

Stop Blaming Salt – Finish Your Concrete Better

Winter will soon wane and it's time to think about sidewalks, curbs, and other flatwork that are on the list for repair or replacement. If you find yourself looking at the scaling or mortar flaking in the surface and saying something like, "yeah, that's what happens when you use salt"...stop it. Look across the street at the sidewalk that was poured in 1967. It looks a little rough at this point, but the surface is still smooth and doing its job. Do you imagine they only are applying salt on your side of the street? No, it's a side-by-side test, your side is losing, and salt is not a variable.



So, if it's not salt, maybe all the good Portland cement was used up years ago and we can't get the good stuff now? Has the aggregate gone bad? Is the global warming thing getting to it? Is it the Russians? Well, perhaps, but not likely.

Making excuses just makes us look small. Let's own up. Too often these days, we're finishing too much water into our concrete and it's as simple as that. Well, not really; we're also using the wrong tools sometimes and beating the entrained air out of it and causing segregation, but let's stay with this particular rabbit hole for now.

Speaking broadly, cement needs about 0.35 pounds of water per pound of cement for full hydration (the process that makes our cement magically durable). But that is under ideal control conditions and so our mix designs are usually based on somewhere between 0.45 and 0.60 for its water to cement ratio (w/c). For many of our common mixes, the specification is a maximum of 0.45 w/c. Too many finishers are adding unnecessary water before it even comes down the trough to make it easier to finish and make pretty.

If it is pretty the first week of its life but can't withstand a little salt a year in, is that really the trade we want to make?

It does not have to be one or the other. We can get a creamier mix and still stay in the right range of water to cement. Using a high range water reducer (plasticizer), a chemical additive, to the mix can give us the workability we want for that "pretty" surface without compromising the concrete durability that comes with adding too much water.

Next, let's work on our patience. After that plastic concrete comes down the chute and we spread it out, screed it out, and bull float it, we need to go find something else to do for a little while. Good time to munch a sandwich. Maybe read some of the latest Concrete Finishers Monthly articles. Sit under a shade tree with the rest of the crew and debate why we still tend to not eat chicken for breakfast or what is the deal with kale. In the summer and with a breeze, this may be a fairly short window; in the winter, it can go a good bit longer. We are waiting for the bleed water to come off.

Bleed water is the excess water that the hydrating concrete mixture is expelling and except in the hottest and windiest days, you will see some of it pool up on the surface after screeding and bull floating the surface. Usually, you can let this evaporate and then you can proceed with final finishing (with magnesium or wood floats; avoid using metal tools on exterior concrete because they can beat the entrained air out of the mix).

And it's during the floating stage that we can once again defeat our purposes. What is it with some finishers, that suddenly they are consumed about the cleanliness of their tools and keep dipping them in a bucket of water? They're so clever, introducing all that water onto the surface to make it pretty. Knock it off. And stop it with the water bottle with the hole in the cap. And put that wet brush down – it's for cleaning tools, not for slinging water across the surface.

Joshing aside, finishers can't be blamed for wanting the surface to look nice – they are craftsmen and just like someone who builds cabinetry or does trim work or sweats copper pipe, they like it when someone compliments how nice it looks. But we need concrete to be durable and we don't have to have one or the other. Ordering the right mix will make it workable without compromising the water to cement ratio and if we then exercise some patience while bleed water evaporates and resist the urge to reflexively add water to the surface during finishing, we can have a nice-looking surface and great durability.

Let's up our own game when we're the finishers and when we hire contractors to do it, let's set the bar right from the beginning and let them know that working a bunch of excess water into the concrete doesn't fly in our town. Find a professional way to make it clear – if you can't finish concrete with the durability that those folks did in 1967, go work for someone else.

So, if you are over-applying deicing salts...stop it. The Delaware T²/LTAP Center offers a free winter maintenance training workshop each fall that talks about deicing materials and strategies so you can effectively control ice without wasting material and adversely impacting the environment in the process. Keep an eye out for this most-excellent workshop next fall, attend, and stop blaming poorly performing concrete on deicing salts.

But long-lasting, durable concrete is the other side of that coin. Best construction practices are key, and it begins with selecting the correct mix. The Delaware T²/LTAP Center also offers a free workshop that walks through the practices that will ensure the best concrete results, recognizing that we won't always have the ideal controls over every aspect of the project. That is fine, as long as we understand how each compromise will impact the product. Look for that this spring.

The Delaware T²/LTAP Center's Engineering Circuit Rider is intended to provide technical assistance and training to local agencies and so if you have concrete issues, want to discuss breakfast chicken, or have other transportation issues, contact Matt Carter at matheu@udel.edu or (302) 831-7236.