# Troubleshooting Decorative Concrete

## Common Issues Affecting Decorative Concrete

minnesota Concrete Council
Dedicated to Cast-in-Place Concrete

MINNEAPOLIS, MINNESOTA
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## Why Are You Here?

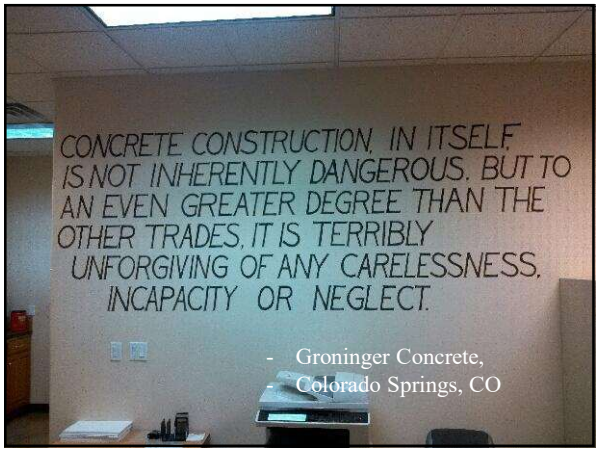
## Program Overview

- Setting the Standards for Success
- Handling Problem Situations
- Colored Concrete
- Stamped Concrete
- Overlays
- Stains and Dyes
- Polished Concrete
- Sealers and Coatings
- Q&A

## 7 Steps to Success……

before you start any *Decorative* project

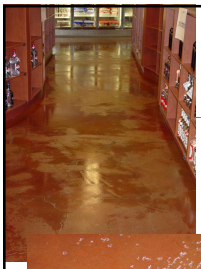
1. Understand the Products and Process
2. Managing Expectations
3. Sell for Success – Perception and Value
4. Systems Approach
5. Samples / Social Media
6. Resource Network
7. Be an Expert




## Question ?

What is the first thing you do when you have a problem on a job?

## Avoid Making it Worse

## Problem Management

Poorly thought out solutions, can turn a small problem into a major issue.


Always test in an inconspicuous area.

If a dispute arises, setting the RIGHT TONE can be the difference between getting PAID or PAYING!

**"Say what you mean, you just don't have to say it mean"**

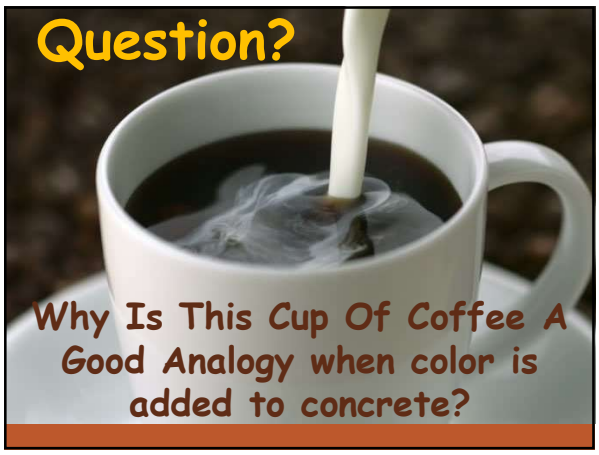
## Customer Feedback Study

Satisfactory Work = Tell No One

Superior Work = Tell One Person

Poor Work = Tell Eight People

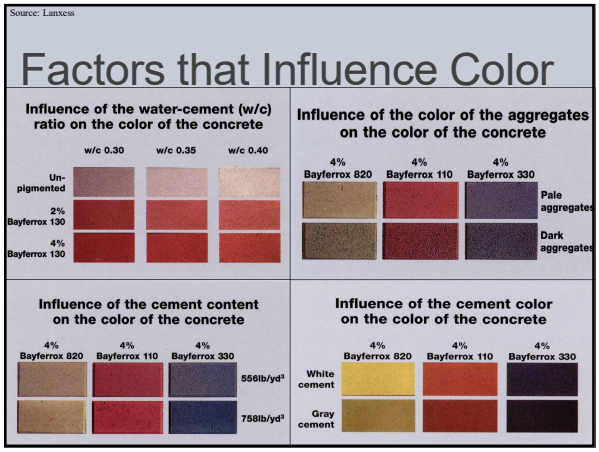
How Important is Price and Quality Work?

