 #2
No water No DAY1
Finished with water
Finished with DAY1

LYTHIC DAY1 TESTING REPORTS

SURFACE COMPRESSIVE STRENGTH

Lythic Day1 Troweling Aid and Curing Agent imparts a range of performance benefits to concrete surfaces. In tests performed under field conditions, DAY1 was shown to increase surface compressive strength.

During cement hydration, calcium hydroxide is created as a by-product. DAY1, sprayed on fresh concrete and worked into the surface during finishing, reacts with that newly-made calcium hydroxide and turns it into additional cement paste – calcium-silicate-hydrates, the back-bone of concrete strength and durability – effectively lowering the water-cementitious material (w/cm) ratio at the surface. The surface becomes stronger and less porous.

Controlled tests performed under field conditions were conducted to determine the impact of DAY1 on finishing workability-time and compressive strength. Three fresh 10' x 10' slabs of concrete from the same mix were placed side by side on plastic sheeting over an outdoor asphalt parking lot. The mix was designed to set rapidly, and the ambient conditions (low humidity, moderate wind, direct sun) could be expected to induce premature set.
The common practice to facilitate concrete finishing is to add water during placement, and again during troweling. This deleterious practice increases the local w/cm ratio, weakening the surface. Application of DAY1 also adds liquid to the surface, but the overall added liquid is about 80% less than finishers typically use with water. Moreover, the chemical reaction of DAY1 creates additional cement paste, tying up excess water and effectively lowering the w/cm ratio at the surface.

The slabs were bull-floated and power troweled in three variations:

- **Control:** concrete was finished in the condition it was delivered from the truck, with no water or other troweling aid added.
- **Water:** Finisher was allowed to add water whenever he felt the need, and have as much water as requested.
- **DAY1:** Finisher was allowed to add DAY1 whenever he felt the need, and have as much DAY1 as requested, but no water.

To determine whether DAY1 was weakening or strengthening the surface of the concrete, surface compressive-strength tests were conducted on the side-by-side slabs cited in the Workability-Time test, using

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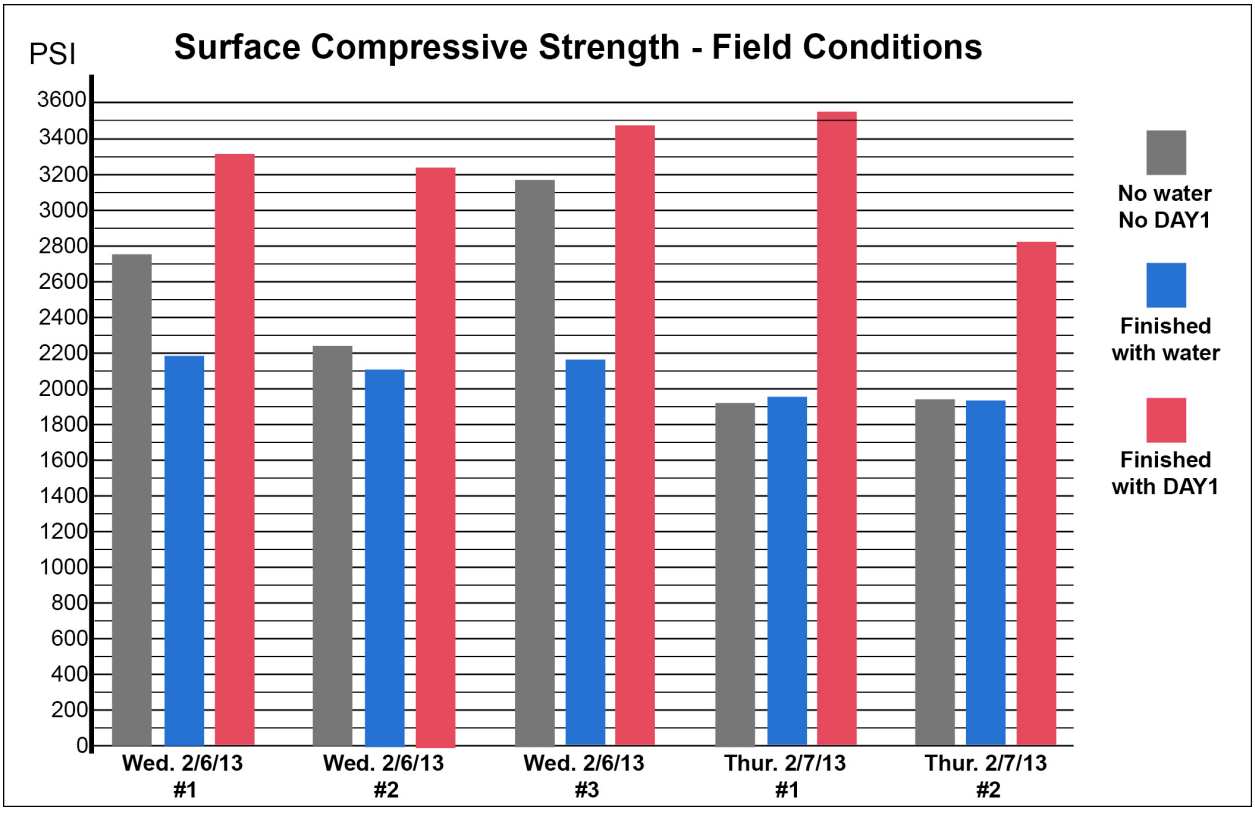
the Schmidt Hammer method. At the time of the tests, three of the slabs were 48 hours old, and two were 24 hours old. Since compressive strength is closely correlated with w/cm ratio, the results indicate that DAY1 lowered the local w/cm ratio at the surface:

