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### **Attwood at Great Meadow International!**

Great News! The dressage and show jumping will take place on innovative all-weather footing provided by Attwood Equestrian Surfaces.



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**Keeping the horses safe in the ring and the riders safe in the sun!**

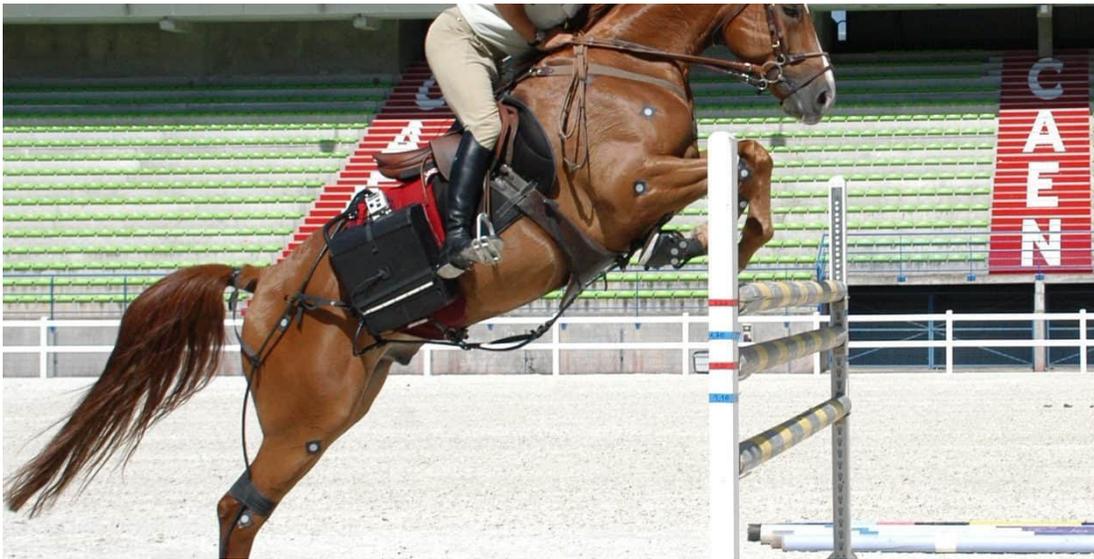
A little #attwoodlove for all the competitors at Morven Park International Equestrian Center.



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## **New Insight on How Surfaces Impact Horses' Limbs**

Researchers found that hard surfaces, shallow footing depths, and compacted footing could increase horses' injury risk.



A few years ago, French researchers developed a **dynamometric horse shoe**-essentially, a pressure-sensitive shoe they hoped would provide useful information about how footing affects our horses' health. And there's good news from those researchers: The shoe has done just that.

At the 2016 International Society for Equitation Science (ISES) conference, held June 23-26 in Saumur, France, the Sequisol research team was back to share what their dynamometric shoe, complete with high-speed kinematic filming, is revealing.

"We have demonstrated that training on a hard track does increase injury risk, as seen by correlations between injuries and the various forces and angles of the lower leg during movement across the surface," said presenter Nathalie Crevier-Denoix, DVM, PhD, Dipl. ACVSMR, of the Equine Biomechanics and Musculoskeletal Pathology department of the Ecole Nationale Vétérinaire d'Alfort and the French National Institute of Agronomic Research.

While this might seem intuitive to many riders, the injury risk related to hard surfaces has not previously been shown in a prospective study, Crevier-Denoix said. And no research team has ever been able to show the biomechanical "how" and "why" of these injuries until now.

To collect their data, the team places the dynamometric shoe on selected fore or hind hooves of a ridden or driven horse. The shoe provides critical information about maximal forces and loading rates (in all three axes-longitudinal, transversal, and vertical) at each instant of "stance"-the time the foot is actually touching the ground.

Meanwhile, synchronized cameras provide high-speed (1,000 frames per second) video footage that allows the scientists to see exactly what's going on, frame by frame, in 2-D or 3-D, in combination with the recorded forces from the shoe. They can measure every angle of every structure within the leg and foot-joints, tendons, ligaments, etc.-at any precise instant of the stance, during all gaits, in straight lines or while turning, and even while jumping, on all kinds of surfaces.

"During stance, the horse's hooves come in contact with the surface, slide, and sink more or less into it, then compress it differently according to the limb, the gait, the speed, and the surface properties," Crevier-Denoix said. "The different phases of stance are affected by the surface's properties."

Her team studied horses working on different kinds of footing, different top-layer thicknesses, and different surface maintenance methods. They found that all these

footing factors play a role in horse health and that certain footing types, thicknesses, and maintenance methods are better than others.

