

Panable Pervious

It has now been one year since Mr. Wang told us about his experience in using a power float, fitted with a pan to finish their pervious flatwork. We have spent the year gathering experience with this process on various mixtures and with various equipment configurations. Most of us agree that this method allows the pervious contractor to produce a superior slab surface in three ways:

Surface defects caused by insufficient compaction or from stretch marks are easily fixed immediately following the screed. The pan replaces the cross roller, the static roller and the plate compactor with a quicker and more effective, localized compaction tool.

Concrete can be deposited in low spots which appear during the first pass. The pan will easily blend these areas to a surface profile that is more flat and more stable.

Surface durability is improved as the pan causes a slight rearrangement in surface aggregate position. The motorized roller screed tends to align the surface aggregate in one direction. The pan will restore the random arrangement of aggregate as well as cause a tighter and more uniform surface density.

Our first concern is about over-compaction causing the infiltration to choke. All of our mixes at the 2012 Roast are built with extra large voids to see the effects of extra weight on the pan. These lighter mixes (117 lb) allowed us to track these areas with infiltration tests to compare the areas where the pan was loaded with light, medium and heavy configuration. John used an improvised piece of iron and another piece of concrete to load the additional weight. John and I are engaged in a public debate that I find useful to illustrate the different views on panning. He uses a conventional pan, as many have done during the early trial runs with this method.



light

medium

heavy



No Snibbling Allowed: After the 2011 Roast, Neal began whining to everyone that our mixes were too heavy. Be advised, don't whine about our mixes being too light. And, don't whine about the goofy, improvised weights that are stacked on the machine. Weights for the Bunyan Skip Float are one quarter of the pan and rest directly on the pan.

Where's the Beef?

I would not want to seem disagreeable with everyone, I just pretend to be disagreeable to illustrate that there are two or more sides to most of our discussions. Before I bang heads with John in public, we spar in private. Everybody should understand how quickly the voids choke off in some mixtures. Consider the equipment and the mixture to determine their compatibility. We have developed the Bunyan Skip Float to exert the lightest possible impact for mixtures which have voids that I would call "fragile". John is not fragile, nor are his mixes.



John Bazella enjoys a nicely balanced mix from his local supplier in Pennsylvania. I worked with John and Bruce Cody on projects where he used a conventional pan float. This is a 36 inch power trowel, fitted with a temporary pan. I see potential issues with this configuration which I have listed in order of importance. I have included a possible modification which could lessen the potentially negative effects of each issue. I consider this configuration to be "high impact", based on these points:

Footprints. Consider modification to the operator's handlebar to a longer reach to allow operation from the edge of the slab. Another option would include "sliders" to walk with less impact.

Weight. One way to reduce the weight is to fit the machine with an oversized pan. A 36 inch machine on a 42 inch pan would help reduce impact.

Speed. Slow the rotation, still too fast for low impact.

Vibration. Slow the engine, still excessive for low impact.



John says that low impact is for wimps and prefers the higher density of a high impact pan configuration. My approach is more sensitive because I've been slapped around more than John has. I have also encountered mixes that need a "low impact" approach with a Bunyan Skip Float and would include these features:

Footprints should be avoided on freshly placed pervious. The Bunyan Skip Float handlebars are longer and available in dual handles for two operators on opposite sides of the slab.

