INNOVATIONS IN PEDESTRIAN AND VEHICULAR WATERPROOFING MEMBRANES

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Agenda

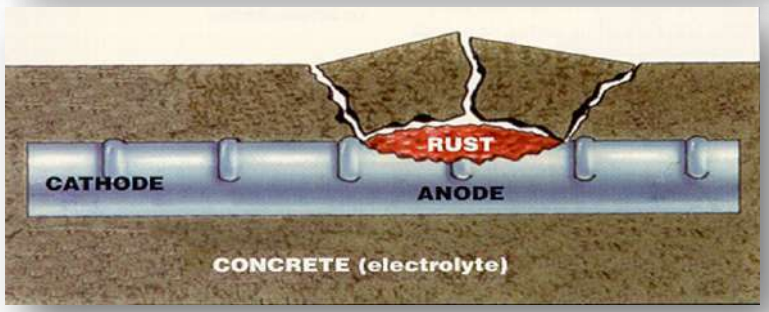
- Where are we going?
- Why trafficable waterproofing membranes
- Standard methods today
- State of the Art in trafficable membranes
- Innovating beyond today with One Shot System

THE MESSAGE

- Innovation combining INTEGRAL TEXTURE and ONE SHOT approach will improve long term durability and installation productivity of trafficable waterproofing membranes.

WHY TRAFFICABLE MEMBRANES?

- Protect the structure….
- From what:
  - Moisture
  - Temperature cycles (freeze/thaw)
  - Contaminants
- Prevent concrete/structural deterioration!



Standard Trafficable Waterproofing Systems

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THE BASE COAT

- Flexible polyurethane resin membrane as the primary waterproofing layer.
- Uninterrupted monolithic layer.
- As a flexible membrane it can bridge cracks to protect moisture, etc. from getting into the structure.

- Good, sound science behind the base coat approach!

THE TOP COAT

- The base coat has to be protected to keep it in tact and performing as a waterproofing membrane.
- Topcoat creates a layer that protects the base coat.
- A main element of the topcoat is to prevent the base coat (the waterproofing layer) from being compromised.

ADDING SLIP RESISTANCE

- Without texture the system would be too slippery, so texture had to be added to the topcoat.
- Broadcasting silica sand into the topcoat created a textured surface for slip resistance.

THE FINAL SYSTEM

- So what we end up with is a multi-step system comprised of:

- BASE COAT
- TOPCOAT 1 (wear coat)
- AGGREGATE BROADCAST
- BACKROLL
- TOPCOAT 2
- AGGREGATE BROADCAST
- BACKROLL

What's really causing this?

RESIN ???