- **DAY1** increased surface compressive strength an average 38% vs the **Control**
- **DAY1** increased surface compressive strength an average 56% vs the **Water-Finished Slab**

Compressive strengths are averaged from the ten middle values of twelve measurement locations on each slab.

	A: Dry	*B: Water*	*C: Day1*	*Strength Gain vs. Dry*	*Strength Gain vs. Water*
Wed #1 *(More than 48 hours old when tested)*	2730 psi	2190 psi	3310 psi	**21%**	**51%**
Wed. #2 *(More than 48 hours old when tested)*	2242	2100	3225	**44%**	**54%**
Wed. #3 *(More than 48 hours old when tested*	3170	2160	3470	**10%**	**61%**
Thur. #1 *(More than 24 hours old when tested)*	1910 psi	1940 psi	3560 psi	**86%**	**83%**
Thur. #2 *(approx 24 hours old when tested)*	2160	2160	2810	**30%**	**30%**



LYTHIC DAY1

Water/Cementitious Materials Ratio

Lythic Day1 Troweling Aid and Curing Agent is a liquid colloidal silica dispersion that is applied topically – sprayed on and worked into concrete during finishing. Since liquid is being added to the concrete, there is a question as to whether it raises the water/cementitious materials (w/cm) ratio. A higher w/cm ratio would mean weaker concrete. Finishers frequently add water ("blessing" the slab) during placement, and again during troweling to help "bring up" more cement paste in order to create a smooth surface. This raises the w/cm ratio, and is known to weaken the surface, often causing dusting. DAY1 eliminates the need for "blessing" the slab, preserving the integrity of the surface.

Based on side-by-side trials of concrete finished with water vs. concrete finished with DAY1, conducted under field conditions, a finisher using DAY1 typically adds only 25% of the liquid added by a finisher using water, or less.

Expert scientific opinion is that the liquid added by DAY1 *does not* raise the w/cm ratio. In fact, DAY1 effectively *lowers* it. The liquid is a carrier for colloidal silica, which reacts with calcium hydroxide in the cement paste, a pozzolanic reaction that creates additional calcium-silicate-hydrates, the 'active ingredient' of cement paste. This reaction uses up water, and increases the amount of cementitious material, effectively lowering the w/cm ratio at the surface. The surface becomes less porous and more abrasion-resistant.

Moreover, colloidal silica helps dissolve cement particles, so more cement is available, also lowering the w/cm ratio.

DAY1 also slows migration of bleed water to the surface, because the surface is denser with a smaller pore network. Bleed water would raise the w/cm ratio at the surface. DAY1 prevents this from happening, yielding a lower surface w/cm ratio than would be seen from conventional finishing.

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August 8, 2013

From: Intelligent Concrete, LLC

To: Lythic Solutions

Re: Does DAY1 raise the w/cm ratio of the surface concrete?

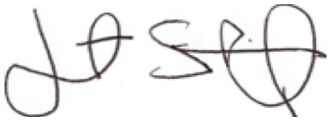
DAY1 reacts with calcium hydroxide in the hydrating concrete, a pozzolanic reaction that creates a denser cement paste. The water brought by DAY1 is consumed by in this pozzolanic reaction. Therefore, DAY1 is not raising the w/cm ratio. In contrast, conventional finishing by adding water ("blessing" the slab) does raise the local w/cm ratio.

Additionally, there is evidence that colloidal silica speeds up the dissolving of cement particles, making more of the cement available for hydration. It is, therefore, effectively lowering the w/cm ratio, not raising it.

Moreover, DAY1 slows evaporation moisture loss through the surface, ensuring that the w/cm at the surface is maintained at the optimum design ratio. When finishing without DAY1, concrete at the surface can dehydrate under severe conditions (high wind, heat, and/or low humidity) and lose a significant amount of surface strength. This can often be seen later as dusting of the surface. DAY1 changes the mobility and viscosity of the surface water, effectively reducing the amount of water that evaporates.

For and behalf of

Intelligent Concrete, LLC



Name: Jon Belkowitz

Title: President

LYTHIC DAY1 TESTING REPORTS

Wicking Bar Test EN 480-5:1996 Summary

Lythic Day1 Troweling Aid and Curing Agent imparts a range of long-term performance benefits to concrete surfaces. In controlled, third party laboratory tests, DAY1 has been shown to produce significant performance improvements in moisture vapor transmission.

