

## Facilitator — April/May 2016



### Solid Foundation

Mark Anderson

A concrete expert answers some frequently asked questions

Welcome to FM Project Profile, an interview-style series in which a restaurateur spotlights a major facilities project. By discussing one of their most memorable facilities jobs, our members hope to share insight and inspiration. This month's profile comes from Mark Anderson with Dave & Buster's.

How long have you been in the concrete/facilities business?

I started in the early 1980s, working for a shell contractor and then a general contractor. I got into facilities in 2000.

Over your career, how many building foundations (including residential) have you supervised pouring? I have supervised close to 1,000 slabs and foundations for five housing subdivisions and multiple commercial buildings. They say practice makes permanent, not perfect, and there are a lot of folks much smarter than me out there.

In your experience, what is the most common failure in foundations? Concrete breaks due to underlying soil conditions.

What can be done to prevent concrete failures?

The first step is to make sure the slab and foundations are properly compacted twice. They should be compacted when the ground is raw, then tested for proper soil density. However, form carpenters and plumbers will disturb the compaction by digging for foundations and pipework. After the concrete forms are placed, and the future depth of the concrete is assured, a proper tamp-and-spray company should compact the soil again.

The engineer will have designed steel reinforcement, and the building inspector should check for compliance. Immediately before the concrete pour, it is important to verify that the rebar is metal chairs, not lying on the bottom of the form or against the sides. The metal rods give reinforced concrete tensile strength and should be well immersed in concrete, not at the bottom or top. Welded wire mesh should be hooked upward into the wet concrete as it is being placed because it will naturally want to settle to the bottom with foot traffic.

Make sure that the concrete placement is done well. "Plastic" or wet concrete has a relatively short shelf life. If it is kept too long in the ready mix truck, it will heat up and harden. The concrete pour should be continuous, with no long intervals between trucks, which will cause a cold joint (a weak point). A concrete testing company should be present, and the truck driver should have a ticket from the batch plant stating the time and the temperature of the concrete mix. The testing company will check that the concrete slump and PSI are according to the structural engineer's design. The concrete finishers and truck driver should also be aware that adding too much water will weaken the concrete mix. Vibrating the deeper sections and foundations will reduce honeycombing and air entrapment, strengthening the concrete and ensuring a good connection to the rebar.

Finally, leave the freshly mixed concrete undisturbed. While concrete rapidly gains compressive strength in the first 28 days, it is susceptible to breaking early on. Delivery schedules should be planned accordingly; heavy trucks must be kept off for 28 days and cars for seven days.

Since concrete will expand and contract due to temperature, expansion and control joints are necessary. Concrete will often have hairline cracks that reach for the least point of resistance when the slab is moving. These cracks are not structurally significant, but it is better for aesthetics if they run to and inside the control joints.

What areas of a facility should use concrete versus asphalt? Why?

Concrete should be placed in the loading areas, as well as the approach. It should be thick and well reinforced. We all know a garbage truck's wheels, when lifting the full dumpsters, and a semi-tractor trailer's slow moving turns, have terrific force. The moving, or "live load," plus the dead load of weight will cause a quick failure for asphalt and/or thin concrete. Rebar mats of reinforcement placed 12 inches on center each way, with thickened reinforced footers, helps ensure a stronger system.

What's the most common concrete failure in restaurant parking lots and sidewalks? There are more than a few. Ice will lift sections up. Caulking the expansion joints and cracks helps prevent that. The other failure is poor placement or under-design. Tree roots will lift sidewalks, but the roots can be stopped by placing root barriers in front of the sidewalk or concrete lot. Heavy trucks will crack pedestrian sidewalks that are only 4 inches thick and not reinforced. For a big project, walk the job with the

contractor and note the broken sidewalks prior to commencing.

What determines a repair versus a replacement when dealing with concrete, specifically with cracks? Most managers look at where the cracks are located. If a crack is hairline, it is not a priority, even at the front entry. If it is more than a quarter of an inch, it may be replaced in the front but not the back dock. When you see a shift in the concrete at the crack, it is time to consider a replacement or another solution.

What is the largest concrete job, in terms of cost and square footage, you've been responsible for? I had a narrow concrete tilt wall office/ warehouse project about 74,000 square feet. If memory serves, the concrete portion was more than \$1 million. Tall walls, narrow footprints and implanted fenestration made this more expensive than it should have been.

What are some of the unique projects you have been involved with? One involved pouring slabs and tie beams next to a site that was blasting cap rock. Richter scales were set up to judge the jolts, and we would pour in the afternoon to avoid the morning blasting. We were surprised that the thunderstorms recorded bigger jolts than the explosives.

In your experience, what are the most common concrete problems when dealing with food establishments? The quality? The preparation? The pouring? You are asking for problems when you hire a bargain-rate contractor or one who is just starting out. Too much can go wrong with the forming, rebar, finishers, and credit to acquire crews and material. With an occupied restaurant, timing is important. If possible, plan the project for the dry season when temperatures are balmy and business is slow. If rain is a good possibility, delay the pour. I have not seen a concrete topping that lasts for the long term. It is important to hire a security guard so that no one writes in the soft concrete or walks on it. For new buildings, the stained concrete floors are only good if they are sealed. Unprotected floors erode, especially with the combination of grease and enzyme cleaners.

What procedures and actions can be taken to ensure concrete is properly specified and installed as designed? Hire a qualified structural design engineer or site engineer, and discuss the operations of the site. If the work is significant, they can supply or recommend field inspectors if they do not feel confident doing it themselves. Unfortunately, municipal building inspectors and contractors may not ensure the proper placement.

How long should a typical concrete sidewalk, apron, lot and curbing last? Concrete continues to strengthen for more than 90 years. It is just a matter of what and how it is placed, designed and used.

Mark Anderson has worked in restaurants since college. He then worked in construction for 16 years, eventually becoming a licensed general contractor. He has been in restaurant facilities for 15 years with Carlson Restaurant Group and joined Dave & Buster's in August 2015.