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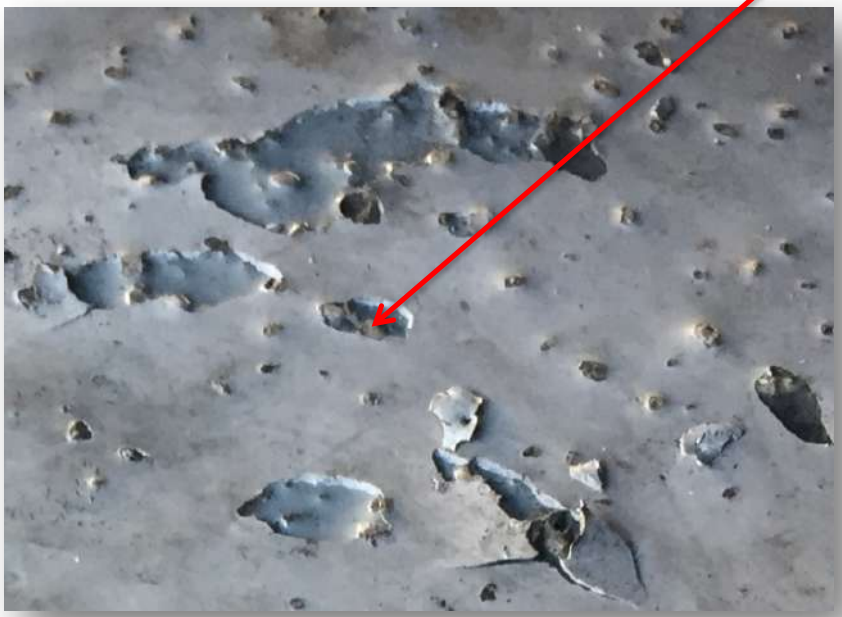
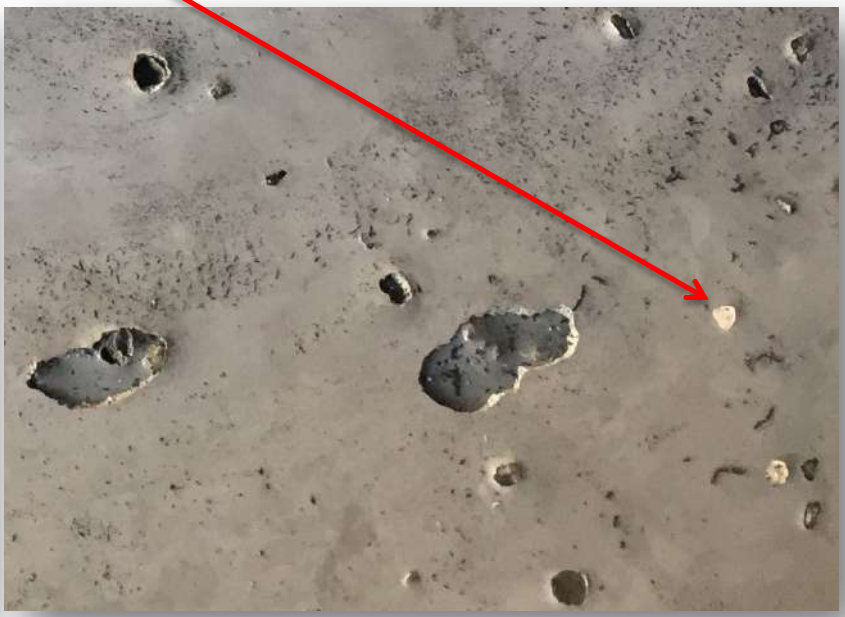
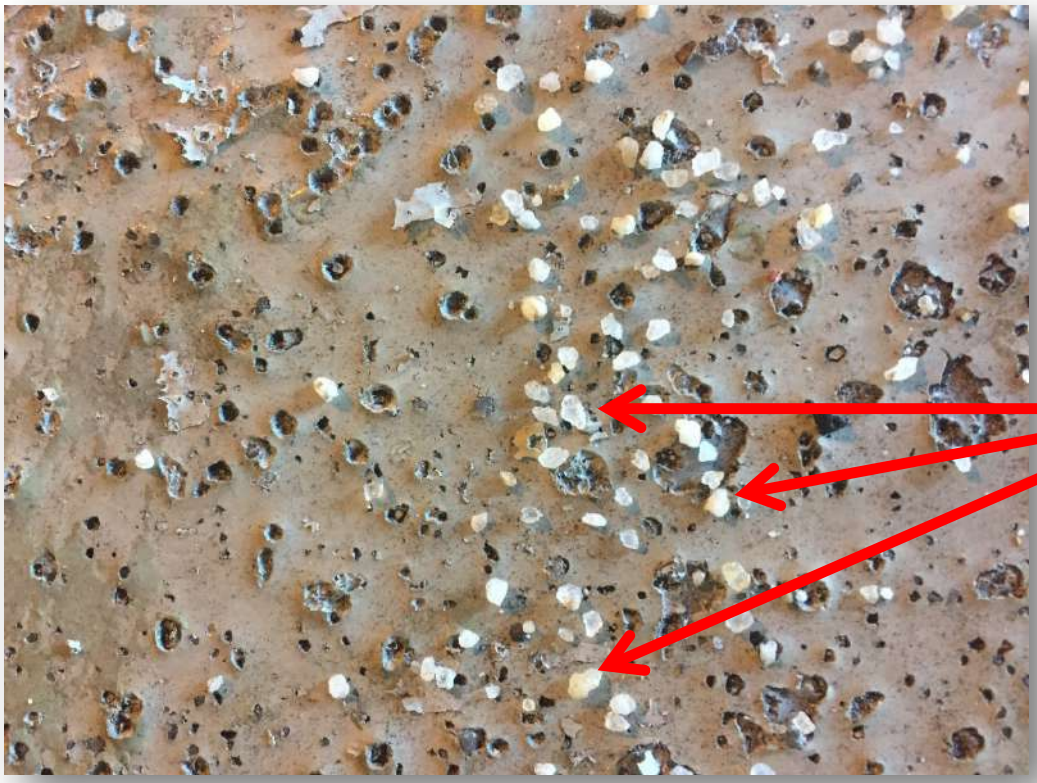
LOOSE AGGREGATE (Sand Paper effect)