No matter how much milk is added, the coffee will always impact the final color

Source: Lanxess

## Factors that Influence Color

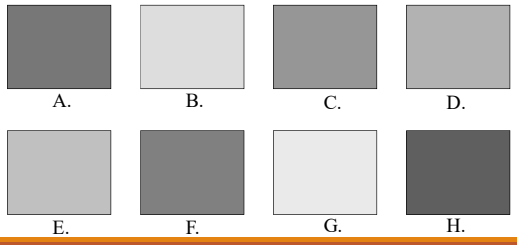



## High W/C Ratio Dilutes Color

Red concrete that is actually "PINK"

## Color Variations
## Gray Portland Type II Cement

6 month time period, Same type, same source; CA 1999

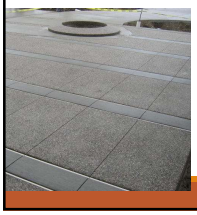


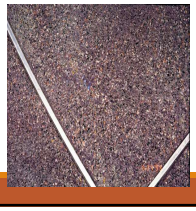

## Cement Color Differences

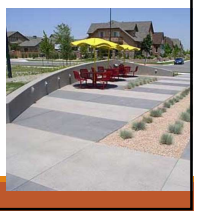
Switched ready mix suppliers mid project. Same color supplier, identical pigment, identical loading, DIFFERENT COLORS!

## Exposed Aggregate

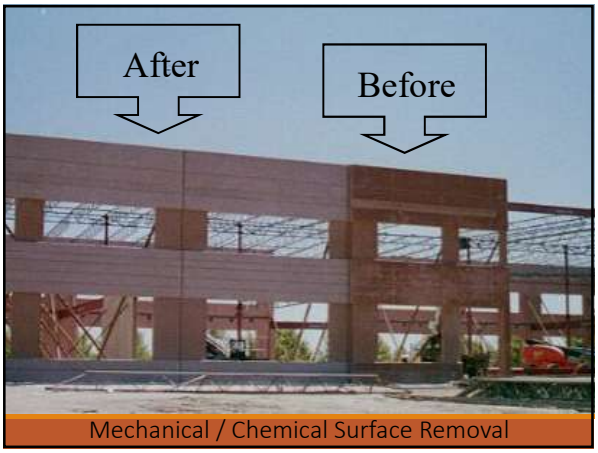
Aggregate type and color impacts the final look.







## Surface Affects – Colored Walls

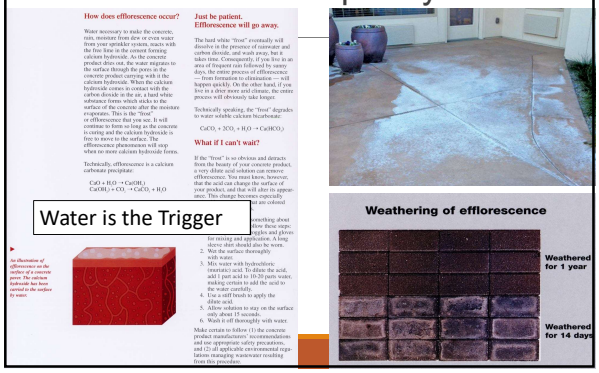



Mechanical / Chemical Surface Removal

Work smarter – not harder.

