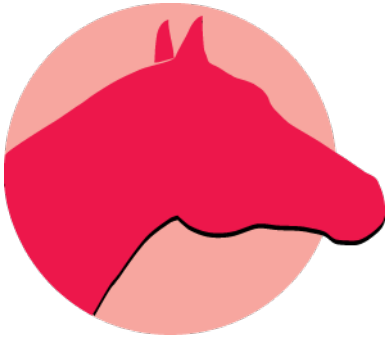
Racing Surfaces Testing Laboratory



Dr. Mick Peterson

Executive Director

Racing Surfaces Testing Laboratory

Racetrack Surfaces Testing Laboratory & The Future of Racing Surface Safety

Michael "Mick" Peterson, Ph.D.
University of Maine
Christie Mahaffey, Ph.D.
Racing Surfaces Testing Laboratory
C. Wayne McIlwriath, BVSc, Ph.D.
Colorado State University

2012 Welfare and Safety of the Racehorse Summit

History of Racing Surfaces Testing Laboratory

- 2008 Welfare and Safety Summit:
  - **RECOMMENDATION 1: TRACK SURFACES**
    - **Promote consistent and safe track surfaces conditions**
    - **Identify laboratory where material can be sent for analysis**
- Launched 2009
- Primary support: CARF, CDI, Oak Tree, NTRA, Jockey Club and NYRA
- A 501(c)(3) non-profit.
- Work with 40 tracks, 15 on a regular basis test

Racing Surfaces Testing Laboratory How it Got Done (is getting done)

- Part time executive director
- 2 full time and 4 part time employees
- Work has resulted in 2 Ph.D.'s and 1 MS degrees
  - Dr. Mahaffey, Dirt Tracks
  - Dr. Bridge, Synthetic Tracks
- $300,000 in testing infrastructure in 900 ft^2 in Orono Maine

Racing Surfaces Testing Laboratory
Orono Maine USA

Goals for Surfaces

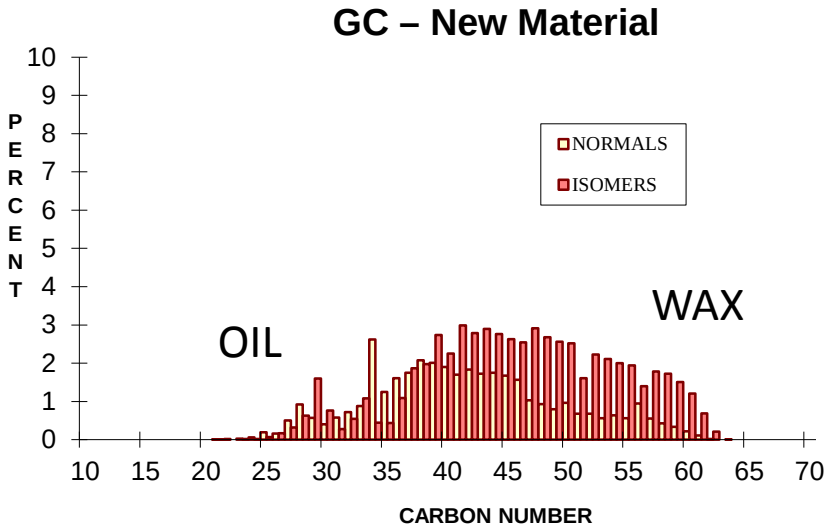
from the 2008 Welfare and Safety Summit

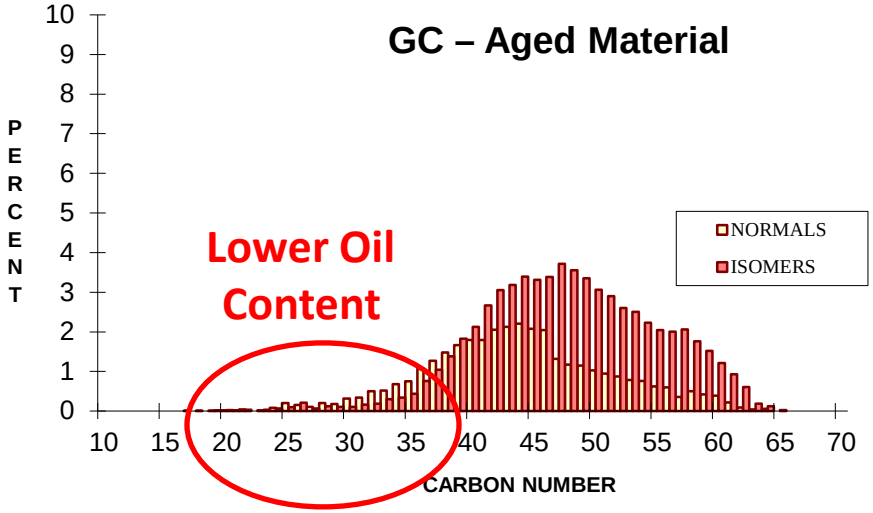
- The ability to monitor changes in materials
- Investigate factors necessary to maintain track stability such as UV inhibitors, watering etc.

