



Racing Surfaces



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Tracks, Health and Racing

Track have improved
over the past ½
century

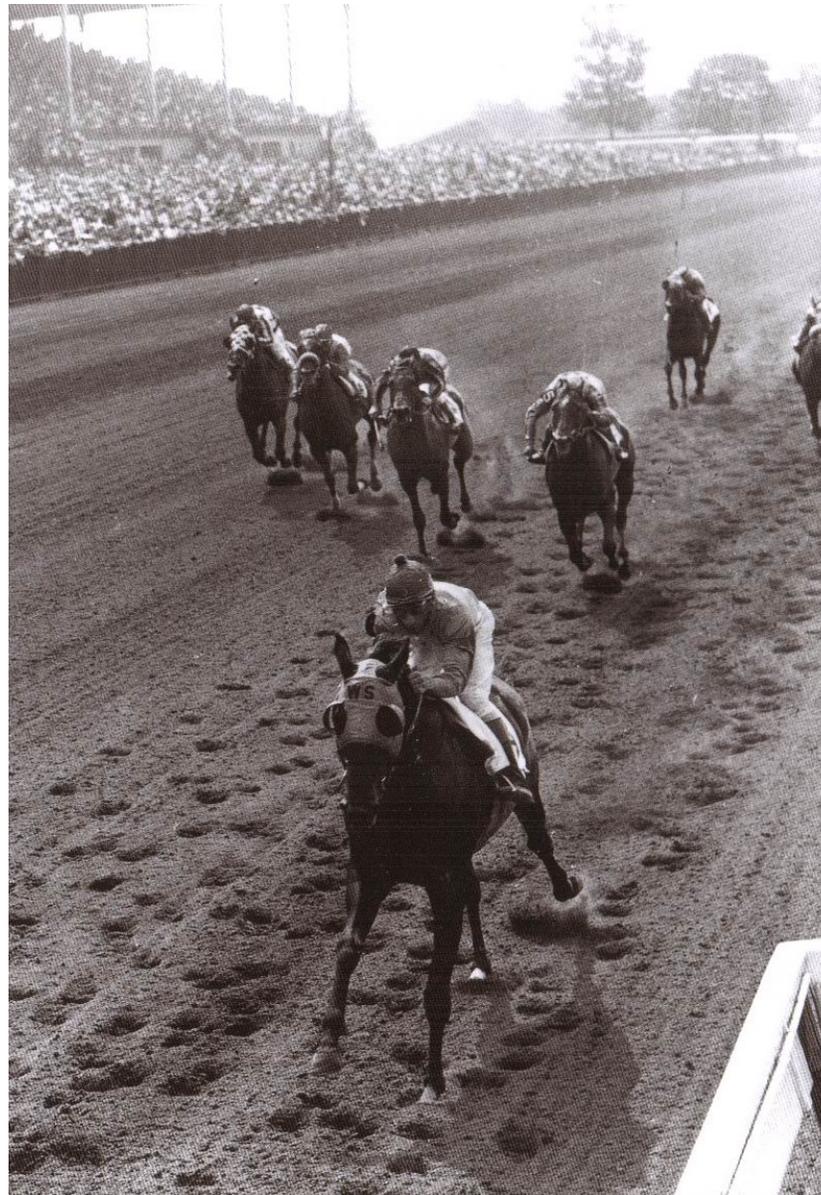


Tracks Impact Racing

- Racing Safety
- Optimal Performance
- Fair and Consistent Racing Surface
- Can help extend careers

Tracks will always be part of the solution

Stymie Stakes, Belmont 1958



- Did they harrow?
- Are the horses running on the base?
- Is that a cloud of “silt”

From: Horse Racing, The Golden Age of the Track, E. Rachlis (Ed.), B. Lefcourt (Ed.),
Photo by Bert Morgan

We Expect More from Tracks

- Analogous to cars
 - seatbelts,
 - padded dashes,
 - airbags!



Improvements are expected

- Standards exist in many areas to ensure safety
 - Soccer fields, swim goggles, football fields, helmets
 - Racing surfaces?