Use color variation to your benefit in the design of colored walls

## Efflorescence. A Temporary Problem





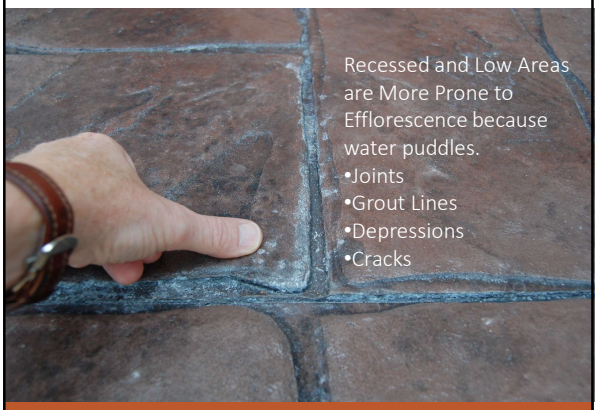




Water is the Trigger

Efflorescence created by Surface Water during brooming

High Alkaline Content in Cement or Ground Water – Foreign Sources



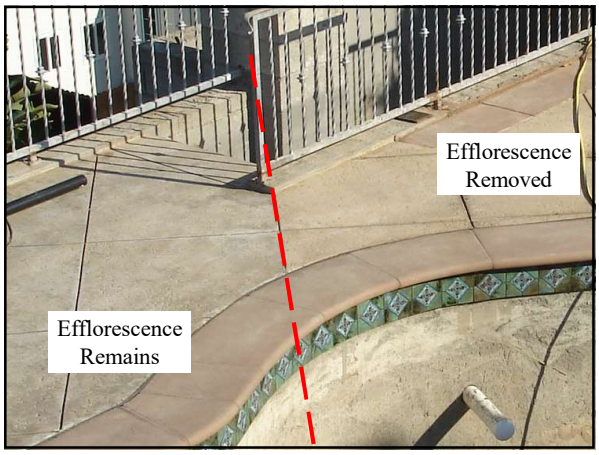

## DID YOU KNOW?

The cycle of efflorescence will eventually end on its own. Once concrete fully cures, no free lime remains to fuel the process.

How long are you willing to wait?

## If You Can't Wait....

1. Efflorescence Cleaner or Dilute Acid or Mechanical Removal
2. Let it Dry
3. Seal It. Penetrating or Membrane




## Maintenance – Sealers are not just for show


## Troubleshooting Imprinted Concrete

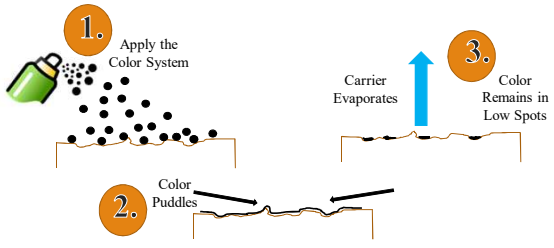
Secondary Color Issues

The growth of post applied secondary highlight color systems has created growth in sealer related failures and issues.

Secondary Color Issues Often Presents as a Sealer Issue

Sealer failure due to excessive post applied color has become one of the most common issues with stamped concrete today!

## Post Applied Highlight Process



## Post Coloring Issues

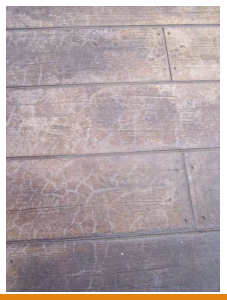
#1 issue is Over application!

**Less is More!**

## Post Coloring Issues

#2 issue is using a post coloring system to force a desired result

- Highlight systems used to change the overall color
- Using a stain post coloring system to “hide” significant surface issues



## Post Coloring Issues

#3 issue is lack of maintenance

- All post coloring systems are adhesive vs cohesive.
- Most require a sealer to lock the color in.
- Without a sealer, the color walks off.

"All post coloring systems have one thing in common – the color lives on the surface, and if not protected, it


Post Coloring applied in 2014

Without maintenance in 2017

## Post Coloring Issues

#4 Poor Application

- The installer has significant control over the final color result.
- Understanding the material and experience are critical to successful application.