First challenge: wax for synthetic tracks

Aging of Synthetic Surfaces

- A clear evolution of the performance of synthetic tracks after installation.
- Second year, less safe & balling





Outcome: Selection of wax for renovation

Bridge, J.W., Peterson, M.L., Radford, D.W., and McIlwraith, C.W. (2010), *Thermochemica Acta* 498 (1-2): 106-111.

Racing Surfaces Testing Laboratory
Orono Maine USA

Additional Goals

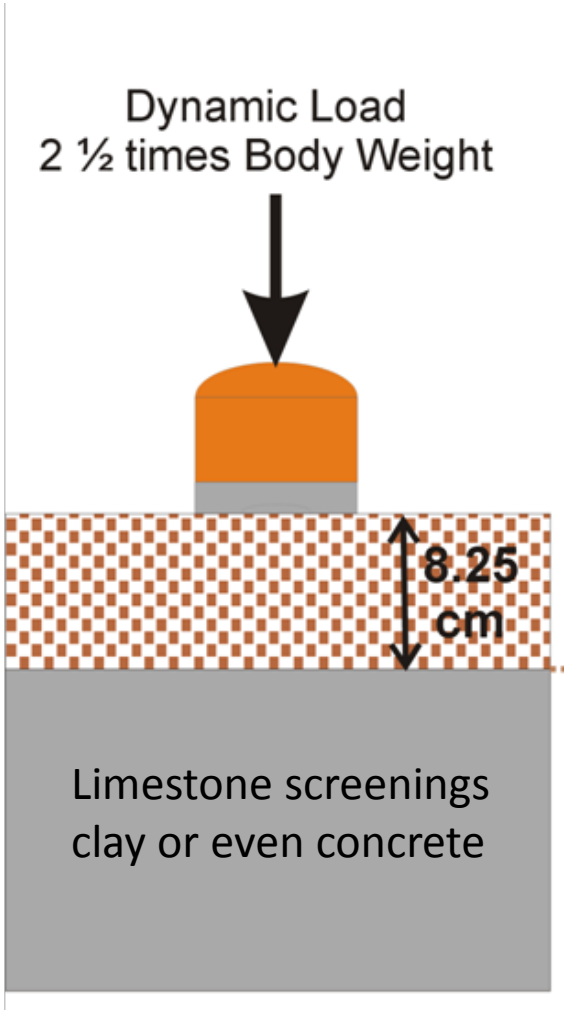
- Develop an R&D model for synthetic, dirt and turf racing surfaces
  - Procedures and methods: shear strength, load bearing, etc., for racing surfaces
  - Best practices for track maintenance
  - Continue improvement of track maintenance equipment design and utilization
- Outcome: understand sand durability, clay, fibers and wax
- Case study: Different track designs

J. W. Bridge, M. L. Peterson, C. W. McIlwraith, and R. M. Beaumont, 2010, *Journal of ASTM International*, Vol. 7, No. 9
DOI: 10.1520/JAI103139

Racing Surfaces Testing Laboratory
Orono Maine USA

Shallow Sand Track

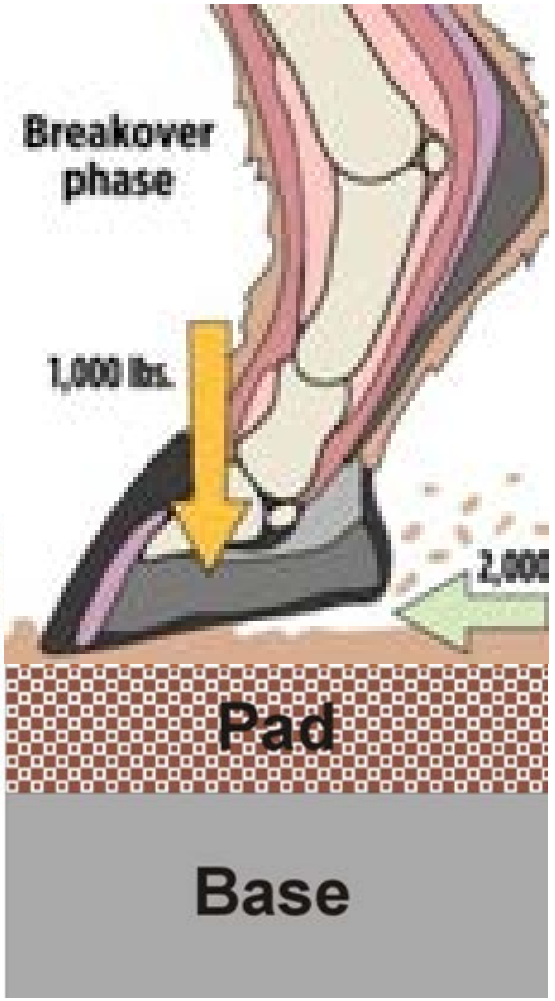
- Hoof contacts surface of track during impact.
- During breakover the hoof penetrates the cushion.
- Shear and penetration strength must be sufficient to avoid toe contact with base



