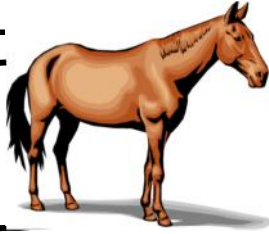


Notes from....



## Serrano Creek Ranch Equestrian Center

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Over the years we made many advances to make the stable more green. Our newest effort involves arenas.

For stables, dust is an ongoing problem, and this is especially true with arenas. While there have been numerous oils, polymers, and other fixes, water has remained the control of choice. In a typical year, our stable will use between 750,000 -1,000,000 gallons of water to control dust. Now that California is facing a drought, we must do our part to reduce that consumption.

It has never made sense to keep the dust in the footing, and each day having to apply some sort of control method. The reasonable question begs, "Why not get rid of it once and for all?" In the past we used a screening method, where the arena footing is scraped and sifted for the finer particles. Ideally we would use a very fine screen that would allow only dust to fall through. This would require the footing to be passed very slowly, and thus it would take many weeks for the sifting process. As a means to accelerate the process, we opted for a screen with slightly larger holes. The benefit is that the arena is closed for only one week; the cost being that the smaller sand particles are lost. While this was an improvement over just watering, the arenas lost some of their softness that the small sand provided. Wouldn't it be better if we just took out the dust and left the good footing in place? With that dream (nightmare?) as our charge, off we went looking for a better system.

Next time you watch a horse trot in an arena, just watch the footing. The heaviest portion of the footing never leaves the arena surface, and the medium size footing particles are suspended for just a second, and then fall back to the surface. It is the lightest particles (dust) that once kicked by the hoof are suspended in the air. When the arena is watered, the cohesive property of water temporarily binds the dust particles together to form a heavier particle and the dust magically goes away. That is until the water evaporates, and the particles become individualized again.

About six months ago I was waiting for my friend Ralph, when a parking lot sweeper truck rolled by. And just like

### Parade Update

**There are a few changes to the Lake Forest Parade this year.**

**The last several years we have been lucky enough to be placed toward the start of the parade. This year we will be right in the middle as we are #53 out of over 100 entries. We will be right behind a Wells Fargo Stagecoach.**

**This placement means we do not have to ride out of the ranch as early so please plan on being ready to leave the ranch at about 9:45 on the Fourth. We will be staging at the elementary school across from the high school which is good as we will not need to ride so far before the parade. I am a little concerned about this area as there are 5 horse groups and this is a rather small parking lot. Please be aware that it might be crowded and besides the stagecoach there will also be a Cinderella Coach.**

**I expect we will get called up around 11 to be in place and go into the parade. Be sure to have drinking water with you. I am trying to arrange for a tub of water for the horses at the school.**

**This year we are going to be escorted in the parade by Mike Anderson and his 51 Chevy truck. Joe Cosgrove will be in the back of the truck filming us so keep on smiling! If any of the adults who are accompanying us need to put anything in the back of the truck or onto the pooper scooper cart behind us please feel free to do so. Just be aware that the truck will not be able to follow us back to the stable when we cut off from Lake Forest. I am sure Mike will come back over to the stable though.**

Tesla, I had a spark of an idea. Why can't we do the same with the arenas? Now rather than dealing with all the footing under the sifting regime, instead let's just target the dust. The key must lie in dust's unique suspension property. Getting back to the sweeper truck, I initially thought; let's just buy a sweeper, drive it around the arena a few times and we'd be done for the week. (Maybe we can post a few no parking signs and a meter maid can drive ahead and cite those horses for being in the arena as an additional income source!) Anyways the bad thing is that these trucks' vacuums are so powerful that it would suck up everything. So this easy answer was out.



*Shown here is the first run of the prototype arena vacuum. The black fabric on the truck was later replaced with a giant sealed dust bag to eliminate dust leakage.*

I'm sure that there are just a few of you that don't spend hours gazing at sweepers. Well that is your loss. For if you did, you would learn that besides sweeping and vacuuming, these trucks also have powerful blowers that dislodge dirt from the cracks in the pavement, so after all the irritating noise, we are left with a clean lot.

So the vision is now becoming clear; agitate the soil so the lightest dust becomes airborne, and then collect the dusty air before it escapes. With a few clicks on the internet, you can find the formulae that are used. The math is fairly simple; the faster the air moves, the larger the particle it can transport. Therefore, determine the particle size you wish to move, calculate the required velocity, and design a system around those numbers. You then buy a strong fan that moves the air, size a hood that captures the dust. Secondly, make a very, very large filter bag that allows the blown air to be released, that traps the dust. Finally, install a smaller fan that blows onto the footing so that the dust is agitated and suspended, so that the process has a good start.

What we found in our initial testing of the system is that the annoying dust that creates so much irritation is actually a very small percentage of the total volume of the footing. After vacuuming up arena dust we collected approximately one tractor scoop of pure dust. Using the past sifting method, we would have had around 20-30 tractor scoops of footing to be disposed of. In other words, under our old sifting program we were throwing out the baby with the bath water.

Our initial testing went quite well with the exception of the dust collection bag that we tried to fabricate with inexpensive materials and methods. It did trap the majority of the dust, but enough escaped to be a nuisance and could attract the weary eye of inspectors. Back to the internet, and we found a manufacture of filter bags of any size. We eagerly await its arrival!

So why all this discussion on a topic of dust? Besides being an irritant to your tack shed contents, dust plays a major role in the compaction of the arena footing. That is because to compact any soil / footing you need soil particles of varying sizes, plus moisture. Moisture acts as a lubricant that allows the soil particles to flow around each other. As the airspace between larger particles is displaced with smaller particles the soil / footing becomes denser. With enough moisture the dust will flow between the larger and medium particles, thus making a densely packed footing. As these spaces are filled with dust which is replacing the air, the more densely packed soil is more resistant to movement. For riders and horses, this means hard, packed arenas.

As the footing becomes hard and compacted, calls go out to bring in the tractor. The tractor teeth break-up the footing, in a sense making it less organized, which equates to air space being reintroduced. With each step, the soil moves and yields to the weight of the horse. But the tractor is very hard on arenas as soil that is trapped between the hard surface and the shank of the harrow is crushed into smaller and smaller sizes. Then the arena footing becomes dustier, this requires more water to control, which facilitates faster compaction, which then results in more calls for the tractor and the circle comes around, slightly faster. Thus if the dust is removed, there is no need for water. Conversely, if the footing is kept drier, footing does not flow to displace air, and thus remains less compacted. So by removing dust, a whole chain of events is avoided.

The advantage of the vacuum is that the arenas can be vacuumed during off hours, and thus we won't have to close them for weeks at a time. The copious amounts of water we save will now be reserved for the future.