"Post coloring systems have become popular, and in my opinion over sold in regard to ease of use"


## Keys to Success

- Know your chemistry – stain or antique.
- Application rate- all systems are designed for light and or thin applications. Less is More!
- Porosity of the surface – Surface preparation – cleaning, degreasing, acid or mechanical opening.
- Penetration of the colorant - Can it get into the substrate!
- Adhesion of the colorant – How well will it hold? Do you need a sealer?
- Sealing and Maintenance – Understand the system requirements – post coloring does compare to in-process coloring in regard to long term durability.
- Expectation Management – how long will it will last and maintenance requirements.

"#1 key to success is understanding the system you are using and using it within its limitations"

# Question ?

What is the most important factor in any overlay application?

a. Material Selection
b. Proper Tools
c. Surface Assessment & Preparation

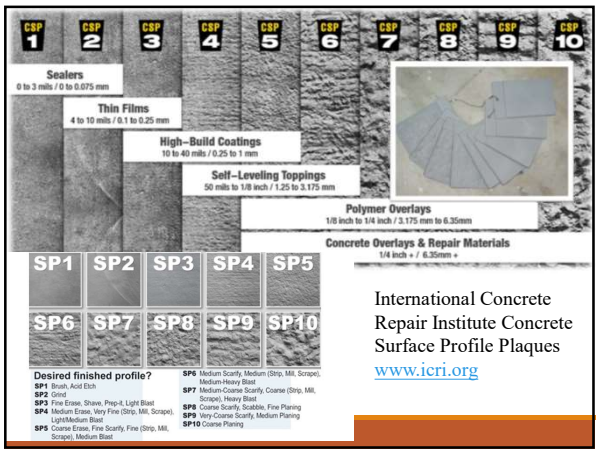

## Overlays: Only As Good As the Substrate!

Substrate Assessment MUST include:

- Sub Base Analysis
  - Visual Inspection
  - Moisture Testing
  - pH Testing
- Strength Analysis
- Surface Profile Analysis

Moisture Tests

pH Tests



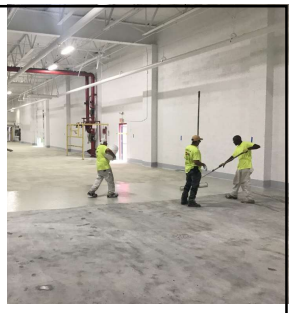

International Concrete Repair Institute Concrete Surface Profile Plaques
www.icri.org


# Question ?

What are the two common types of priming when applying a decorative overlay?

Wet Application

Lower solids



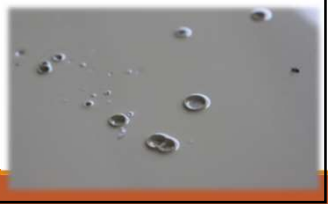
Dry Application

high solids w sand

# Self Leveling Overlays

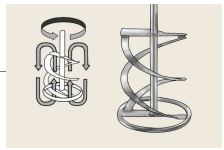
1. Pin Holes

- Mixing air into the material
- Elevated temperatures – above 70F causing off-gassing
- Lack of primer



## Mixing Paddles

BEST OPTION: Double helix that mixes from the bottom up designed for heavy bodied concrete mixes



## Self Leveling Overlays

### 2. Delamination

- Poor Surface Preparation
- Application Issues

## Self Leveling Overlays

### 3. Crazing or MAP Cracking

- Overwatering
- Rapid Hydration due to wind
- Elevated temperatures

- Flame test to detect air movement

# Self Leveling Overlays

## 4. Job Site Consistency

- Environmental Changes
- Batch to batch variations
- Delays in Mixing

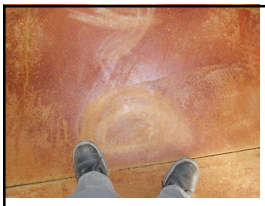


Samples or Mock Ups
Easiest and Cheapest Form of Expectation Management Insurance you can Buy!