Recommendations:

The Welfare and Safety of the Racehorse Summit

- **The inconsistency of racetrack surfaces (#28)**
- **Recommended Actions for Consideration by Potentially Responsible Parties:**
 - A racetrack surface examination and certification process
 - More racetrack surface research and workshops

The Welfare and Safety of the Racehorse Summit (cont.)

- **Primary Objective 2:**
Safer Racing Surfaces throughout the Country
- **Related Objectives:** Analysis and data gathering with objective to implement a certification and standardization process for racing surfaces
- **Criteria for Success:**
A standard and accepted reporting method for testing surfaces at all tracks
- **Tasks for Consideration:**
 - Present the information and request participation from all of the track
 - Contact the press with the information
 - Pilot the system on one track with a short meet
 - Create a system using the data collected that can be offered to other tracks
- **Potential Participants:**
Initial volunteer racetracks & Dissemination to the major Thoroughbred racing organizations

A Certification Process

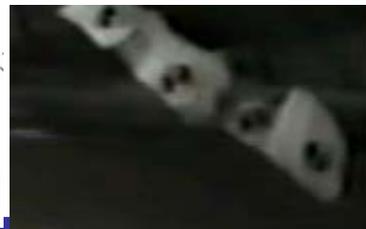
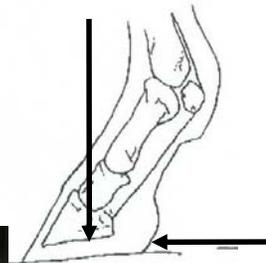
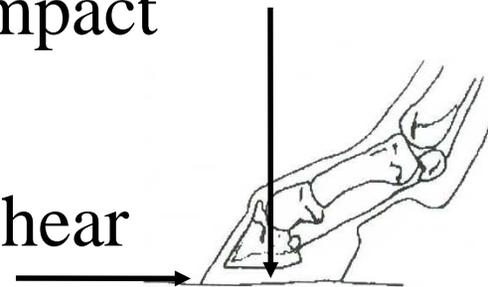
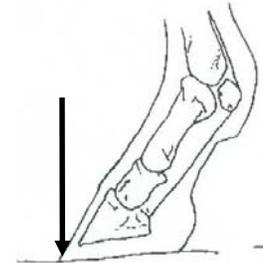
- Two options:
 - Procedural, maintain all the tracks the same
(need to learn about synthetics)
 - Performance based tests
(applicable to all surfaces)

Realistically: A hybrid model

- What does a good track do?
- How do you keep a track consistent?

Track Supports Horses: Phases of Gait

- Impact
 - Vertical Loading Joint Impact
- Stance phase
 - Vertical loading of soil/shear
- Break-Over
 - Unloading with shear
- Swing



Dynamic Response of Soil

Measure the effect of the track on the horse by simulating the most extreme case, impact and loading

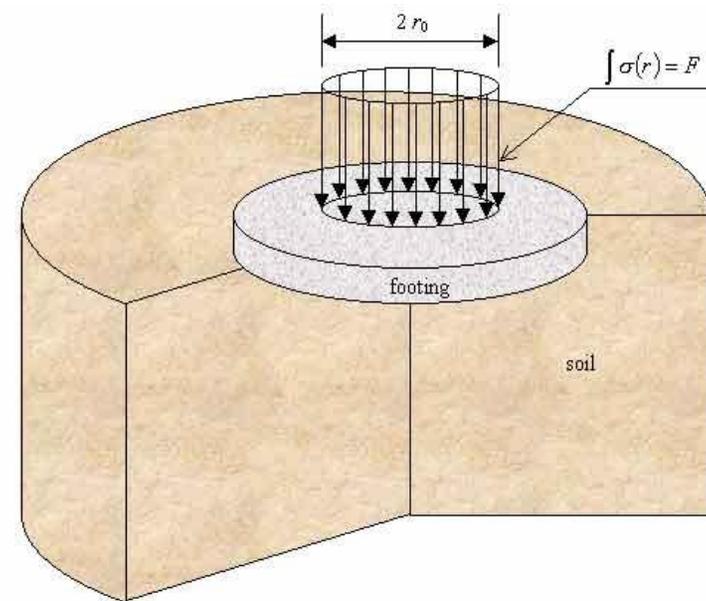
Modeling suggests that properties more than one foot beneath the surface of the track are critical – a sound base



Everything needs to be right – need to measure what the horse feels

What is Measured?

