



CASE STUDY

1000 SF GARAGE, HEAVY SPALLING, MULTIPLE CRACKS, RAINY CONDITIONS

COMPANY

Citadel Floor Finishing Systems

OBJECTIVE

Stop the deterioration of a concrete slab by installing a decorative Polyaspartic Polyurea floor coating.

REPAIRS REQUIRED

Heavy spalling throughout will need to be overfilled and ground flush prior to coating. Some areas will be filled in the coating process using Polyurea 350 as a self-leveling primer/basecoat. Nearly 200' of cracks need to be chased out and filled. Multiple areas on front lip of garage need to be formed and filled. A large oil spot in the middle of the floor needs to be cleaned and removed prior to coating.

MATERIALS REQUIRED

CFFS Fortification Formula
CFFS TX-3
CFFS CPC Degreaser
CFFS Polyurea-350 and corresponding color tint
CFFS ¼" Decorative Chip (Tan)
CFFS RG-80

TIMELINE

One day installation with two trained installers.
Total time on-site: 12 hours
Total cost of materials used: \$2,331*
Total bid price including repairs: \$6,200
Overall profit margin: 44%



*Standard Contractor Pricing

The concrete in this particular garage was only about 10-12 years old but had deteriorated to the point where it almost should have been removed and replaced. Around the entire perimeter were large cracks due to settling over the years and extensive damage could be found throughout, most likely caused by salt, freeze-thaw, and improper finishing in the concrete placement process. The homeowners mentioned that there were also a few spots on the floor that collected water when they drove their cars in during snowy and rainy conditions. In these low spots, also known as "bird baths," water and snow would accumulate and freeze. This created a major slip/fall hazard that the homeowner found out about first hand (involving a short stay at the hospital). All these problematic areas needed to be remedied, and a phone call was placed to Citadel Floor Finishing Systems to handle the installation.

To start the installation we used a Werkmaster Raptor grinder with 20 grit L-segs (Super Soft Metal Bond) to mechanically prepare the floor and help to level out some of the heavily spalled areas. Using this machine also helps to remove some of the high spots in the floor and get us closer to a monolithic slab ready for coating. The edges were prepared using the Hum-B edge grinder first and then followed up with the Metabo 5" hand grinder to grind tight up to the wall. We also used the Metabo hand grinder to level out areas of the floor that had heaved and caused uneven surfaces around a crack. It is always best to use a small hand grinder to level these areas as opposed to taking a larger grinder like the Werkmaster Raptor or the Citadel 7500 and chance damaging the machine. With two trained installers on-site, most of the repairs including cracks, front lip damage, and spalling were done before the main section of the floor was completely ground.

With a large number of lineal feet of crack to chase and fill, we chose to use the CFFS TX-3 mixed with sand to make the repairs. First, all the cracks were chased out using the Metabo hand grinder with crack chase blade attached. They were then all vacuumed out to remove any dust and debris prior to filling. We mixed a total of 32 oz. of TX-3 (16 oz. A, 16 oz. B) and added about 20-30 ounces of dry silica sand as a filler. The mixed material was poured in place and then troweled using a 10" putty knife to spread it evenly. We did this due to the large amount of spalling located around the areas where the cracks had formed. Eventually all these areas needed to be filled to help level out the floor so it worked out quite well. Some of the cracks were extremely wide and required the use of dry silica sand to fill the voids prior to applying the TX-3. This was done so that the liquid filler would not simply run down the crack and disappear. Once the sand was in place it was struck off using a finger to create a void about 1/8"-1/4" deep for the repair material. For these cracks we used CFFS Fortification Formula with no fillers. The material was batch mixed in small quantities and poured in place. Because there was somewhat of a hump in the floor due to heaving, we had to come back and fill in some areas that had run downhill. While doing this we added dry silica sand to the poured material to thicken it up and force it to stay in place. Once all the repairs had cured we used various grinders to remove the overfill. (See next page)





An area that was heavily spalled also turned out to be the spot the homeowner told me was the frozen "bird bath." To remedy this area we again used the TX-3 mixed with dry silica sand to overfill and level the floor. It was an area however that the Werkmaster Raptor could not prepare so we used the Metabo hand grinder to purposefully gouge and clean the surface so that the repair material had a strong base to bond to. The area was vacuumed, and we mixed a batch of TX-3 with sand to fill the majority of the hole. Once this was done, a second batch was mixed without sand to allow it to self-level and flow easier. The end result was a large repair that we ground down using the Werkmaster Raptor, mostly due to its larger footprint and flatter grinding capabilities when compared to the Hum-B or hand grinder.