1 Year Old System – Wrong Aggregate Selection



Top Coat

20 mils

Aggregate 8/20 MESH

93 **ıils**

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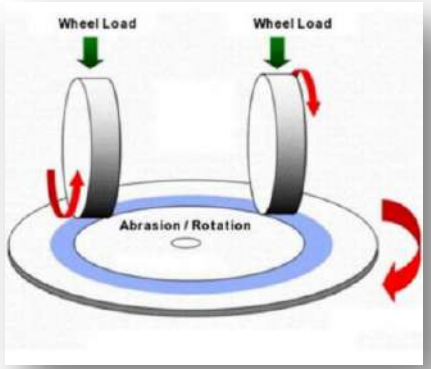
How has wear resistance of standard system been tested ?
ASTM 957 Standard Specification

- ASTM 957 - section 5.9 Abrasion Resistance – **Test method C 501** (Taber Abraser test)

- 5.9.1 Cast test samples of entire membrane excluding aggregate to a minimum total cured thickness of 20 mils
- 5.9.3 Run test for 1000 cycles using CS-17 abrasion wheel



- All standard traffic systems **PASSED** this specification including Abrasion Resistance Test
- SHEAR STRESS and FLEXING MOVEMENTS ???

  braking, acceleration and turning the vehicles

Systems that passed the standard test methods do not necessarily perform under real conditions!

OK, SO NOW WHAT?

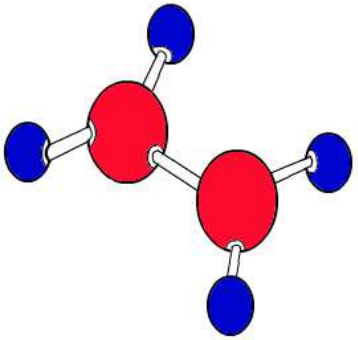
- How do we increase the aggregate retention and therefore the durability of a trafficable waterproofing system?
- And how do we test for performance?

State of the Art in Traffic Coating – Integral Texture Topcoats (Textured Topcoats)

- Wear Resistance and Durability

How can we improve **aggregate retention in resin** to improve durability of the system?

- Create better bond between the aggregate and resin



- Based on our research, the best way to improve bond is a chemical reaction between the aggregate and resin

In some pre-textured products when aggregate is added to the resin it forms a copolymer matrix with the resin polymer.

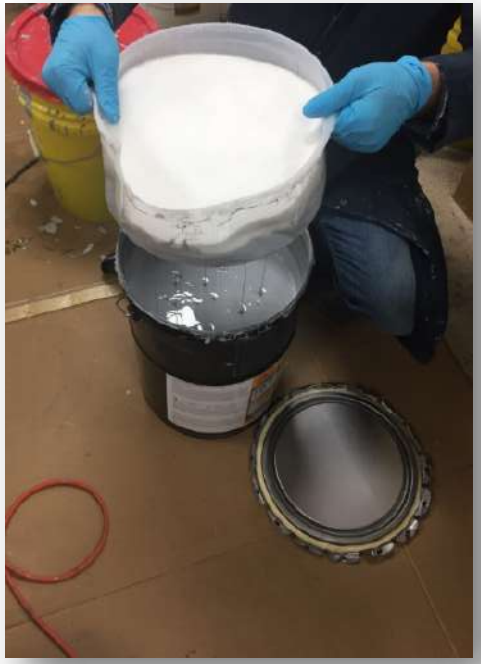
- Excellent abrasion resistance
- Excellent aggregate retention
- Higher durability

Which aggregate ?