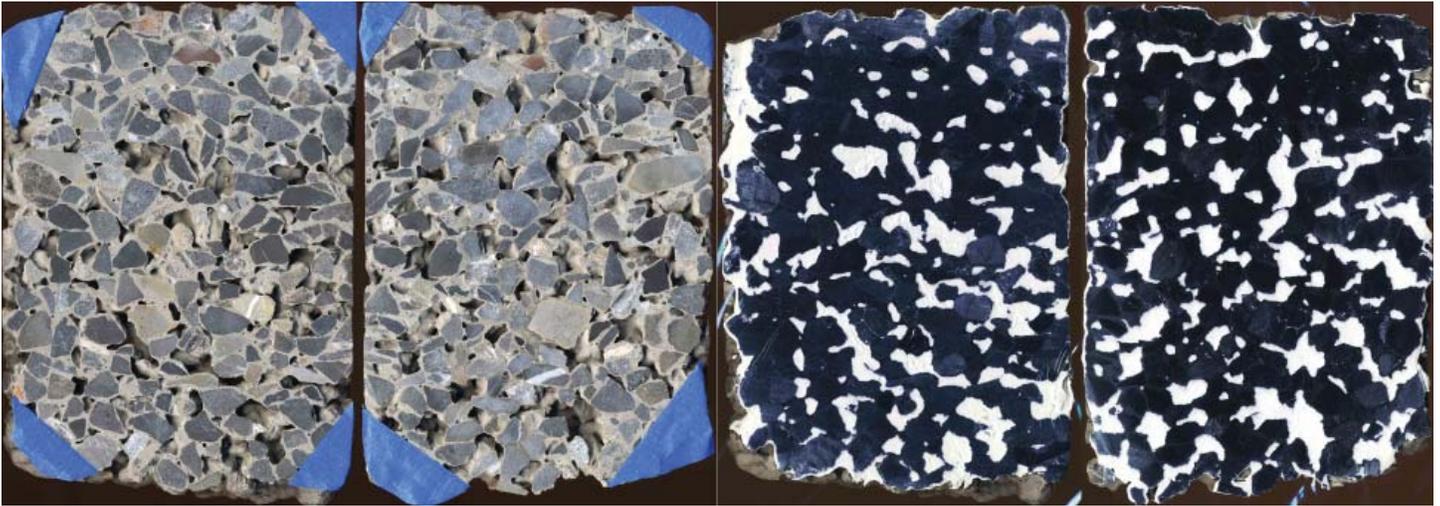
Weight. Light, hydraulic drive gives the lightest pan float configuration without engine vibration.

Speed. Start at 10 RPM, until you see how the slab responds. Increase speed as needed, reverse rotation if the pan is pulling the wrong way on an edge.

A fragile pervious concrete mixture is certainly made easy to choke if the voids are designed too low. It is also made fragile with certain aggregate shape, texture and size (round, smooth and small). It is also made fragile with high lubricity in the paste (fume, water, plasticizer, etc.).

The images show a mixture that uses a premium, round crushed stone of perfect, 1/4 inch size. After panning this mixture, those who saw it agreed, you would not want that pan to be an ounce heavier or turn any faster. This slab was hit lightly with one pass, then touched up with a pool trowel. The job is flawless. But, a conventional pan would have spoiled the infiltration.





The sample shown above is one core from a slab that was finished with a Bunyan Skip Float. The slab area showed more than 90% average loss of infiltration as compared to the same batch in an area finished with a standard Bunyan Cross Roller. The core was split in half, then the same pair is shown on the right, with white filler in the voids.

All of the samples shown here are from the fume trials at Oldcastle QC labs with help from Lonnie Gray. This batch includes #8 stone, with 520 pounds of powder.

The sample shown below was prepared the same way, from the same batch, at the same time, finished with a standard Bunyan Cross Roller.



We can know how fragile a certain mixture is and verify it with infiltration numbers. The mix that John placed in the slab shown here, is well proportioned and has no fume. The high impact compaction that was applied to this slab still showed average infiltration over 700 inches per hour.



“...the equipment must match the mixture.” Colin Lobo, 2004

Some things never change. As we try new equipment, it must be compatible with the mixture. Keep a firm grip on our objectives to make more durable pavement that drains well.

Durability is a bit complex to evaluate. But, a quick and easy ASTM C-1701 test for infiltration will certainly tell us if the pavement is choked.

This speaks to the wisdom in making test panel placements to evaluate a mix with a certain method, before the job begins.



Side Effects:

When using a pan float for decorative slabs, be aware that minute traces of the metal pan will wear off and slightly discolor the surface. Particularly with integral color, tool the surface evenly over the entire surface. The final cleanup load was late during the placement of the slab shown on the left. Extra panning was done to blend the loads and caused a slight discoloration to the finish in that area.



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The Bunyan Skip Float can also be fitted with brushes or buffing pads for exposed aggregate.