Discuss the Limitations
•Heavy Concentrated Traffic
•Hard Sharp Chair Legs
•Poor Maintenance


Common Application Related Issues:
Marks left from roller application of dyes or stains

Droplets and spatter from poor quality sprayer and or tip with low pressure

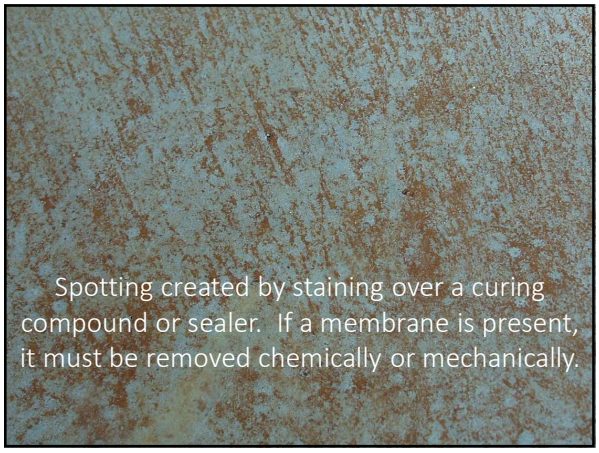


Waste and residue

Sealer failure caused by stain residue

## How Much to Use?

This is Where Experience and Understanding the Product and Process Comes into Play!



Spotting created by staining over a curing compound or sealer. If a membrane is present, it must be removed chemically or mechanically.

Acid Burn or Stain Spots

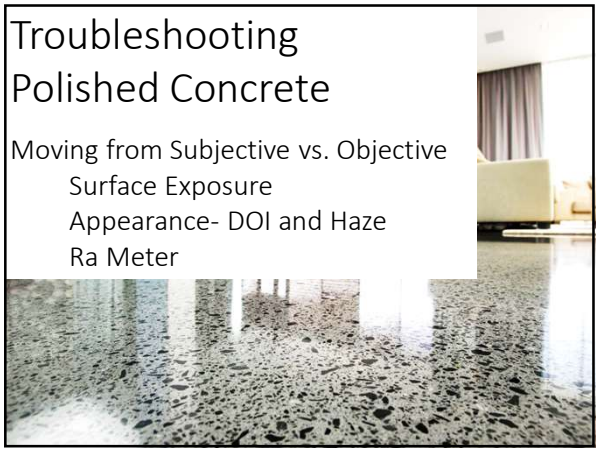
Created by applying stain or dye directly to dry concrete resulting in a dark spot. Dampen the surface with water to avoid this issue.

## Manage Job Site Contamination


## Troubleshooting Polished Concrete

Moving from Subjective vs. Objective

- Surface Exposure
- Appearance- DOI and Haze
- Ra Meter



## Depth of grind, level of gloss, and when to switch out tooling?

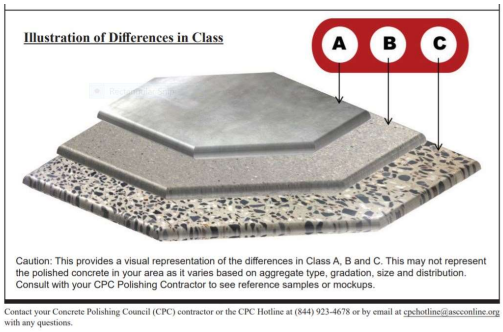

These have been a source of debate and confusion.

## Surface Exposure – Finish

**CONCRETE POLISHING COUNCIL**
**POLISHED CONCRETE AGGREGATE EXPOSURE CHART**
*REPLACES CPAA AGGREGATE EXPOSURE CHART*

| CLASS | NAME | SURFACE EXPOSURE, % |
|---|---|---|
| A | Cement Fines | 85 – 95 % Cement Fines<br>5 – 15 % Fine Aggregate |
| B | Fine Aggregate | 85 – 95 % Fine Aggregate<br>5 – 15 % Blend of Cement Fines and Coarse Aggregate |
| C | Coarse Aggregate | 80 – 90 % Coarse Aggregate<br>10 – 20 % Blend of Cement Fines and Fine Aggregate |

## Surface Exposure




Caution: This provides a visual representation of the differences in Class A, B and C. This may not represent the polished concrete in your area as it varies based on aggregate type, gradation, size and distribution. Consult with your CPC Polishing Contractor to see reference samples or mockups.