CFFS CPC Degreaser was used to remove a large oil spot in the middle of the floor. Once we started grinding the floor we noticed a large oil stain that kept coming back through after we ground over it. We applied a full concentrate of CPC Degreaser to the area and let it sit for nearly an hour as we were grinding the rest of the floor. Once grinding was nearly complete, we took a scrub brush and worked the degreaser into the surface to break up the contaminants. We used clean water to flush the surface and again scrubbed it in with a brush. The remaining water/oil/degreaser was then soaked up using rags to get it off the floor. This is usually done with a shop-vac but at the time we did not have it in our trailer. We both knew that you should NEVER use your Pulse-Bac to suck up moisture, so we had to improvise. We ran the Werkmaster Raptor over the cleaned spot and the heat from the diamonds removed the remaining moisture. We did a quick check with water and found that none of the contaminated area resulted in the water beading on the surface. We hit it again with the grinder to remove the moisture and the prep in this area was complete.

There were also a number of repairs to be made on the front lip of the garage slab where it meets the driveway. These were done quickly and easily using CFFS Fortification Formula, plastic sheeting and a 10" putty knife. To make the repairs we used the Metabo hand grinder with the crack chase blade to open up and prepare the damaged areas for filling. We vacuumed the area to remove all latent dust and debris then put our forms in place.



Once the Fortification Formula had cured we used the Metabo 5" hand grinder to remove the overfill and profile the radius to match that of the existing slab. When we were done you could not even tell that there was any damage to begin with. For this particular application there were about 6 areas that had damage, and all of them were completed in about 25 minutes. At this point all the necessary repairs had been made (except for the spalling, see below) and we were ready to start applying the liquid materials.



Because we were going to use color tinted Polyurea-350 as a self leveling coating to fill the spalling, we decided to expedite the spreading of the material by carving small notches in a standard squeegee to allow it to leave material behind as we pushed it around the floor. After the material was spread with the notched squeegee it was back-rolled to lay it off and even everything out. By doing this we were able to "wet-out" the entire floor in about 45 minutes. From there, we waited about 15 minutes before we went back and did a full broadcast of ¼" Tan chip. Because we had "wet-out" such a large area at once, we decided to use a dry roller to go back over the broadcasted chip and force it into the coating, thus guaranteeing uniform coverage throughout.



Because we had applied the Polyurea-350 material thicker than normal (to fill in and level the spalled areas) we had a slightly longer cure time than the normal 1 ½ hours. It took about 2 hours and 15 minutes to reach full cure before we could walk on it to recover the loose chip. During this time we left the jobsite and caught an early dinner. Sometimes this is the best option – take care of something that will need to eventually be done while there is down-time. When we returned we used the leaf blower to push all the loose chip to a corner of the garage for recovery. The chip was re-boxed and labeled "recovered" so that next time we used that color we would be more likely to look for possible contaminants such as leaves and small chunks of sheetrock. Two 14" scrapers and smaller putty knives were used to scrape the chips down in both directions and flatten the floor. The scrapings were then blown into a corner, picked up and thrown in the garbage. The corner where the scrapings were blown was thoroughly vacuumed and then the leaf blower was used to push any and all remaining chip out of

the garage onto the driveway for clean-up before leaving the site. At this point it started to rain heavily again and we had to protect the chip from moisture. We used thin mil poly (plastic) taped to the partially opened garage doors to create “tents” that would shield the rain away from the floor. This also allowed us to continue working even though we were coating to the outside edge of the garage slab.



We decided that since we were going to be clear coating a large area at once we could mix large batches of RG-80 to be used for the topcoat. A total of 2 gallons at a time was mixed, poured on the floor and pulled around with a squeegee to evenly distribute the material. Once the first batch was spread, an 18” roller was saturated and used to back-roll the coating to lay it off. We continued this process until the entire floor was clear coated. The customer had asked at the beginning of the job that extra anti-slip additive be broadcast into the clear-coat to provide additional traction. To do this evenly we used a small, hand-held seed spreader filled with clear silica sand. Wearing spiked shoes, we moved quickly to ensure saturation of the sand in the clear-coat, as well as to eliminate heavy spots (which will diminish the shine of the topcoat). The end result was a monolithic coating wall to wall, with a nice flat finish and heavily textured topcoat. The homeowner was so pleased with the results that she actually sent us gift cards to Chipotle to the tune of \$25 each! My camera died before I could take finished photos of the floor, but it turned out beautifully and we had another happy (hopefully repeat, or reference) customer.