- Proprietary aggregate
- No mineral
- No silica
- Standard and consistent gradation 20/40 or 16/30
- Extremely durable

Premixed in factory

Packed separately and mixed at site



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How has excellent durability been proven?

- Textured Topcoats proven performance in vehicular

and pedestrian actual use.

- Internal experimental testing – internally developed testing device creating real conditions

EXPERIMENTAL SETUP

880 lbs wheel load – simulating 3500 lbs standard vehicle load

Standard Tire 175/65 R14T
Tire pressure 36 psi

2’ x 2’ concrete block + traffic system

Rotation by 90° angle

1 cycle profile is defined as
5 seconds rotation
followed by 6 seconds break

Heating up to 150 ° F

Performance comparison between Standard System (seeded) and Textured System

500 CYCLES

Standard system classification **4** Textured system classification **1**

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Performance comparison between Standard System (seeded) and Textured System

2000 CYCLES

Standard system classification **5** Textured system classification **1**

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Performance of the Textured System

5000 CYCLES

Textured system classification **1**

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Textured Topcoat after 5000 cycles – surface under microscope

- Aggregate well encapsulated
- Resin removed only from top sharp edges of aggregate
- Top coat is solid without any major mechanical damage

NOW WHAT?

- We have taken the standard multi layer system to the next level of durability with Textured Topcoats.
- Can we take another step? Can we go further?
- Challenging the theory of keeping aggregate out of the base coat membrane and only in the protective topcoat.
- Innovating to a ONE STEP system!

The Next Generation - Innovation with the ONE SHOT Approach

- Eliminating installation steps!

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WHAT'S THE ONE SHOT?

- **The ONE SHOT concept:**
- Trafficable waterproofing membrane with integral texture applied in a single step.
- Flexible enough to bridge cracks.
- Tough enough to handle traffic - Durable integral aggregate tested via the PAT test.

ONE SHOT DECREASES STEPS…

- The ONE SHOT approach clearly reduces the steps from start to finish of a balcony or vehicular traffic coating system….

Standard traffic coating system seeded with silica sand :

- Order & Ship Resin
- Order & Ship Aggregate
- Stock the aggregate on site (covered and protected)
- Transport the aggregate at job site .
- Make sure that the condition of the aggregate is OK (moisture)
- Make sure that the size and shape of the aggregate is OK
- Detailing
- Primer
- Base Coat
- Top Coat #1
- Seeding with Silica Sand (S&B)
- Remove and dispose all excess sand (Seed and Lock)
- Top Coat #2
- Seeding with Silica Sand (S&B)
- Dispose of sand bags and pallets.
- Concern about long term encapsulation of the aggregate.
- OSHA restrictions

16 STEPS

Textured traffic coating system :

- Order & Ship Resin
- ~~Order & Ship Aggregate~~
- ~~Stock the aggregate on site (covered and protected)~~
- ~~Transport the aggregate at job site .~~
- ~~Make sure that the condition of the aggregate is OK (moisture)~~
- ~~Make sure that the size and shape of the aggregate is OK~~
- Detailing
- Primer
- Base Coat
- Top Coat #1
- ~~Seeding with Silica Sand (S&B)~~
- ~~Remove and dispose all excess sand (Seed and Lock)~~
- Top Coat #2
- ~~Seeding with Silica Sand (S&B)~~
- ~~Dispose of sand bags and pallets.~~
- ~~Concern about long term encapsulation of the aggregate.~~
- ~~OSHA restrictions~~

6 STEPS

ONE SHOT Vehicular Traffic Coating:

- Order & Ship Resin
- ~~Order & Ship Aggregate~~
- ~~Stock the aggregate on site (covered and protected)~~
- ~~Transport the aggregate at job site .~~
- ~~Make sure that the condition of the aggregate is OK (moisture)~~
- ~~Make sure that the size and shape of the aggregate is OK~~
- Primer
- Detailing
- ONE SHOT Integral Texture Traffic Membrane
- ~~Top Coat #1~~
- ~~Seeding with Silica Sand (S&B)~~
- ~~Remove and dispose all excess sand (Seed and Lock)~~
- ~~Top Coat #2~~
- ~~Seeding with Silica Sand (S&B)~~
- ~~Dispose of sand bags and pallets.~~
- ~~Concern about long term encapsulation of the aggregate.~~
- ~~OSHA restrictions~~