Contact your Concrete Polishing Council (CPC) contractor or the CPC Hotline at (844) 923-4678 or by email at cpchotline@ascconline.org with any questions.

## Surface Exposure

## Distinctness-of-Image (DOI)

Using instrument readings and established written standards to get consistent results in gloss and reflectance.

## Distinctness-of-Image (DOI)

**CONCRETE POLISHING COUNCIL**
**POLISHED CONCRETE APPEARANCE CHART**
*REPLACES CPAA FINISHED GLOSS CHART*

| LEVEL | NAME | DISTINCTNESS-OF-IMAGE (DOI) GLOSS | IMAGE CLARITY VALUE, % | HAZE INDEX |
|---|---|---|---|---|
| 1 | Flat (Ground) | Images of objects being reflected have a flat appearance. | 0 – 9 | <10 |
| 2 | Satin (Honed) | Images of objects being reflected have a matte appearance. | 10 – 39 | |
| 3 | Polished | Images of objects being reflected do not have a sharp and crisp appearance but can be easily identified. | 40 – 69 | |
| 4 | Highly Polished | Images of objects being reflected have a sharp and crisp appearance as would be seen in a near-mirror like reflection. May require grouting. | 70 – 100 | |

## Ra Meter (Roughness Average)

Using real numbers and data to determine the condition of the floor and when to switch tooling.

## Troubleshooting Sealers for Decorative Concrete

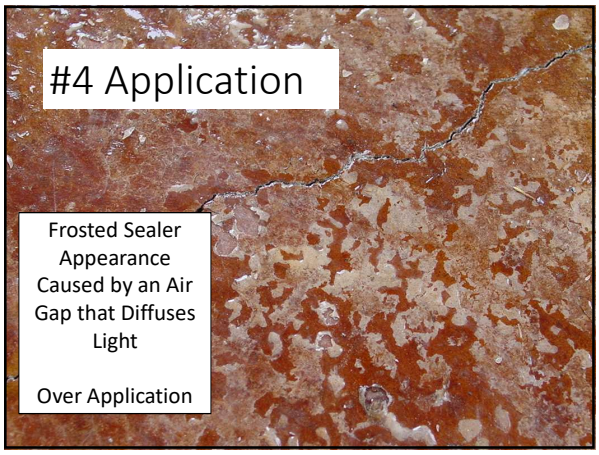
- Blushing / Haze
- Temperature
- Surface Issues
- Application

| Factor | Presentation | |
|---|---|---|
| Moisture | Milky |  |
| Temperature | Blisters |  |
| Surface Profile | Flaking |  |
| Application | Frosted |  |


#1 Moisture
Moisture Trapped in or Under the Sealer


#2 Temperature
Blisters Caused by Surface Skinning and trapped solvent.
Elevated Temperatures, wind, and / or Fast Flash Solvents
This is *more* an issue with high acetone content sealers!


#3 Surface Profile
Flaking or Peeling Sealers





## Resources

American Concrete Institute (ACI) www.concrete.org

310R-13 Guide to Decorative Concrete
308.1-11 Specification for Curing Concrete
CCS-5(16) Placing and Finishing Decorative Concrete
132R-14 Guide for Responsibility in Concrete Construction

American Society of Concrete Contractors - Decorative Concrete Council (ASCC / DCC) www.ascconline.org

International Concrete Repair Institute www.icri.org

National Ready Mixed Concrete Association www.nrmca.org

Portland Cement Association www.cement.org

Lanxess Corporation www.laxness.com

So…….

The Next Time You Think You Have Problems…….


Thank You!

Questions?

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