As the name implies, DAY1 is designed to improve concrete from the beginning, and testing has borne out that the sooner it is applied, the greater the benefit. Effects were generally the most dramatic when DAY1 was applied to the surface immediately as concrete was being placed. Lower but significant levels of benefit were recorded when DAY1 is applied as late as 6 hours after placement.

During cement hydration, calcium hydroxide is created as a by-product. DAY1, sprayed on fresh concrete and worked into the surface during finishing, reacts with that newly-made calcium hydroxide and turns it into additional cement paste – calcium-silicate-hydrates, the back-bone of concrete strength and durability – effectively improving the water-cementitious material (w/cm) ratio at the surface. The surface becomes less porous. DAY1 slows moisture loss, helping avoid premature set, and positively impacting curing.

Samples were tested using the Wicking Bar test, EN 480-5:1996. Concrete was cast in steel prisms, and DAY1 was applied to the exposed surface with three variations of application-time: immediately after casting, delayed 6 hours after casting, and delayed 24 hours after casting. Samples were placed inverted in a 3mm-deep water bath with the treated surface immersed, and cured for up to 180 days. Samples were weighed at intervals: 3, 7, 10, 14, 21, and 28 days.
Immediate application showed the greatest reduction of ingress of water into the sample. Water absorption by the **immediate application** sample stopped increasing after 10 days, and was approximately 35% less than the control after 28 days. As DAY1 application was delayed, the efficiency in reducing wicking lowered.

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March 8, 2013

From: Intelligent Concrete, LLC

To: Lythic Solutions

Re: Interim Report on **LYTHIC SOLUTIONS** Product Evaluation

The intent of the following document is to track the INTERIM (28 DAY) wicking with the **LYTHIC SOLUTIONS** DAY ONE. For the purposes of information security the DAY ONE sizes and gradations will not be included in this report. All **LYTHIC SOLUTIONS** DAY ONE packages will be referred to by pre-designated Day One names. **Final results are on Page 3.**

Materials

A Type I/II with a Blaine fineness of 3790 cm^2/g was used for this experiment. The Type I/II OPC was mixed with a control water and fine sand. The water that was batched into the mixing basin was changed from the design water based on water content of the **LYTHIC SOLUTIONS** Products to be added. **Table 1** documents the constituents used in each of the mixtures for the conducted experiments.

Mixing

The constituents were batched according to the mix designs listed in **Table 1** in a variable speed, two (2) quart Hobart mixer. The dry cement and aggregate were added into the mixing bowl and mixed for thirty (30) seconds. The water was added carefully for 30 seconds and allowed to mix thoroughly for an additional sixty (60) seconds. The mixer was stopped and the bowl was removed from the mixing platform for hand mixing to ensure the universal dispersion of constituents for 30 seconds. The bowl was then placed back onto the mixing platform. The SASOL Nano-Alumina was added and then mixed for the final 90 seconds. The mixing basin was removed and the mortar mixture was mixed by hand for another 30 seconds to ensure the constituents in the bowl were universally mixed.

Casting

After mixing, the various mortars were placed into 40 mm by 40 mm by 160 mm prism steel molds according to standard EN 480-5:1996. The mortar was first poured until half of the prism's volume was occupied. A rubber tamper was then used to consolidate the mortar and the mold was then consolidated on a vibratory table. This process was repeated after the mortar was loaded to fill the entire volume. The last step was to take a steel trowel and finish the top of the plastic concrete. At this point three of the samples had the Day One Product immediately finished into the surface. Next, the samples sets had the Day One Product applied after a 6 Hour delay and 24 Hour delay. In all 3 cases the Day One Product was applied per the Lythic Solutions standard operating procedures.

Curing

The samples were cured at the casting station for 24 hours up to 180 days standing up in a 3 mm bath of water. The weight of the samples are measured intermittently throughout the 180 days.

Wicking Testing

On the break time and date, each sample was taken out of the temperature controlled water bath. The specimens are dried with a cloth ensuring that none of the sample is broken off in the process. **Figure 1** illustrates the evolution over 28 days.

Results

The Day One Product effectively reduces the wicking of water into the cast prism as shown in **Figure 1**. The Immediate application shows the best results in reducing the egress of water into the sample. As the Day One Product application was delayed the efficiency in reducing the propensity for wicking became less efficient.

Conclusions

1. OPC - For ordinary portland cement concrete mixture, the Day One Product by Lythic Solutions reduces the wicking of water into cement composites and concrete. Reducing the amount of water that wicks into the concrete can effectively increase the service life of a concrete structure by reducing the amount of harmful contaminants in the concrete that would cause chemical degradation.