Racing Surfaces Testing Laboratory
Orono Maine USA

Track for Semi-Arid Climate

- Hoof contacts surface of track during impact.
- During breakover, hoof penetrates the cushion.
- The toe can come in contact with the pad without changing the dynamics of gait
- Compromise Design: False Base



Racing Surfaces Testing Laboratory
Orono Maine USA

Information for Maintenance

New tests on clay

(X-Ray Diffraction) from the Racing Surfaces Lab

Design & maintenance is defined by rainfall & materials

	Clay content (%)	Organic content (%)	Annual Precipitation
Shallow Sand	2.35 (1.02)*^	0.26 (0.25)*^	120.2 (28.3)*^
False Base	3.57 (1.53)*	0.47 (0.35)*	107.7 (45.2)*†
False Base with Pad	6.76 (3.60)*^	2.49 (2.70)*^	66.0 (25.2)*^†

* ANOVA $p<0.05$
^ † Tukey-Kramer post-hoc $p<0.05$

Outcome: Maintenance must match materials

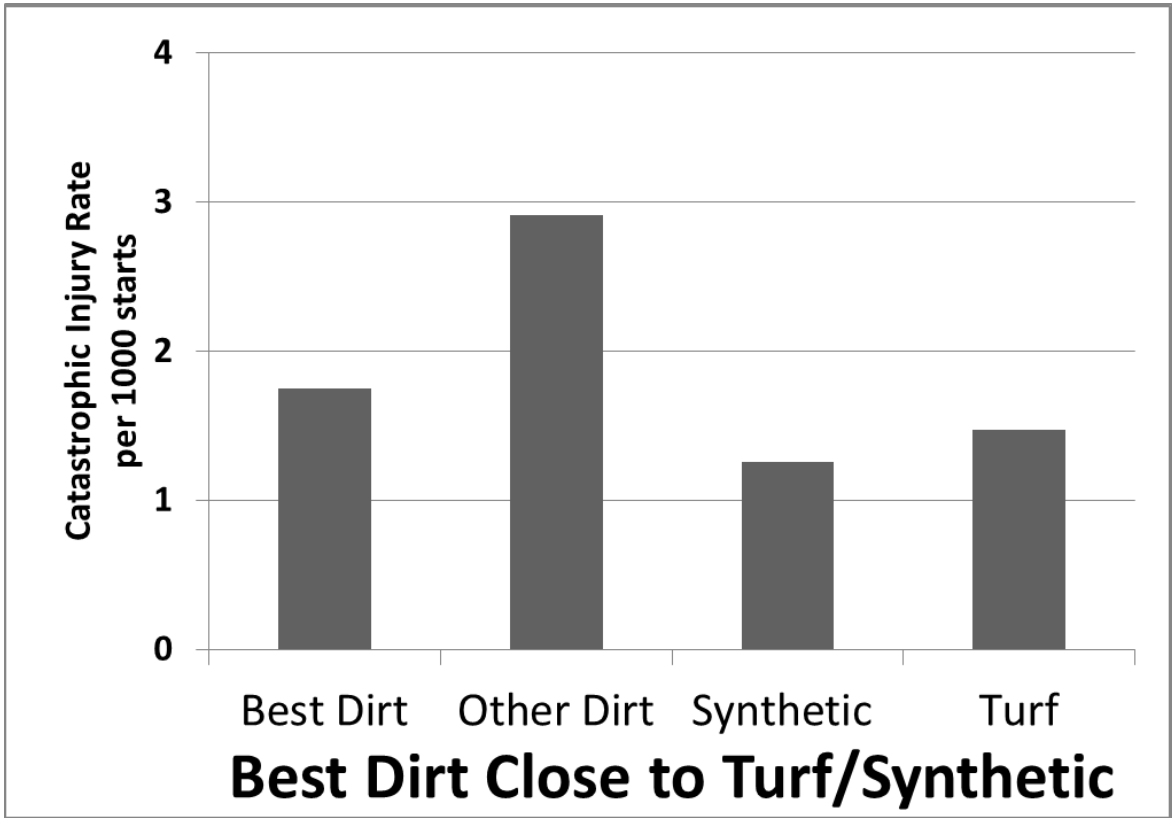
Christie A. Mahaffey, Michael Peterson, C. Wayne McIlwraith, Sports Engineering March 2012, Volume 15, Issue 1, pp 21-27

Racing Surfaces Testing Laboratory
Orono Maine USA

What about Safety of Horse and Rider?

- 3 different racetrack designs,
  Defined by maintenance, climate and clay mineralogy
- What is safest?
- Data is not statistically significant:
  This year, may not be the same next year

Best Dirt Almost as Safe as Synthetic!



