

Footing Project History

*-The road that led to the FEI meeting on Equestrian Surfaces in Lausanne 2015-
Development of five functional parameters*

In all equine activity since ancient times, surface has always been an issue. The first example of the effect of surfaces is the use of horseshoes to protect the hoof from wear. The earliest signs of horseshoe use dates from 2000 BC. The focus on surfaces and their influence on performance and safety of horses have increased over time. In particular, the demand on surfaces has increased for horses used for sport purposes during the last century. A modern scientific approach to surfaces was pioneered in the 1960s. The work of Professors Fredricson and Drevemo and their group led to trotting racetracks being banked. Since then a large number of scientific papers have been published in the academic press by research groups from, for example, United States, United Kingdom, France, Japan and Sweden. A vast majority of these papers have been aimed at racetrack properties and their effect on the horse locomotion and health. From studies in the racing industry, there is clear proof of surface properties affecting the risk of catastrophic injuries. The "harder" the surface is the more fractures and tendon injuries.

Despite the general experience, the epidemiologic evidence of such correlations were lacking in the equestrian industry. The lack of clear evidence for the effects of surfaces on horses became clear when several horses were severely injured during the Athens Olympic Games with some questions raised about the contribution of surface properties. In 2007/2008 the FEI, the World Horse Welfare and the Swedish Foundation for Equine Research financed a project specifically aimed at equestrian arenas. The objective of the project was to enhance knowledge of the biomechanics of the hoof – ground interaction and to develop tools for objective assessment of arena surface properties. The research project included the collaboration of scientists from Sweden, UK and US.

During the course of the project, techniques were developed, validated and extensively used to mechanically measure the functional properties of equestrian arenas. Early in the project, a workshop was held in Gothenburg (2008) with stakeholders to survey terminology used in the sport to subjectively characterise surface properties. Based on the outcome of the workshop, an extensive technical effort was initiated to use measurements such as acceleration and force to map five parameters to describe the function of a surface from a horse and rider perspective. The goal of the work was to choose terms that make sense to riders and are intuitively understandable for all stakeholders.

To date more than 400, both competition and training arenas have been tested. This large data set provides critical understanding of how these parameters vary both among arenas and within a single arena. In 2013, the FEI financed another research project with the aim of defining the relationship between subjective evaluation of arena properties and the five parameters, as well as acceptable upper and lower limits for these parameters at major events. It was concluded that the subjective judgement of riders matches the objective measurements and this enables recommendations on a range of these measurements satisfying rider expectations for competition surfaces.

In conclusion, we have five parameters that:

- can be measured objectively
- represent rider threshold preferences
- are useful for organisers, manufacturers etc. to specify desired properties
- can have thresholds tuned to minimise risk of injuries when injury data is correlated to surface properties
- provide a basis for standards to be developed by the FEI

Any effort to develop standards will require adoption of a culture of continuous improvement. As more is known about both performance and injury prevention surfaces can become more consistent, safer and maintain a performance level, which will provide the best possible experience for both participants and spectators.