

ICRI 2018 Fall CONVENTION

Omaha, NE
November 7-9, 2018

“Installing Polished Overlays With Consistent Results”

Mike Tracy – ARDEX Americas



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WHAT IS A POLISHED OVERLAY?



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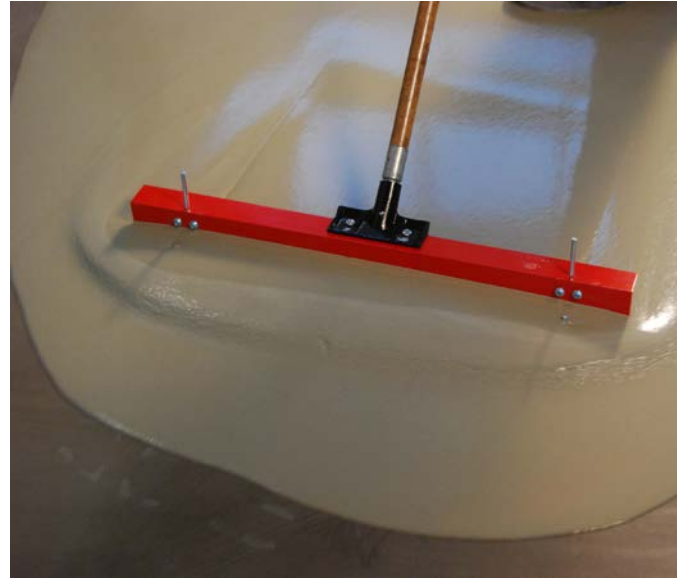
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WHAT IS A POLISHED OVERLAY?

- Blend of engineered Portland and other hydraulic cements
- Available in Light Gray, Gray and White
- Pourable, pumpable and self-leveling
- Fast-setting and walkable in 2-3 hours
- Polishable in 24 hours
- Chemically bonded using an epoxy with sand broadcast



WHAT IS A POLISHED OVERLAY?



POLISHED OVERLAY



WHAT IS A POLISHED OVERLAY?

- Accommodates thicknesses from **3/8” to 2” neat**, up to 5” with aggregate
- Creates a flat, hard, smooth surface with high compressive strength
- Dense surface suitable to be ground and polished to expose small aggregate and simulate the look of concrete



HOW ARE OVERLAYS DIFFERENT FROM STANDARD CONCRETE?

- Polished overlays are a blend of **various cements, sand and polymers** mixed with water
- Standard concrete also uses these ingredients but includes **course aggregate** in as much as 60-80% of the mix
- Aggregates add strength, compensate for shrinkage, provide for greater abrasion resistance
- These varying material compositions require different polishing processes



HOW ARE OVERLAYS DIFFERENT FROM STANDARD CONCRETE?



HOW ARE OVERLAYS DIFFERENT FROM STANDARD CONCRETE?

- Standard concrete cures and dries approximately **35% through hydration and 65% via evaporation**
- Polished overlays rely on a much greater degree of hydration than evaporation
- Most overlay materials **bind up to 90-100%** of the mix water via hydration, resulting in fast set times and rapid strength development



WHY ARE OVERLAYS USED?

- Existing concrete surfaces vary in age, condition, finish and mix designs
- Existing concrete may be deteriorated, spalled, cracked, un-level and contaminated
- Existing substrate may include floorcoverings, adhesive residues or coatings
- Polishing a variety of existing surfaces will not result in uniform, monolithic appearance



WHY ARE OVERLAYS USED?



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WHY ARE OVERLAYS USED?



WHY ARE OVERLAYS USED?



WHERE ARE OVERLAYS USED?

- Retail stores / grocery
- Schools and institutions
- Warehouses
- Showrooms and office space
- Restaurants and hospitality
- Residential
- Military

*Recommendations on interior vs exterior, degrees of traffic, water / stain resistance vary by manufacturer



WHERE ARE OVERLAYS USED?