Racing Surfaces Testing Laboratory
Orono Maine USA

Equine Injury Database… Looking at Tracks (Dr. Tim Parkin)

- Descriptive analysis: Not controlled for all factors!
  - Synthetic safer than turf
  - Turf safer than dirt
- Multivariable analyses: synthetic tracks /turf tracks/"fast" dirt tracks NOT significant for risk of catastrophic distal limb fracture.

- An "off" dirt track is significant : 20%-30% increase in the likelihood of catastrophic distal limb fracture

Synthetic Appears to be Better:
A Great Dirt Track May be Comparable

Racing Surfaces Testing Laboratory
Orono Maine USA

Make Every Dirt Track as Safe as the Safest Dirt Track!!!

- More Goals from WSS
- Establish daily reporting of maintenance on racetracks
  - Provide information for track management, owners, trainers, jockeys and racing public
  - Institute database of daily maintenance of the main and turf course

Weather Station Summary | RSS Weather List | SIMM Data

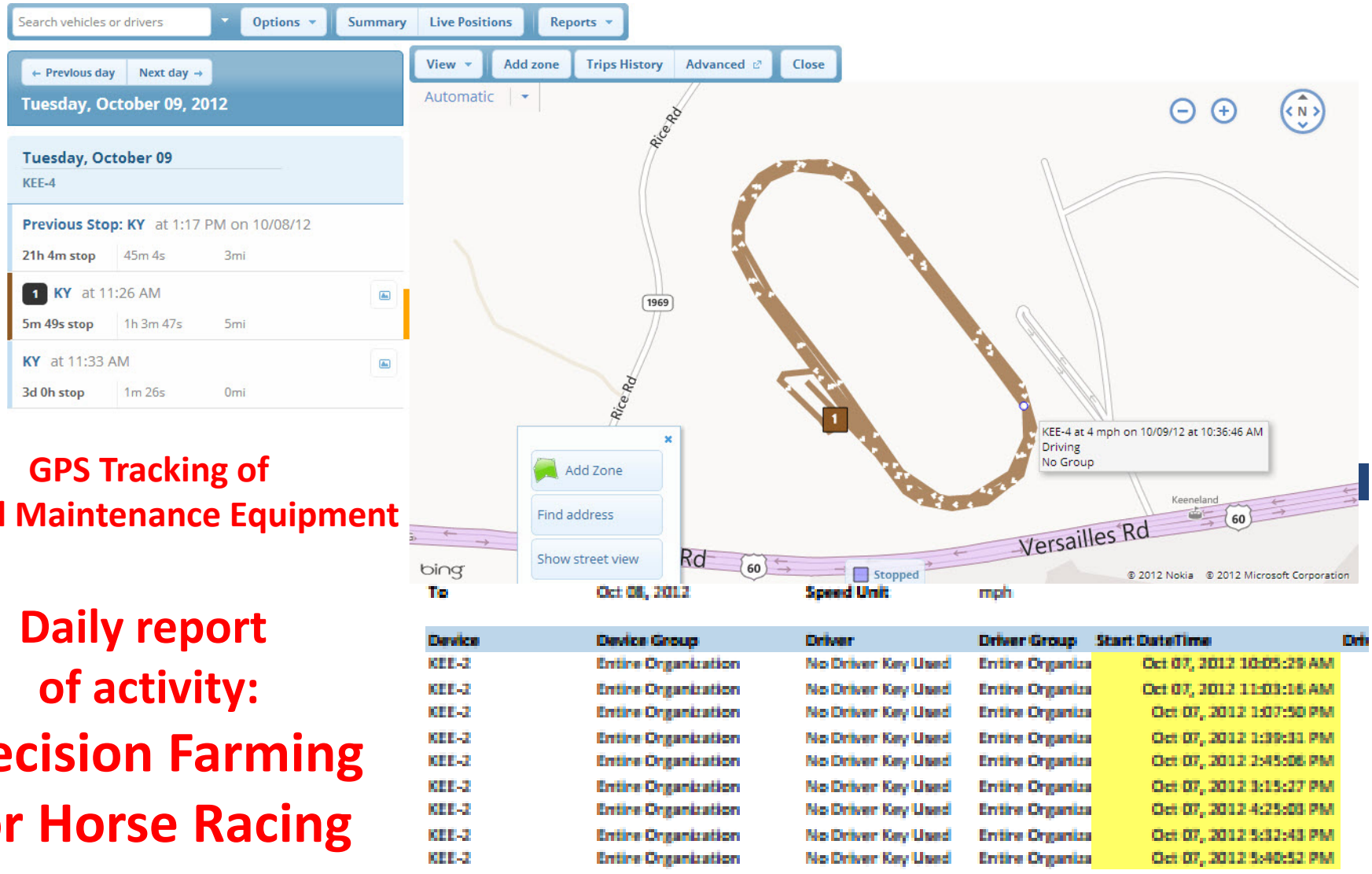
Site ID	Track	WX Src	Last Weather	Batt	Links				
812	Aiken Training Track	WU	2012-10-14 23:55:00		Weather	Data Entry	Setup	Race Sched	Change Pwd
801	Aqueduct	WU	2012-10-14 23:51:00		Weather	Data Entry	Setup	Race Sched	Change Pwd
100	Arlington Park	WU	2012-10-15 21:45:00	6.54	Weather	Data Entry	Setup	Race Sched	Change Pwd
802	Belmont Park	Active	2012-10-15 22:45:00	6.30	Weather	Data Entry	Setup	Race Sched	Change Pwd
105	Calder Race Course	WU	2012-10-14 23:53:00		Weather	Data Entry	Setup	Race Sched	Change Pwd
102	Churchill Downs	Active	2012-10-15 22:45:00	6.57	Weather	Data Entry	Setup	Race Sched	Change Pwd
813	Darley Stable	WU	2012-10-14 23:53:00		Weather	Data Entry	Setup	Race Sched	Change Pwd
107	Del Mar	CHRB	2012-10-15 15:00:00		Weather	Data Entry	Setup	Race Sched	Change Pwd
106	Emerald Downs	Active	2012-10-15 19:45:00	6.66	Weather	Data Entry	Setup	Race Sched	Change Pwd
303	Evangeline Downs	Active	2012-10-15 21:45:00	6.60	Weather	Data Entry	Setup	Race Sched	Change Pwd