Table 1 – Constituent Proportions for Mortar Mixtures

EN 480	
MATERIALS	**Weight (Grams)**
Type I/II Portland Cement	900
Sand	2822.0
Water	585.00

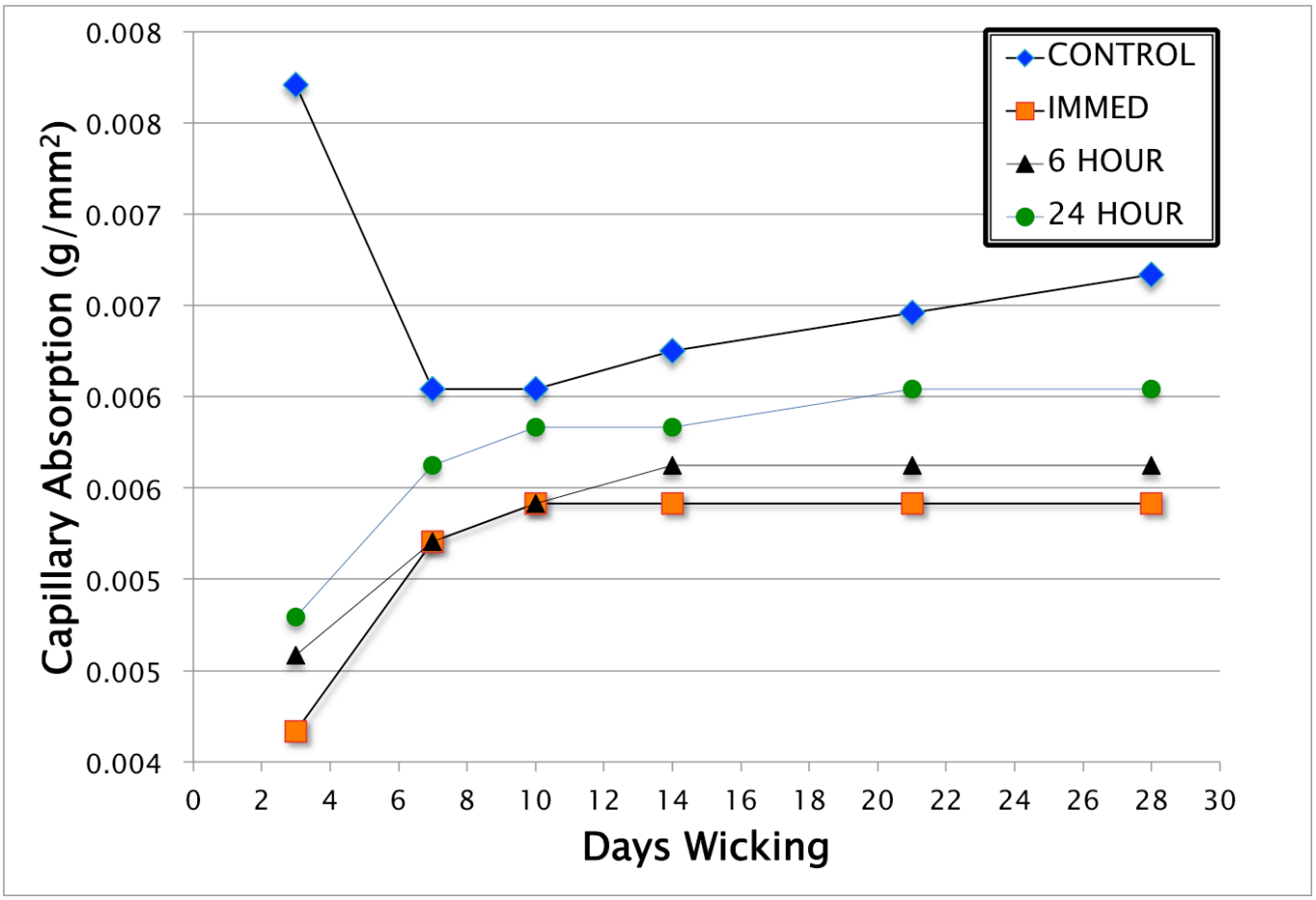

Figure – Interim Wicking Results for Day One Product

LYTHIC DAY1 TESTING REPORTS

MOISTURE VAPOR EMISSION RATE – ASTM F1869 MVER Summary

Lythic Day1 Troweling Aid and Curing Agent imparts a range of long-term performance benefits to concrete surfaces. In controlled, third party laboratory tests, DAY1 has been shown to produce significant performance improvements in moisture vapor transmission.

As the name implies, DAY1 is designed to improve concrete from the beginning, and testing has borne out that the sooner it is applied, the greater the benefit. Effects were generally the most dramatic when DAY1 was applied to the surface immediately as concrete was being placed. Lower but significant levels of benefit were recorded when DAY1 is applied as late as 6 hours after placement.

During cement hydration, calcium hydroxide is created as a by-product. DAY1, sprayed on fresh concrete and worked into the surface during finishing, reacts with that newly-made calcium hydroxide and turns it into additional cement paste – calcium-silicate-hydrates, the back-bone of concrete strength and durability – effectively improving the water-cementitious material (w/cm) ratio at the surface. The surface becomes less porous. DAY1 slows moisture loss, helping avoid premature set, and positively impacting curing.