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WHERE ARE OVERLAYS USED?



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SIZE OF U.S. POLISH MARKET?

- Industry experts estimate the size of the U.S. concrete polishing market in 2016 at **360 million square feet**
- The polishing market has grown over **25%** per year **in the last two years**
- Projected growth rates of **25-30%** are **expected through 2020**
- Polish growing at a **much faster rate** than other hard surface flooring



SIZE of the U.S. Concrete OVERLAY MARKET

- Industry experts also report that **65% of all polish project are renovations**
- **75%** of these renovations **incorporate an overlay** into some portion of the project
- In **new** concrete polishing applications, approximately **only 3% use an overlay**

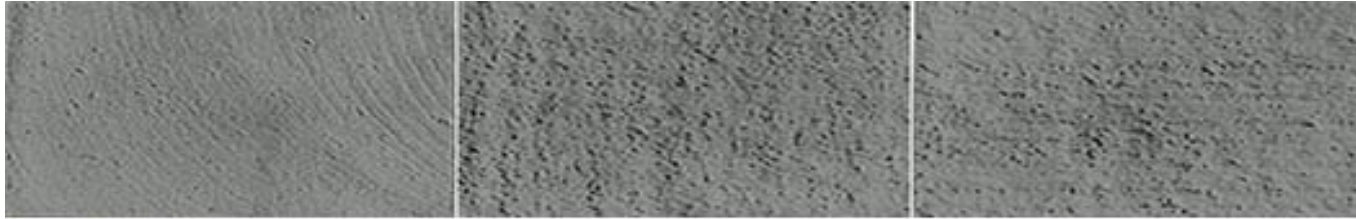


PREPARATION REQUIRED?

- All concrete must be sound, solid, clean and free of all oil, grease, dirt, curing compounds or any bond breakers
- Minimum **tensile strength of 200 PSI**, when tested per **ASTM C1583**
- Do not acid etch or use sweeping compounds
- Mechanically prepare the surface to a minimum **ICRI Surface Profile of 3 (CSP #3)**



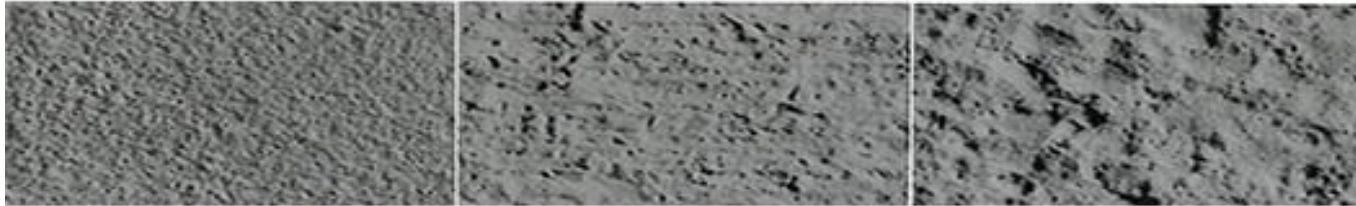
PREPARATION REQUIRED?



CSP-2 (Grinding)

CSP-3 (Light Shot Blast)

CSP-4 (Med. Shot Blast)



CSP-5 (Med-Heavy Blast)

CSP-6 (Heavy Blast)

CSP-7 (Heavy Blast)



PREPARATION REQUIRED



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PREPARATION REQUIRED?

- Inspect substrates for moisture, per **ASTM 2170**
- Moisture vapor emissions shall **not exceed** overlay manufacturer's requirements
- If MVE's exceed the manufacturer's specified limits, follow guidelines which may include the installation of a **moisture control system**
- Consider attending ICRI's **Concrete Slab Moisture Educational Program** to hone skills



PREPARATION REQUIRED?