103	Fair Grounds Race Course	WU	2012-10-14 23:53:00		Weather	Data Entry	Setup	Race Sched	Change Pwd
803	Fair Meadows	WU	2012-10-14 23:53:00		Weather	Data Entry	Setup	Race Sched	Change Pwd
301	Fairplex	WU	2012-10-14 23:53:00		Weather	Data Entry	Setup	Race Sched	Change Pwd
307	Golden Gate Fields	CHRB	2012-08-02 08:00:00		Weather	Data Entry	Setup	Race Sched	Change Pwd
804	Gulfstream Park	WU	2012-10-14 23:53:00		Weather	Data Entry	Setup	Race Sched	Change Pwd
101	Hollywood Park	WU	2012-10-15 15:00:00		Weather	Data Entry	Setup	Race Sched	Change Pwd
104	Keeneland	Active	2012-09-20 10:00:00	6.90	Weather	Data Entry	Setup	Race Sched	Change Pwd
306	Los Alamitos	CHRB	2012-10-15 15:00:00		Weather	Data Entry	Setup	Race Sched	Change Pwd
805	Nicosia Race Club	WU	2012-10-14 23:50:00		Weather	Data Entry	Setup	Race Sched	Change Pwd
814	Pegasus Training and Equine Rehabilitation Ce	WU	2012-10-14 23:53:00		Weather	Data Entry	Setup	Race Sched	Change Pwd
806	Portland Meadows	WU	2012-10-14 23:53:00		Weather	Data Entry	Setup	Race Sched	Change Pwd
807	Randall 'Doc' James Racetrack	WU	2012-10-14 23:53:00		Weather	Data Entry	Setup	Race Sched	Change Pwd
201	Reeds-Brook Middle School	Active	2012-08-29 19:30:00		Weather	Data Entry	Setup	Race Sched	Change Pwd
305	Remington Park	WU	2012-10-14 23:55:00		Weather	Data Entry	Setup	Race Sched	Change Pwd
304	Santa Anita	CHRB	2012-10-15 15:00:00		Weather	Data Entry	Setup	Race Sched	Change Pwd
809	Saratoga	WU	2012-10-14 23:53:00		Weather	Data Entry	Setup	Race Sched	Change Pwd
999	test track		2012-06-19 17:00:00	6.69	Weather	Data Entry	Setup	Race Sched	Change Pwd
810	Turfway Park	WU	2012-10-14 23:52:00		Weather	Data Entry	Setup	Race Sched	Change Pwd
815	Winstar Farm	WU	2012-10-14 23:54:00		Weather	Data Entry	Setup	Race Sched	Change Pwd
811	Woodbine	WU	2012-10-14 23:00:00		Weather	Data Entry	Setup	Race Sched	Change Pwd
302	Zia Park	WU	2012-10-14 23:55:00		Weather	Data Entry	Setup	Race Sched	Change Pwd