Concrete was cast and treated with DAY1, and tested according to ASTM F1869-MVER, also known as the calcium chloride test. Samples were cast and cured under conditions designed to demonstrate vapor transmission. DAY1 was applied with three variations of application-time: immediately after casting, delayed 6 hours after casting, and delayed 24 hours after casting. MVER was tested after 7 days, 28 days and 56 days.

DAY1 **applied immediately** after casting showed a significant reduction in moisture vapor transmission, which grew more pronounced with time:

- 17.6% reduction at 28 Days
- 69% reduction at 56 days.

Applying DAY1 **delayed 6 hours** was still effective but not as dramatic:

- 14.2% reduction at 28 days
- 37% reduction at 56 days.

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April 29, 2012

From: Intelligent Concrete, LLC

To: Lythic Solutions

Re: Final Report on **LYTHIC SOLUTIONS** Product Evaluation, Anhydrous Calcium Chloride Test (ASTM F 1869 - MVER)

The intent of the following document is to track the Moisture Vapor Emission Rate (MVER) with the LYTHIC SOLUTIONS DAY ONE. For the purposes of information security, the DAY ONE sizes and gradations will not be included in this report. All LYTHIC SOLUTIONS DAY ONE packages will be referred to by pre-designated Day One names.

Materials

A Type I/II OPC (Ordinary Portland Cement) with a Blaine fineness of 3790 cm^2/g was used for this experiment. The cement was mixed with potable water at a water-to-cementitious ratio of 0.44. The fine aggregate used was ASTM C 33 concrete sand and the coarse aggregate was an alluvial 67/57 graded rock. **Table 1** documents the constituents used in each of the mixtures for the conducted experiments. All mixes were batched and mixed at 1.50 cubic feet.

Casting

A concrete sand with an absorption rate of 0.8% and a moisture condition of 4.25% was placed in the concrete mold measuring 26 inches by 18 inches by 6 inches deep. A total of 20 lbs of sand (for an net sand depth of 2.0 inches) was placed in the bottom of the molds and compacted, to give a net concrete depth of 1.5 inches. An extra liter of water was evenly distributed over the sand to create a highly water-saturated environment. The fluid concrete (56 lbs) was then placed over the sand and consolidated. The concrete was then finished uniformly to a depth of 1.5 inches. The control sample was immediately sealed with a non-absorbent lid and was finished similar to most concrete slabs.

The experimental samples were finished with the LYTHIC SOLUTIONS DAY ONE Product at the following times from the original casting time:

1. Immediately After casting
2. 6 Hours from casting time
3. 24 Hours from casting time

Curing

The samples were cast and cured for 7, 28 and 56 days before the MVER test was conducted. The samples were marked according to MIX ID and application time. The samples were cast and cured in a temperature and humidity controlled room until and through the test dates.

Results

The Lythic Solutions Day One Product showed a reduction in the MVER over time, as shown in **Figure 1.** The 7-day results reflect the still-fresh state of the concrete slab, the amount of moisture contained within that slab, and the fact that significant reductions of in-slab moisture are ongoing as part of the normal curing process. Upon reviewing the 28-day results, the immediate application of the Day One product (that is, immediately after concrete placement) resulted in 17.6% reduction in through-slab moisture vapors. As the Day One application was delayed following concrete placement, the reduction over the control was not as pronounced: 6 hour delay gave a 14% moisture migration reduction and a 24 hour delay gave only a 2.0% reduction. The 56-day results showed the immediate application of the Day One resulted in 69% reduction in moisture vapors. As the Day One application was delayed, the reduction over the control was not as pronounced: 6 hours gave a 37% reduction and 24 hours showed an actual increase of 6.0% over the control sample, which is interpreted as the Day One product having little significant effect, long term, on the MVER if the application is delayed by a day after concrete placement.

Conclusions

The Lythic Solutions Day One applied immediately after concrete placement appears to successfully mitigate the amount of water vapor that emit through the concrete slab. By densifying the surface and sub-surface of the concrete slab, the Day One effectively modifies the concrete slab to reduce the propensity for water vapor permeation over time. In all cases, a thicker concrete slab section will have a lower MVER than a thinner section, if all other properties of the slab are equal.