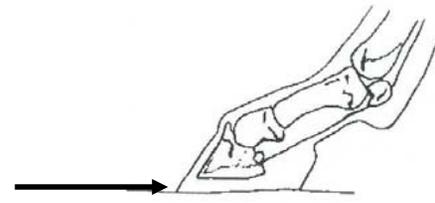
- Vertical stiffness
- Resistance to slip
- Both should be dynamic because of the speeds of the horse



This matches tests for synthetic
turf playing surfaces

ASTM F1551-94

Track Performance

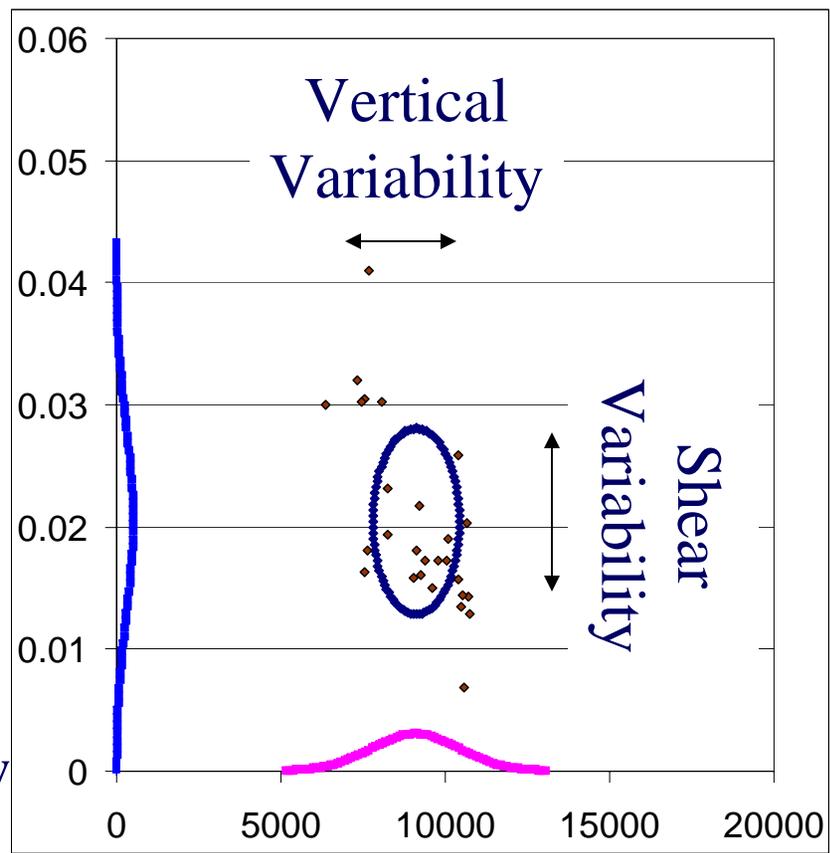


- Location on the graph

Amount of variability

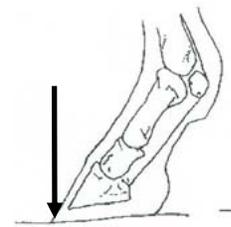
Fast

Slow

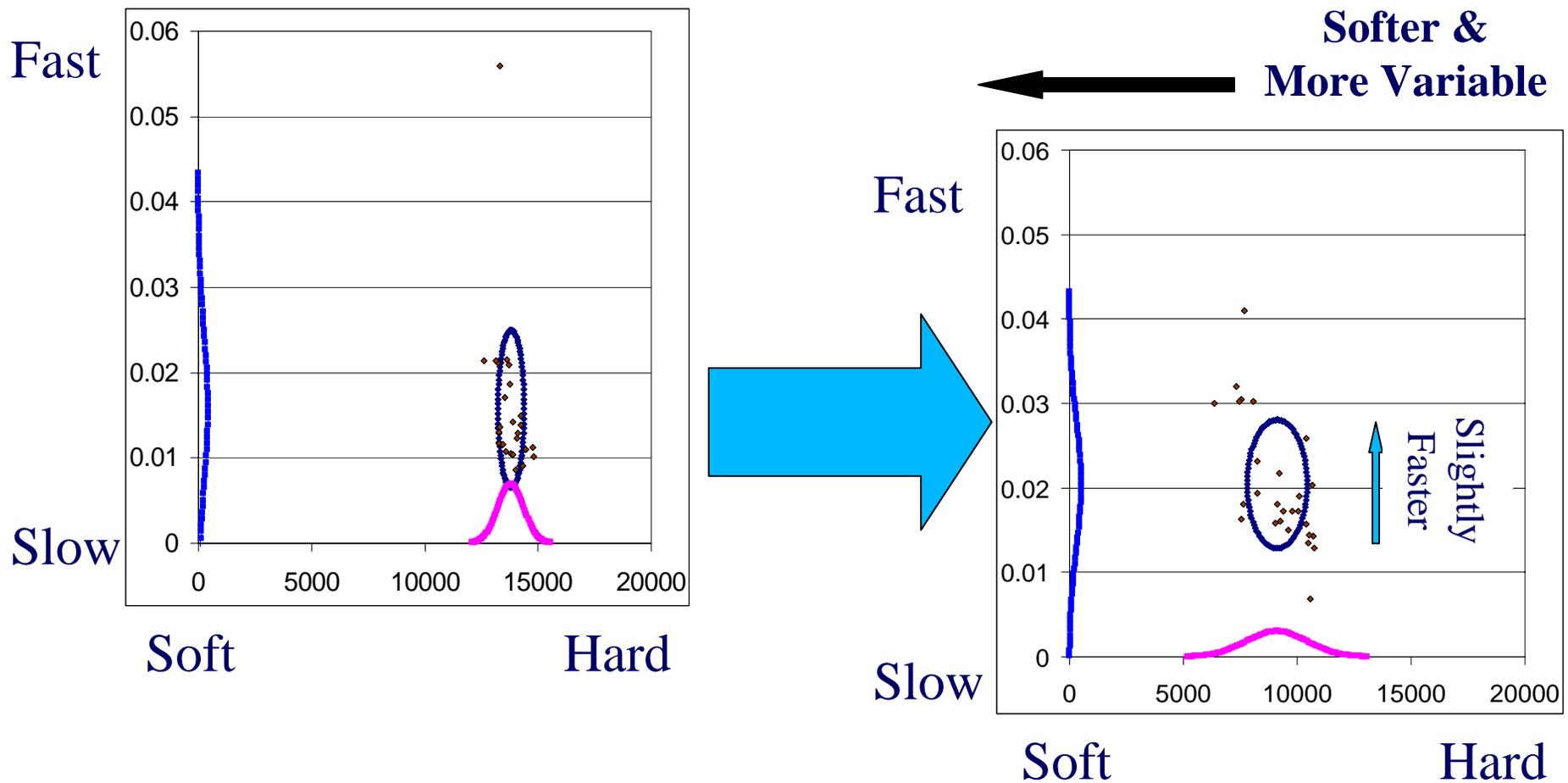


Soft

Hard



Example: What Happens? Rip, Till and then Set a Track?



Complemented by Maintenance & Quality Control

- Separate amounts of components
 - Percentage of clay, sand and organic material as well as clay mineralogy, salts and water in dirt track
 - Percentage of wax, sand, fibers and rubber in synthetic tracks as well as drop melt point of wax, length of fibers etc. in synthetic tracks

**Different tests but like ASTM F1551-94
synthetic turf playing surfaces,**

Standard Maintenance Procedures

- Characterize the Materials according to Temperature and Response, and develop standard maintenance protocols.
- End the panic that when a superintendent gets hurt or retires 😊



The Turfway Model

A Day in the Life:

Trainin g Temp.	1'st Post Temp.	Last Post Temp .	Precip- itation	Roto- Till Time & Depth	Power Harrow Time & Depth	Water 1000 Gallons
12	21	18	Trace Clouds	0	3 hrs 3 in	40

Also note track evaluation:

Outriders: Good

Racing: Slick at gate

Maintenance: 3rd shift, blowing snow in turns

Document Response

- Central database maintained at tracks with critical information
- Basis for studies and response
- Guidance for future

If the maintenance is the same, then something must have changed, add wax, add fibers or add sand...