Manual Maintenance Tracking System in use at 4 Racetracks

Weather Tracking at 9 Racetracks

Racing Surfaces Testing Laboratory
Orono Maine USA

GPS Equipment Tracking



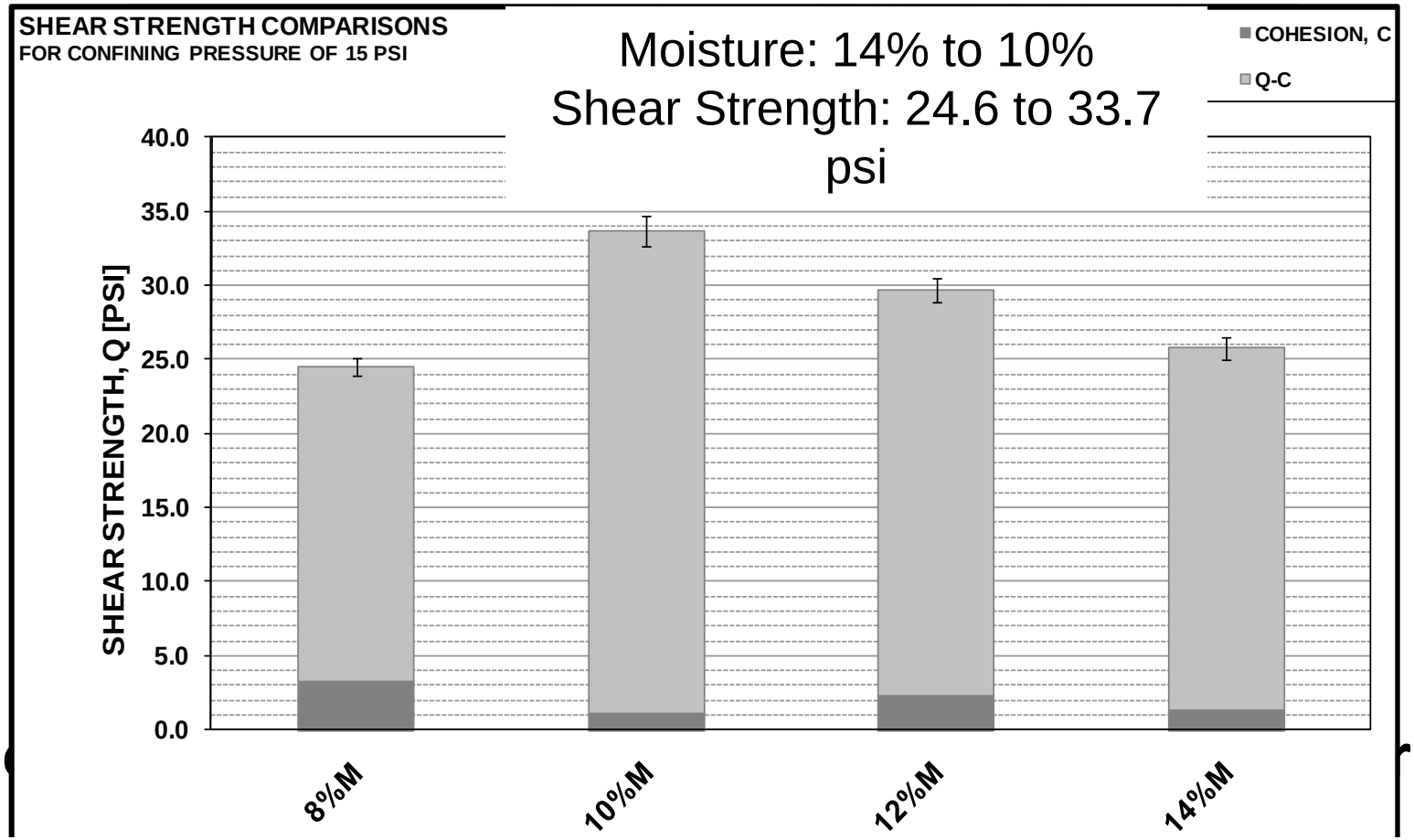
GPS Tracking of Critical Maintenance Equipment

Daily report of activity:

Precision Farming For Horse Racing

What really matters?

MOISTURE CONTENT!!!

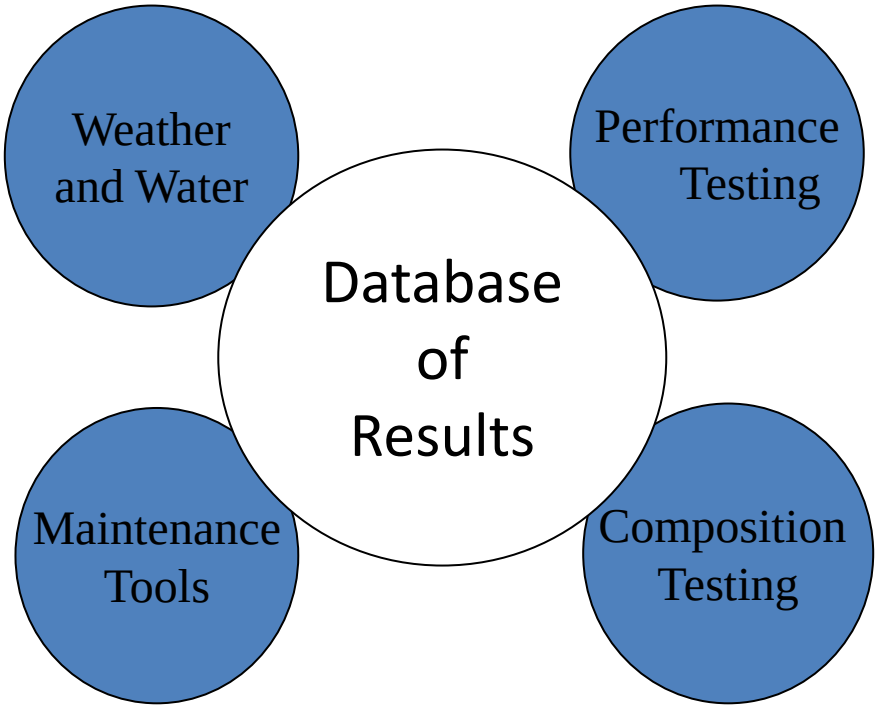


You n riable?