For and behalf of

Intelligent Concrete, LLC

Name: Jon Belkowitz

Title: President

Date: 29 April 2013

For and behalf of

Intelligent Concrete, LLC

COLORADO REGISTERED PAUL R. BRYANT 29932 PROFESSIONAL ENGINEER

29 Apr 13

Name: Paul Bryant

Title: Professional Engineer

Date: 29 April 2013

Table 1 – Constituent Proportions for Mortar Mixtures

LBS PER CUBIC YARD				
MATERIALS (lbs)	**CONTROL**	**IMMED AP**	**6 HR DELAY**	**24 HR DELAY**
Type I/II Cement	708			
67/57 Rock	1757			
Concrete Sand	1168			
Total Water	310			
Air Entrainment (fl.oz/cwt)	0.5			
High Range Water Reducer (fl.oz/cwt)	3.5			

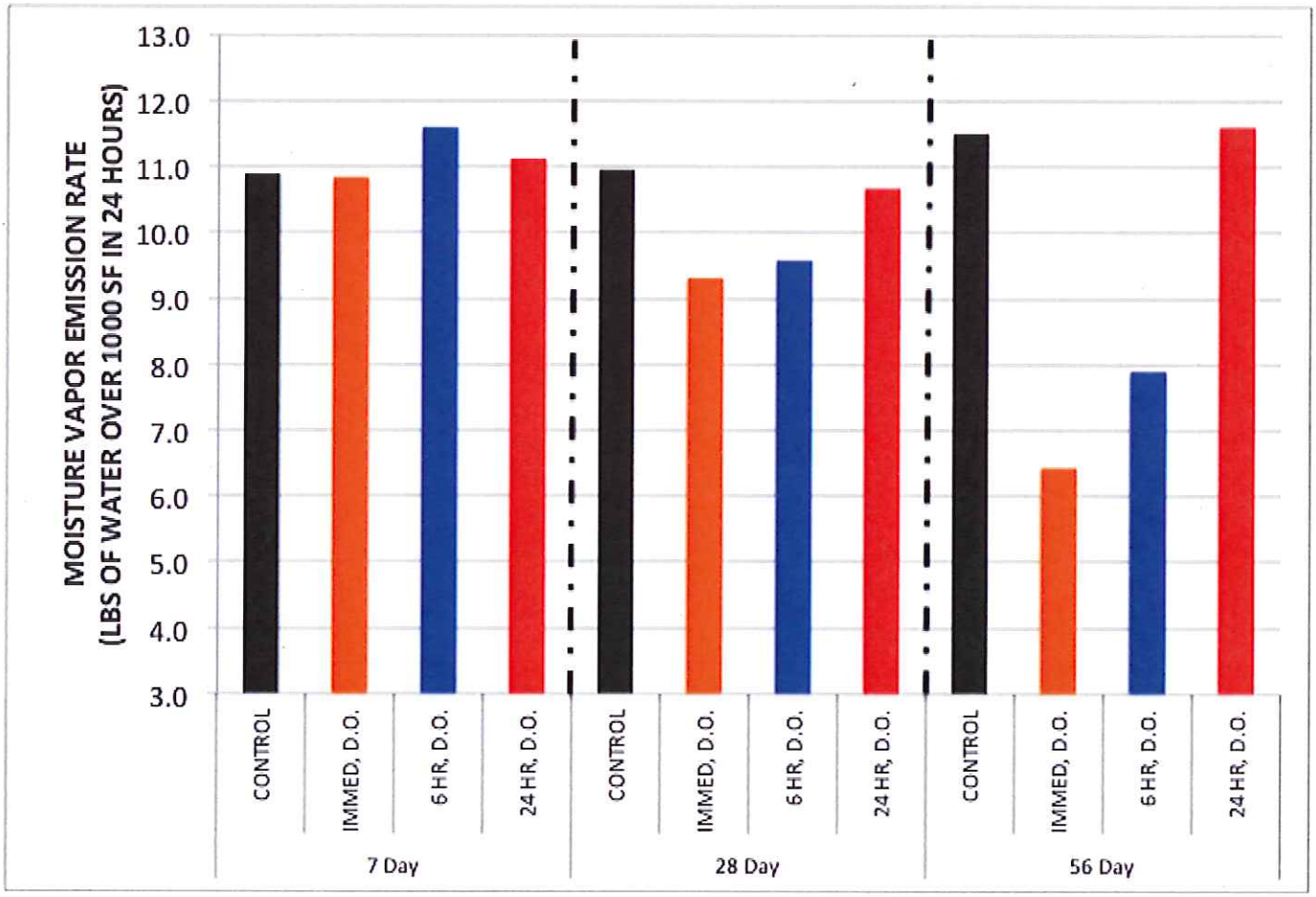

Figure 1 – 7 Day, 28 Day and 56 Day MVER Measurements

LYTHIC DAY1 TESTING REPORTS

MOISTURE TRANSMISSION ASTM D4263 Summary

Lythic Day1 Troweling Aid and Curing Agent imparts a range of long-term performance benefits to concrete surfaces. In controlled, third party laboratory tests, DAY1 has been shown to produce significant performance improvements in moisture vapor transmission.

As the name implies, DAY1 is designed to improve concrete from the beginning, and testing has borne out that the sooner it is applied, the greater the benefit. Effects were generally the most dramatic when DAY1 was applied to the surface immediately as concrete was being placed. Lower but significant levels of benefit were recorded when DAY1 is applied as late as 6 hours after placement.