- Prepare existing joints and cracks
- **Honor all moving joints** and crack up through the overlay, including expansion, isolation and control joints
- All **non-moving cracks should be filled** with a low viscosity, rigid, polyurethane crack and joint filler



OVERLAY BONDING AGENT

- **Two-component, single coat epoxy** primers are recommended by most polished overlay manufacturers because of weight, head pressure of equipment and polishing process
- Solvent-free, low viscosity **100% solid resins**
- Epoxy primers suitable for **porous and non-porous substrates**
- Primers help to **minimize cracking** and can be used as crack filling material
- Receives **sand broadcast**



BONDING AGENT INSTALLATION PROCESS

- After mechanical surface preparation to obtain a minimum ICRI surface profile of 3 (CSP3), vacuum the prepared surface
- Open separate, pre-measured units of epoxy resin and hardener, stir the components, **add the hardener to the resin**
- Blend for approximately three minutes with a low speed drill and epoxy paddle



BONDING AGENT INSTALLATION PROCESS

- Apply the freshly mixed epoxy primer to the prepared substrate in a uniform direction and at approximately **10 mils thick**
- Apply primer using a paint roller with nap length appropriate for surface, notched squeegee, paint brush for corners and hard to reach places



BONDING AGENT INSTALLATION PROCESS

- While the primer is still in a wet state, broadcast an **excess of fine sand consistently over the entire area**
- Grain size of sand should be **less than 1/50"** (98.5% passing sieve size #30 or #35)
- When broadcasting sand, use a **NIOSH-approved dust mask** compliant with OSHA requirements for handling of sand



SAND BROADCAST



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BONDING AGENT INSTALLATION PROCESS

- **Do not stand or walk** on the freshly applied epoxy when broadcasting the sand
- Use approximately **one pound of sand per square foot of area** and avoid all general traffic over the area for six hours or dry
- After approx. 16 hours **broom sweep and vacuum** the surface to remove loose sand
- This clean and prepared surface is now the primer and bonding agent for overlay



QUALITY ASSURANCE

- **Carefully select** material, equipment and tooling manufacturers with **warranty and proven track record** of products and process to polish overlays
- Before performing the work, install an **onsite mock up** of specified products, process, surface, finish, color, sealers and joint treatments for review / approval
- Conduct **pre-installation conference** with owner, architect, GC and manufacturer to review site conditions, specs, schedule, etc.
- Attend manufacturer's **factory training**



QUALITY ASSURANCE

- Polished overlays are intended for **foot traffic, moderate rubber-wheeled forklift traffic**
- Not suitable for **hard plastic or steel-wheeled environments**
- Not suitable for **heavy-duty manufacturing, chemically harsh or industrial sites**
- Dragging **heavy metal** equipment or loaded **pallets with protruding nails** will gouge, indent and damage



QUALITY ASSURANCE



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Polished Overlay Mixing and Application



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Polished Overlay Installation

1. Designed to be mixed with a **specific amount of water**, using a high speed drill **(minimum 650 rpm)** for 2 minutes

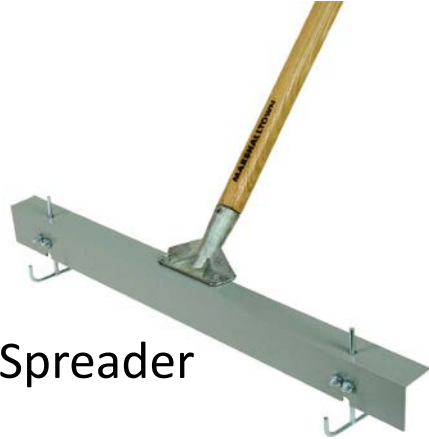


Polished Overlay Installation

2. Using **appropriate tools** can greatly increase productivity and ease of application



Recommended Tools:



Spreader



Spiked Shoes



Mixing Drum



1/2" Drill



Smoother



Mixing Paddle



Measuring Device



Spiked Roller

Rolling Cart



Barrel Not Included



Level Peg



Contain Dust



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Polished Overlay Installation

3. Pour material in **rapid succession** to ensure good healing/blending from batch to batch





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Polished Overlay Installation

4. Can be **pumped** for **fast track**
and **large scale** applications



Pumping Polished Overlay



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Polished Overlay Installation

5. **Range of applications include flattening or levelling applications**





Ideal for flattening/smoothing large areas



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Do you need Flat & Smooth... or Level?