The Effect of Composition Variation is MUCH lower

Key to Understanding: Database

- What is the difference between the best tracks and the other tracks
  Hint: not always money!
- Technical support to raise the bar for every track in the industry



"Quality is never an accident;
it is always the result of intelligent effort." **John Ruskin**

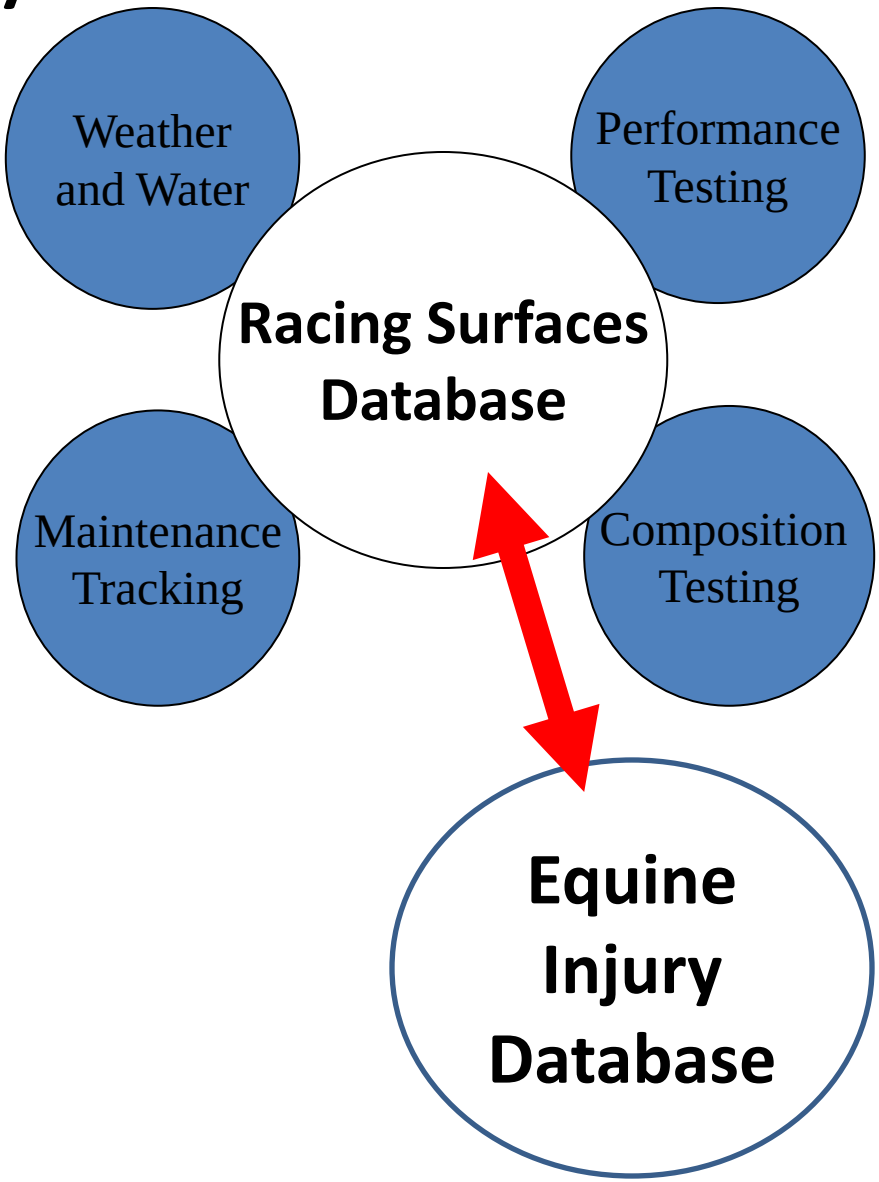
"Quality means doing it right when no one is looking." **Henry Ford**

"*You can expect what you inspect*." **W. Edwards Deming**

Racing Surfaces Testing Laboratory
Orono Maine USA

Consistency -- Results

- Understand how the best tracks control variability
- Manage the track as a precision product rebuilt every day for training and racing
- Link this back to our goal, safety of the horse and jockey



Racing Surfaces Testing Laboratory
Orono Maine USA

Some Progress:
Biomechanical track tester:
Open source design, shared development