During cement hydration, calcium hydroxide is created as a by-product. DAY1, sprayed on fresh concrete and worked into the surface during finishing, reacts with that newly-made calcium hydroxide and turns it into additional cement paste – calcium-silicate-hydrates, the back-bone of concrete strength and durability – effectively improving the water-cementitious material (w/cm) ratio at the surface. The surface becomes less porous. DAY1 slows moisture loss, helping avoid premature set, and positively impacting curing.

Concrete treated with DAY1 was tested for the presence of through-slab moisture using the polyethylene sheet method, ASTM D4263 *Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.* Fresh concrete samples were treated with three variations of application-time: immediately after casting, delayed 6 hours after casting, and delayed 24 hours after casting.

The test involves covering samples with a plastic sheet for 16 hours, and then evaluating the moisture accumulation on the concrete surface. Results were judged subjectively based on appearance, on a scale of 1 to 10, from dry to wet.

At 28 days, **immediate application** and **delayed 6 hours** showed significant moisture reduction vs. the control.

At 56 days, **immediate application** and **delayed 6 hours** showed even more dramatic moisture reduction.

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May 6, 2013

From: Jon Belkowitz
Intelligent Concrete, LLC
173 Woodcrest Drive
Freehold, NJ 0772

To: David Loe
Lythic Solutions
11304 NE 66th St, Ste 102
Vancouver, WA 98662

Re: Final Report on **LYTHIC SOLUTIONS** Product Evaluation, Presence of Moisture on Concrete Slab Surface (ASTM D 4263 – Polyethylene Sheet Method)

The intent of this document is to track the presence of moisture in a concrete slab with the LYTHIC SOLUTIONS DAY1. For the purposes of information security, the DAY1 sizes and gradations will not be included in this report. All LYTHIC SOLUTIONS DAY1 packages will be referred to by pre-designated DAY1 names.

Materials

A Type I/II OPC (Ordinary Portland Cement) with a Blaine fineness of 3790 cm^2/g was used for this experiment. The cement was mixed with potable water at a water-to-cementitious ratio of 0.44. The fine aggregate used was ASTM C 33 concrete sand and the coarse aggregate was an alluvial 67/57 graded rock. **Table 1** documents the constituents used in each of the mixtures for the conducted experiments. All mixes were batched and mixed at 1.50 cubic feet.

Casting

A concrete sand with an absorption rate of 0.8% and a moisture condition of 4.82% was placed in the concrete mold measuring 26 inches by 22 inches by 6 inches deep. A total of 110 lbs of sand (for an net sand depth of 2.0 inches) was placed in the bottom of the molds and compacted, to give a net concrete depth of 1.5 inches and a total composite depth of 3.5 inches. A liter of water was evenly distributed over the sand to create a highly water-saturated environment. The fluid concrete (75 lbs) was then placed over the sand and consolidated. The concrete was then finished uniformly to a depth of 1.5 inches. The control sample was finished similar to most concrete slabs and then immediately sealed with a non-absorbent lid.

The experimental samples were finished with the LYTHIC SOLUTIONS DAY1 Product at the following times from the original casting time:

1. Immediately After casting
2. 6 Hours from casting time
3. 24 Hours from casting time

Curing

The samples were cast and cured for 7, 28 and 56 days before the plastic sheet test was conducted. The samples were marked according to MIX ID and application time. The samples were cast and cured in a temperature and humidity controlled room until and through the test dates.

Polyethylene Sheet Test (ASTM D 4263) is a simple test where an 18 by 18 inch [450 by 450 mm] square plastic sheet is taped tightly to the concrete and left in place for a at least 16 hours. The presence of moisture under the plastic sheet is a positive indication that excess moisture is likely present in the slab. For the purposes of this research we expressed the presence of moisture using a subjective scale from 1 to 10. One represents a concrete slab surface that is completely dry. Ten represents a concrete slab surface with excessive slab moisture that is completely wet. However, a negative indication is not an assurance that the slab is acceptably dry below the surface.

Results

The Lythic Solutions DAY1 Product showed a reduction in the presence of moisture, over time, as shown in **Figure 1.** The 7-day results reflect the still-fresh state of the concrete slab, the amount of moisture contained within that slab, and the fact that significant reductions of in-slab moisture are ongoing as part of the normal curing process. Despite the still-fresh state, the immediate DAY1 applications show a significant reduction in the presence of water at the concrete slab surface. Upon reviewing the 28-day results, the immediate application of the DAY1 product (that is, immediately after concrete placement) resulted in a reduction in through-slab moisture presence. As the DAY1 application was delayed following concrete placement, the reduction over the control was essentially equal for the 6 hour delay. The 24 hour delay gave only a minimal reduction. The 56-day results showed the immediate application and 6 hour delay of the DAY1 resulted in the most significant reduction in moisture presence. As the DAY1 application was delayed for 24 hours, the reduction over the control was greatly diminished and showed only minimal reduction over the control sample, which is interpreted as the DAY1 product having little, if any, significant effect, long term, on the surface moisture characteristics of a concrete slab if the application is delayed by a day after concrete placement.