Hard tracks, they found, are associated with a much higher injury rate than softer ones. In their most recent study, they followed 12 young Standardbred horses over four months during training. Half the horses trained on a hard sand track, while the other half trained on a soft sand track. In the hard track group, 50% of the horses had developed moderate to severe superficial digital flexor tendon (SDFT) tendinopathies in both front legs by the end of the study period. The hind fetlocks were also more frequently—and more severely-affected in this group than in the soft track group, Crevier-Denoix said.

The team has also compared jumping horses on sand-fiber-mix footing with three different thicknesses of otherwise identical top (soft) layer: 7, 13, and 20 centimeters (about 2.8, 5.1, and 7.9 inches). They found that the impact shock and vertical loading rate on the limb structures were greater—and hence more likely to cause injury—in the 7-centimeter thickness compared to the other two. Between 13 and 20 centimeter thicknesses, the loading rate decreases (and, thus, comfort improves) but the differences in impact and maximal vertical forces were not significant.

"It's not a good idea to try to cut costs by going with a 7-centimeter thickness on your arena," Crevier-Denoix said. "You're just likely to end up with more injuries than if you use a 13-centimeter thickness."

This study also allowed the researchers to identify an important difference between leading limbs and trailing limbs during canter and jumping, Crevier-Denoix said. "These two limbs behave very differently, and this is not a surface effect, just general biomechanics of equine movement that our device has allowed us to demonstrate," she relayed. "And this can have pathological consequences."

Ironically, she added, it's the leading limb that actually lands second in a jump—as most jumping riders probably know. So it's the trailing limb that actually takes the initial load at landing, and the leading limb follows with a lower rate/intensity.

"We see that the trailing limb has the highest load, and it would seem logical that it's this limb that would suffer the most injuries, but that's not necessarily true," Crevier-Denoix said. "The load-absorbing phase of the leading limb is very long, with the fetlock low and all the tendons in the palmar (lower) position playing their role of absorption."

"These structures would be tense longer during the load absorption phase," she said. "So, actually, a horse with SDFT or fetlock pathology will probably have more pain when his limb is in the leading position."

Finally, the team compared jumping horses on a sand-fiber mix footing with two different maintenance treatments: harrowed (plowed) or rolled (compacted). The maintenance method resulted in many differences in forces and angles within the foot and leg, Crevier-Denoix said, with harrowing being a clear preference for reducing injury risk. This is especially the case for the leading limb, she added.

"The leading limb contacts the ground obliquely, so the influence of the surface is more progressively applied than in the trailing limb, which lands more vertically," she said. "So preparing the surface would have more influence on the limb that is progressively penetrating the ground rather than on the limb that is applying weight vertically and suddenly."

But even a harrowed arena can lose its benefits if it gets compacted from frequent use, Crevier-Denoix said. "Surface compaction increases impact shock and vertical loading, so in a given surface you should harrow regularly after horses have trod over it, or you'll end up with a compacted surface instead," she said.

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## Product Profile - Green Footing

Our footings are now available in a green shade. This 'Green Pinnacle' as we refer to it has all the properties of our high performing Pinnacle footing. Additionally, the colour resists fading, and does not wash out in rain.

Because our Green Pinnacle contains very pure fibres and polymeric coating, and no carpet scrap or recycled rubber which turns the footing black, we believe we are the only company capable of supplying a quality green product that will remain green throughout its life.



### PRODUCT HIGHLIGHTS

- ★ Green Pinnacle now available
- ★ Same exceptional properties as regular Pinnacle
- ★ Attractive natural green colour
- ★ Helps in cases of difficult local planning restrictions
- ★ Green TerraNova and Eurotex in the pipeline

### Focus on Green Footings

When we developed our Green Pinnacle footing, one property we knew at the outset it should have, is that the green colour should not wash out in the rain. This was a challenge since our Pinnacle footing is used outdoors in wet climates, and the constant abrasion of sand and fibres could easily lead to loss of the colour. To simulate these conditions we adapted a test we developed many years ago to measure the longevity or lifetime of coated surfaces. The test inflicts the type of wear suffered by outdoor footing subject to the vagaries of weather, in regular use for many years, but takes place in the lab in a manageable timeframe. Thanks to the test we have been able to prove that the Green Pinnacle product we have developed does not lose any of its colour over the typical lifetime of Pinnacle footing.



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*Attwood Equestrian Surfaces provides meticulously engineered surfaces that benefit both the horse and the rider.*