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Flat & Smooth



Flat & Smooth

Level

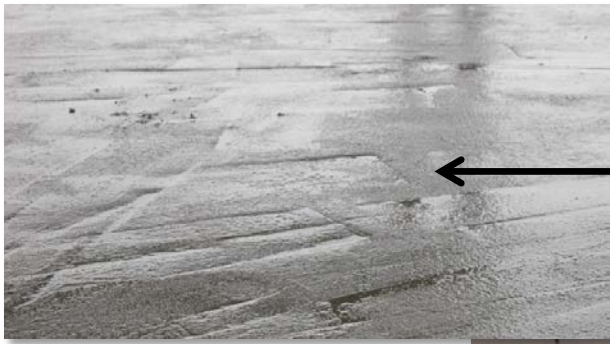


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May require **3/8"** minimum



May require **1/2" to 1 1/2"**



Polished Overlay Installation

6. Self-Leveling polished overlay installation option provides **time and labor savings** compared to trowelable applications



STEPS FOR POLISHING THE OVERLAY

- **GRIND / POLISH WITH 60-80 METAL-BONDED DIAMONDS**
- **VACUUM AFTER EACH STEP TO REMOVE DUST**
- **GRIND / POLISH WITH #100 GRIT TRANSITIONAL / CERAMIC / FLAT BLOCK RESIN-BONDED DIAMOND**
- **GRIND / HONE WITH #200 GRIT RESIN-BONDED DIAMOND**
- **APPLY DENSIFICATION / ALLOW TO DRY FOR ONE HOUR**
- **GRIND / POLISH WITH #400 RESIN-BONDED DIAMOND**



TOOLING FOR OVERLAY PROCESSING



PLANETARY GRINDER



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EDGEWORK

- Polished edgework of the overlay shall be done with a **hand held or walk behind tool**
- The edge polishing process will **match the corresponding steps** described for the desired gloss level
- Edgework **ALWAYS precedes** the corresponding polish steps



STEPS FOR POLISHING THE OVERLAY

- **APPLY GUARD MATERIAL AT APPROXIMATE RATE OF 2,500 SQ. FT. / GALLON**
 - **MICROPOLISH / BURNISH WITH # 400-1500 GRIT PAD**
 - **DRY MICRO-FIBER MOP THE SURFACE AND ALLOW TO COOL TO ROOM TEMPERATURE BEFORE APPLYING SECOND COAT**
 - **APPLY SECOND COAT OF GUARD MATERIAL AND ALLOW TO DRY FOR ONE HOUR**
 - **MICROPOLISH / BURNISH WITH #1500-3000 GRIT PAD**
 - **DRY MOP THE FLOOR TO REMOVE ALL DEBRIS**
- ❖ **These polishing steps will result in a typical gloss reading range of 40-65 (ASTM E 430)**



MICRO-BURNISHER



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PROTECTION

- Protect the new polished overlay from **spills and contamination** by petroleum, oil, hydraulic fluid, acid and acid detergents, paint and other liquid dripping from trades and equipment working over the substrate
- Protect the new surface by installing a **temporary breathable** protective floor covering
- **Avoid moisture for 72 hours** after installation, don't permit standing water or place any plastic, rubber mat, rugs or furniture that can prevent the system from drying by trapping moisture, resulting in cloudy finish
- Light **pedestrian traffic** only in the **24 hours** after installation / **normal traffic in 7 days**





THANK YOU!!

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