How to Implement Track Engineering



- Monitor tracks with the biomechanical hoof test
- Questions arise:
 - Base problems (GPR)
 - Maintenance Protocol
 - Composition

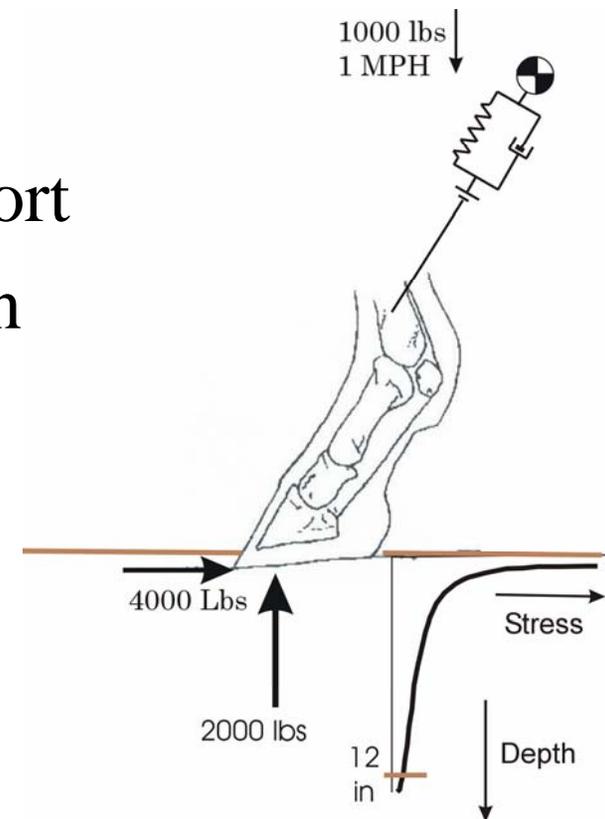


Organic
Moisture
Organic
Clay

Synthetic
Fiber
volume
Wax content

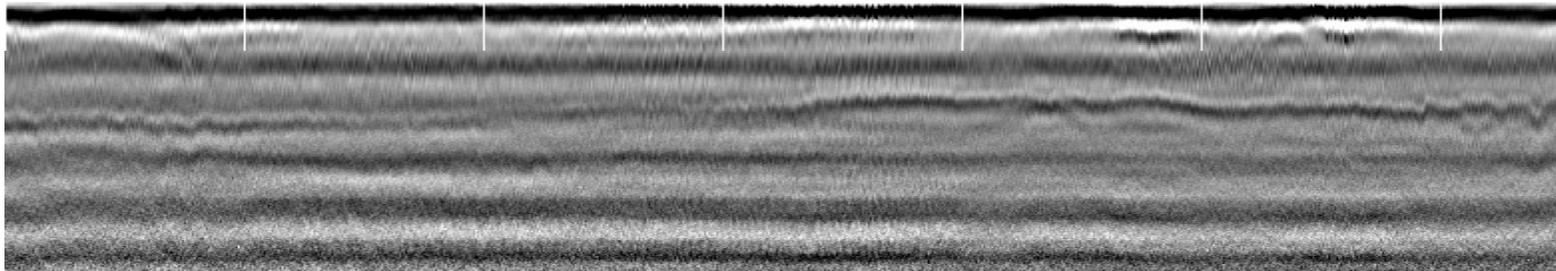
Implementation: Biomechanical Hoof Tester

- Biomechanical Hoof Tester
 - Implemented 2004, single system in use for track support
 - Comparison data available on 21 tracks



Implementation: Ground Penetrating Radar

- Imaging of base and track consistency
 - Available for diagnosing local base problem, image before you dig
 - Base line on 14 tracks including synthetics