4 STEPS

ONE SHOT Balcony Coating:

- Order & Ship Resin
- ~~Order & Ship Aggregate~~
- ~~Stock the aggregate on site (covered and protected)~~
- ~~Transport the aggregate at job site .~~
- ~~Make sure that the condition of the aggregate is OK (moisture)~~
- ~~Make sure that the size and shape of the aggregate is OK~~
- ~~Primer~~
- Detailing
- ONE SHOT Integral Texture Traffic Membrane
- ~~Top Coat #1~~
- ~~Seeding with Silica Sand (S&B)~~
- ~~Remove and dispose all excess sand (Seed and Lock)~~
- ~~Top Coat #2~~
- ~~Seeding with Silica Sand (S&B)~~
- ~~Dispose of sand bags and pallets.~~
- ~~Concern about long term encapsulation of the aggregate.~~
- ~~OSHA restrictions~~

3 STEPS

CRACK BRIDGING WITH ONE SHOT APPROACH

- Can a membrane with integral texture bridge cracks? Is it flexible enough with the aggregate included to pass the ASTM C957 Crack Bridging test?
- The answer to this question is: YES.
- Tested with a detail coat of 23 mils of flexible membrane underneath – Passes 1/16” crack bridging.
- Tested without detail coat – Passes 1/16” crack bridging.

DURABILITY WITH ONE SHOT APPROACH

- Can a system flexible enough to bridge cracks also be tough enough to handle traffic? Can it handle the tough PAT test?
- Passes 2000 cycles of the PAT test.
- Aggregate holds up!
- Resin holds up!

Wrapping it Up

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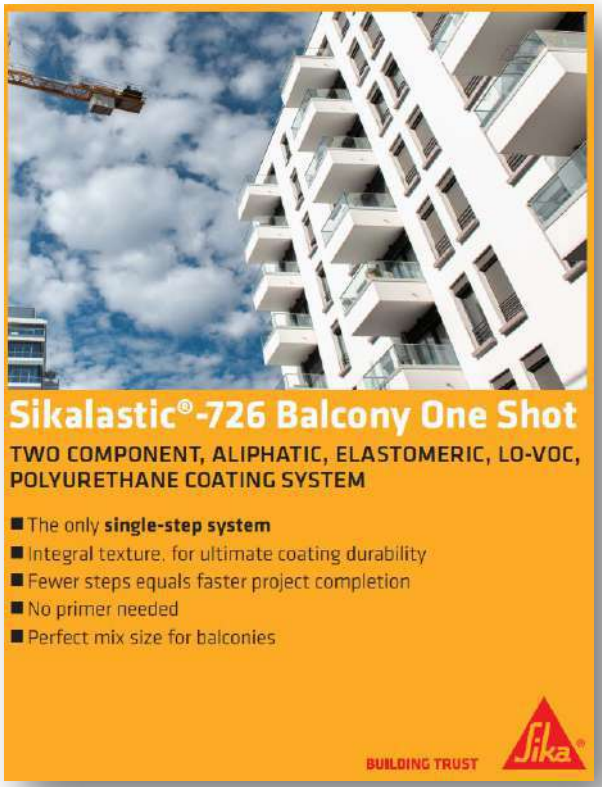
SUMMARY

- Reviewed inherent challenges in standard systems with aggregate kick out.
- Showed how Integral Textured topcoats retain aggregate and improve durability.
- Introduced concept of a ONE SHOT system – (challenged the theory of “no aggregate in the base coat”).

BRINGING INNOVATION TO THE MARKET

- Recent launch of Sikalastic 726 Balcony One Shot.
- Primerless balcony traffic membrane system.
- One Coat, two-component, polyurethane, integral texture coating system.



THANK YOU

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