Conclusions

The Lythic Solutions DAY1 applied immediately after concrete placement appears to successfully mitigate the presence of water at concrete slab surface. By densifying the surface and sub-surface of the concrete slab, the DAY1 effectively modifies the concrete slab to reduce the propensity for water presence. In all cases, a thicker concrete slab section will have a higher presence of water than a thinner section, if all other properties of the slab are equal.

For and behalf of

Intelligent Concrete, LLC

Name: Jon Belkowitz

Title: President

Date: 6 May 2013

For and on behalf of

Intelligent Concrete, LLC

Name: Paul Bryant

Title: Professional Engineer

Date: 6 May 2013

Table 1 – Constituent Proportions for Mortar Mixtures

LBS PER CUBIC YARD				
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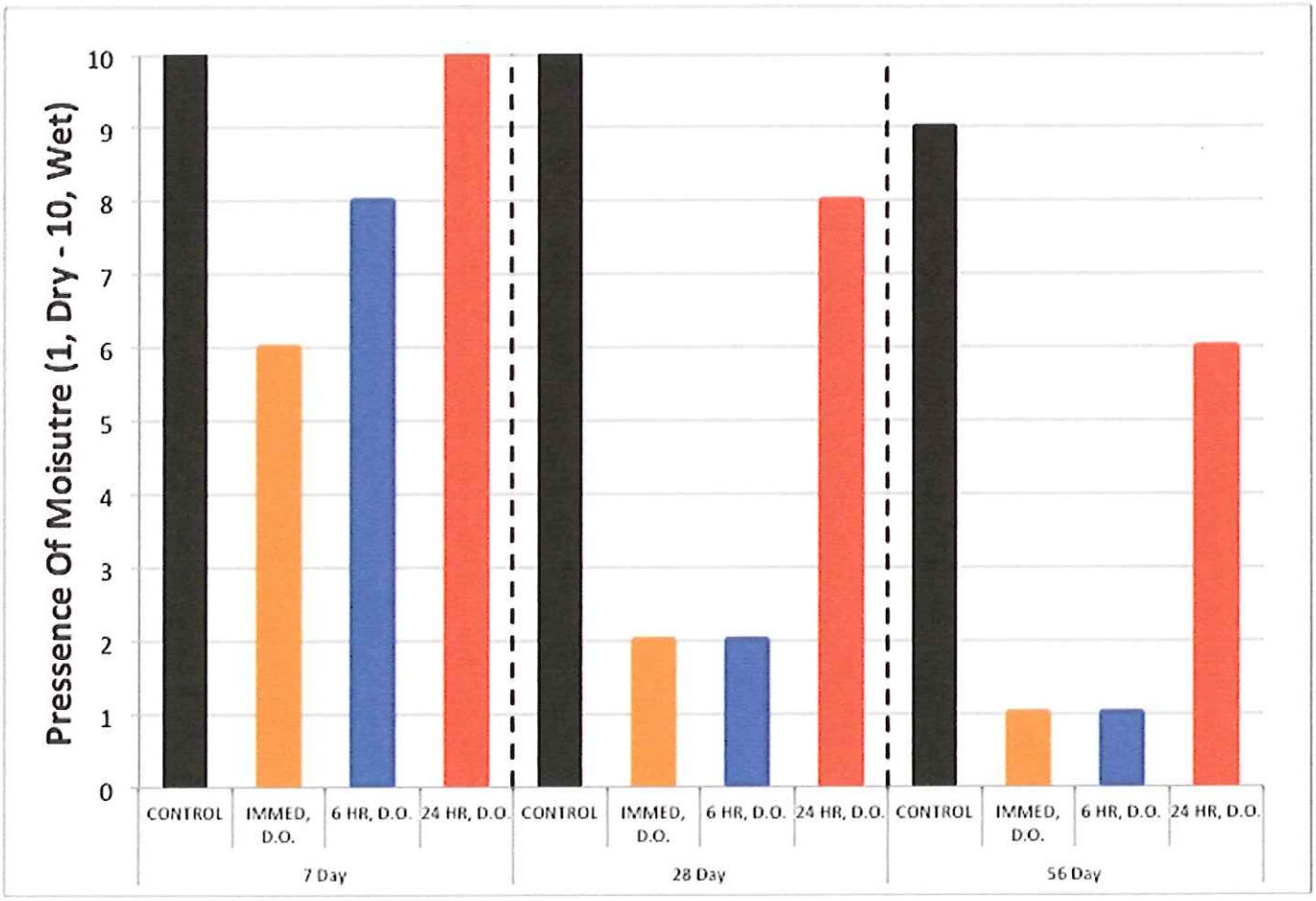

Figure 1 – 7 Day, 28 Day and 56 Day Moisture Presence