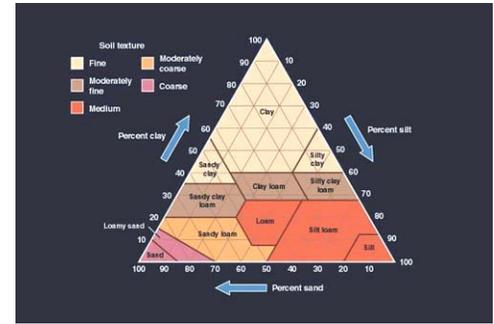
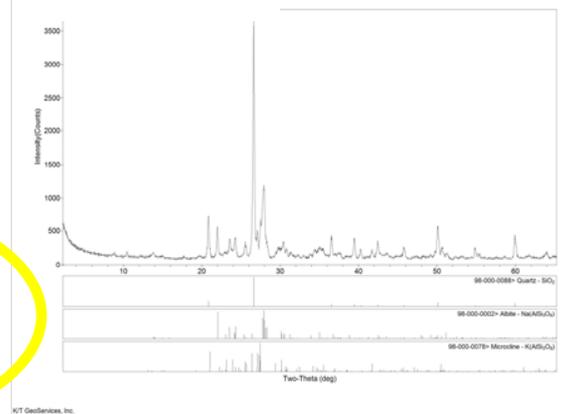


Implementation: X-Ray Diffraction & ...

- Used to characterize clay mineralogy
 - Base line on 5 tracks of both “East Coast” and “California” design
 - Results consistent with maintenance "traditions”

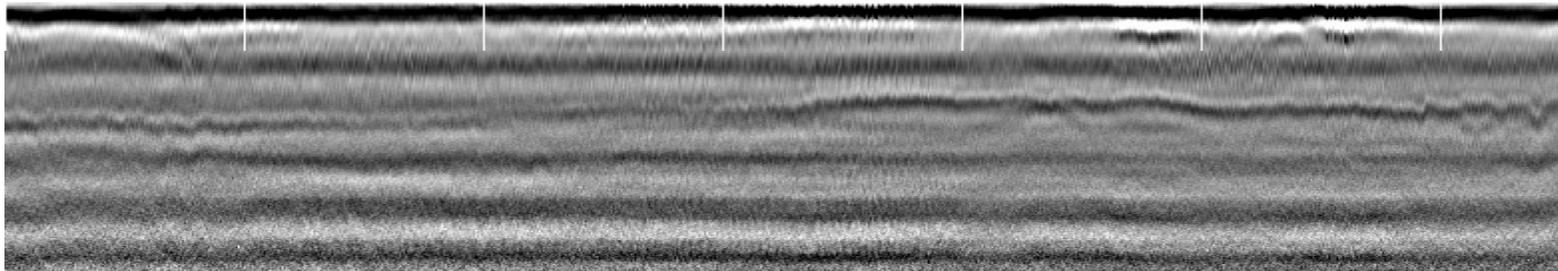


Summary Mineralogy (Weight Percent)		
Quartz	8.6	32.8
K-Feldspar	0	19.9
Plagioclase	2	38.5
Amphibole	0	2.5
Calcite	37.4	0.5
Aragonite	1.3	0
Dolomite	0	0.8
Illite & Mica	0	3
Kaolinite	0.7	1
Chlorite	0	1
TOTAL	100	100



Implementation: Composition of Synthetics

- Need tools for synthetics
 - Pilot results for solvent separation for quantifying wax percentage in synthetic tracks
 - Analytical techniques for fibers, rubber and sand



Future

- Biomechanical Hoof Tester
 - Expand number of machines commercial or supported
 - Use at tracks to support maintenance
- Ground Penetrating Radar
 - Tool now available for diagnosing local base problem
- Characterization of synthetic tracks
 - Support for composition
 - Develop techniques for temperature sensitivity
 - Develop standard maintenance protocol



Do Synthetics Solve This?

- Tracks have been designed with different compositions for different applications
- Tracks have in some cases been renovated to “tweak” the mixture
- Different maintenance in different locales



*If Synthetic Tracks do not Solve ALL of the Problems....
Suppliers and tracks must be ready to
show that the problem is not with the track!*

Philosophy

- Need to provide a common set of measures
- Primary measures should be based on biomechanics as well as on “inputs” and procedures
- Need to continue to understand why the behaviour is different on some tracks
- Provide tools & lab support to monitor tracks



Track Certification
A Investment in the Track for the Horses

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Top Flight Handicap, Belmont 1953



From: Horse Racing, The
Golden Age of the Track
Photo by Bert Morgan

*Even if tracks did not “cause” the problem,
they CAN improve the situation*

The remaining question: Epidemiology?



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