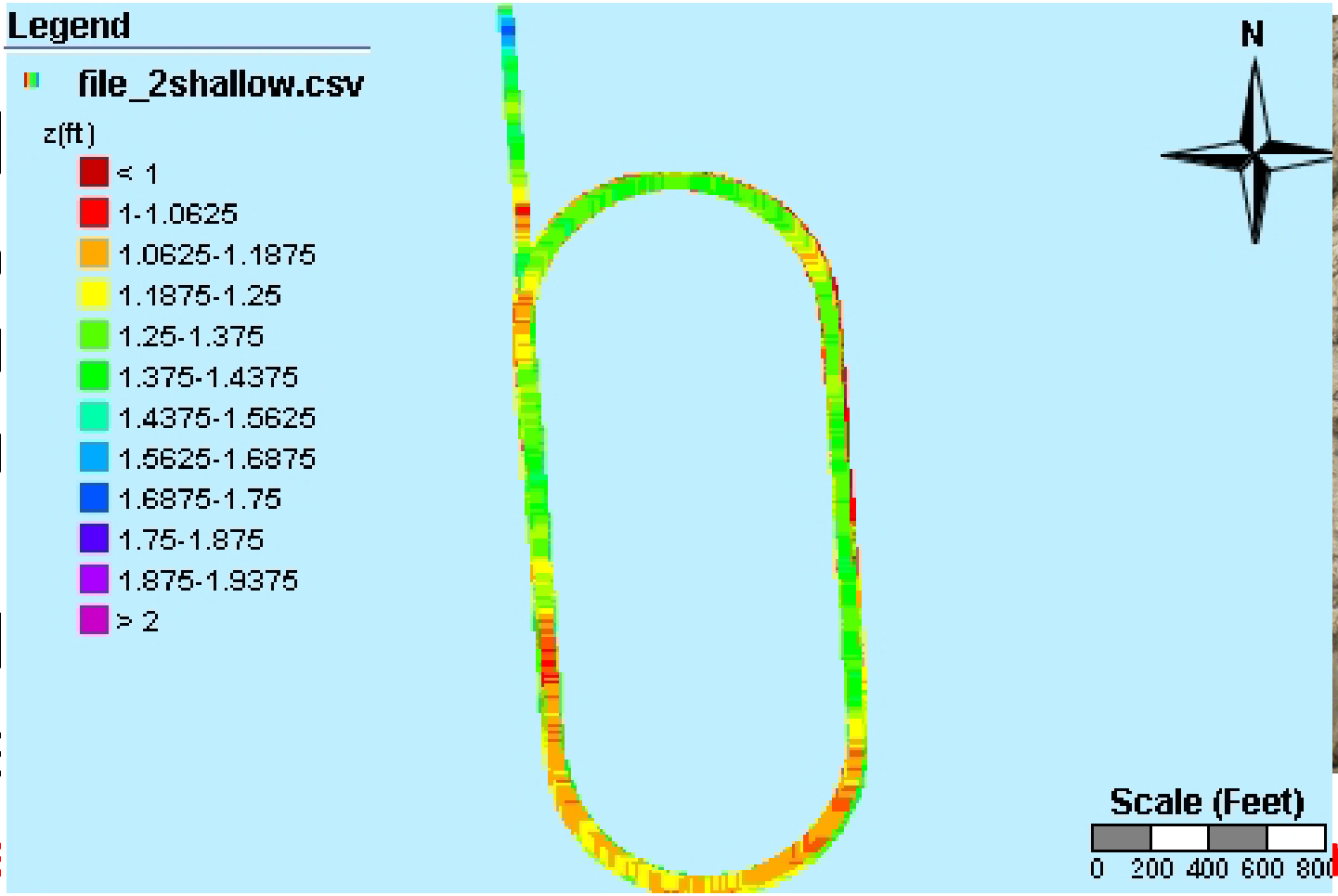
Some testing is becoming standardized

Racing Surfaces Testing Laboratory
Orono Maine USA

More Progress: Tools
Ground Penetrating Radar

- Mos
  Trac
- Bett
  or pr
  - Sy
  - Sh
  - Fa
- Rada

Care rly!



Racing Surfaces Testing Laboratory
Orono Maine USA

We Have a Long Way to Go:

- Only a small minority of tracks are systematic in the approach to maintenance
- Regular testing is the exception not the rule
- Track maintenance and investment in the surface is reactive not pro-active
- Investment in finding causality is minimal

Racing Surfaces Testing Laboratory
Orono Maine USA

Big Goal from 2008 WSS

- Research potential causes of catastrophic injury
  - Review existing research and inform public and industry regarding other causes of musculoskeletal injury including microdamage, changes in training methods, unrecognized disease, potential role of rider, etc.

Ongoing Challenge

Racing Surfaces Testing Laboratory
Orono Maine USA

Tracks did not "cause" the problem, they CAN improve the situation

No disease no breakdown….

Issues in Musculoskeletal Disease

- Conformation
- Individual predisposition
- Pre-existing disease
- Shoeing
- Training
- Track surfaces
- Multi-factorial risk

Acknowledgements

Racing Surfaces Testing Laboratory
Orono Maine USA

OAK TREE
RACING ASSOCIATION