

Fiber Sand Harrow

The need:

Most high end equestrian surfaces have sand and fiber as a part of the composition. In some cases such as the 2012 Olympics the main arena has a small amount of wax as well. The focus of this project is on the design of a harrow to mix the fiber into the surface and retain a thin layer of loose material on top of the surface. The need will become immediate and local as we maintain the new experimental arena surface at Witter Farm.

The key project design objective:

The key design objective is to maintain a consistent surface as horses move across the surface. These design objectives will be met by consistently interacting with a range of riders who use different surfaces.

Who is the final customer for this device;

This system will be purchased by arena owners for maintenance of the surface and will be used as a part of a new open design approach for consistency of footings at the international level of competition.

The most recent motivation for this work was the arena at Caen which had been installed for the World Equestrian Games (<http://www.normandy2014.com/>)

Who will be supervising and evaluating the outcome of the project:

Project review will include oversight by Dr. Robert Causey in Animal and Veterinary Sciences, Professor Lars Roepstorff from the Swedish University and Agriculture and several representatives of German and US arena harrow manufacturers. Input will be available from a range of end users in agriculture, construction and Thoroughbred horse racing.

This project has very strong buy-in from the top specialists in the field. The equipment will be designed, the review will be performed by an international team of experts and the construction will be approved and tested at the top level of the sport.



http://news.bbcimg.co.uk/media/images/62053000/jpg/_62053578_equestrian_getty.jpg



<http://www.stableandarena.com/images/harrow1.jpg>

UMaine Mechanical Engineering technical contact point:

Professor Peterson will supervise the mechanics, materials and manufacturing issues related to the project and will serve as an interface with outside entities. Outside technical support will be available for the evaluation of this project.

The core Mechanical Engineering classes required as background for the project:

Design I & II
Strength of Materials
Material Science

Resources available:

This project is unique in that a wide range of people and equipment can be provided for the project. While the applications of the technology are quite broad, the immediate support for this project is from the international equine industry.

End of year deliverables:

The design will require starting with a technology assessment of current harrows and the strength and weaknesses. Skype meetings will commence once an interview guide is in place. This is a critical step in the project formulation. A design proposal for a single tooth and a subscale testing plan will then be completed prior to building a full scale system. Drawings with tolerances for manufacturing will be completed for a demonstration unit. A prototype test device must be built based and tested under real conditions and show the ability to provide a consistent cushion for the hoof even under heavy use. Testing will match the device to the design goals. The completion of a complete drawing package and analytical support is critical to this project.