September 8, 2023

ThorTurf
Track in a Box Results
Racing Depths

Prepared by:

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Orono Biomechanical Surface Tester (OBST)

The Orono Biomechanical Surface Tester (OBST) was developed to provide a functional comparison of racing surfaces. The OBST machine duplicates the speed, directions and loads of the leading foreleg of a Thoroughbred horse at a gallop. The machine which was initially funded by the AQHA Racing has now been used on more than 60 racing and training surfaces in the US and Canada. See *ASTM F3400: Standard Test Method for In-situ Testing of Functional Properties of Equine Surfaces: Artificial Surfaces* for more information.

OBST "Cushioning": Racing Depths 6in & 7in

Surface Average: 9.9 / Std: 0.1 / Std. Error: 0.1 / CoV: 1.2%

Surface Average: 10.0 / Std: 0.1 / Std. Error: 0.1 / CoV: 1.0%
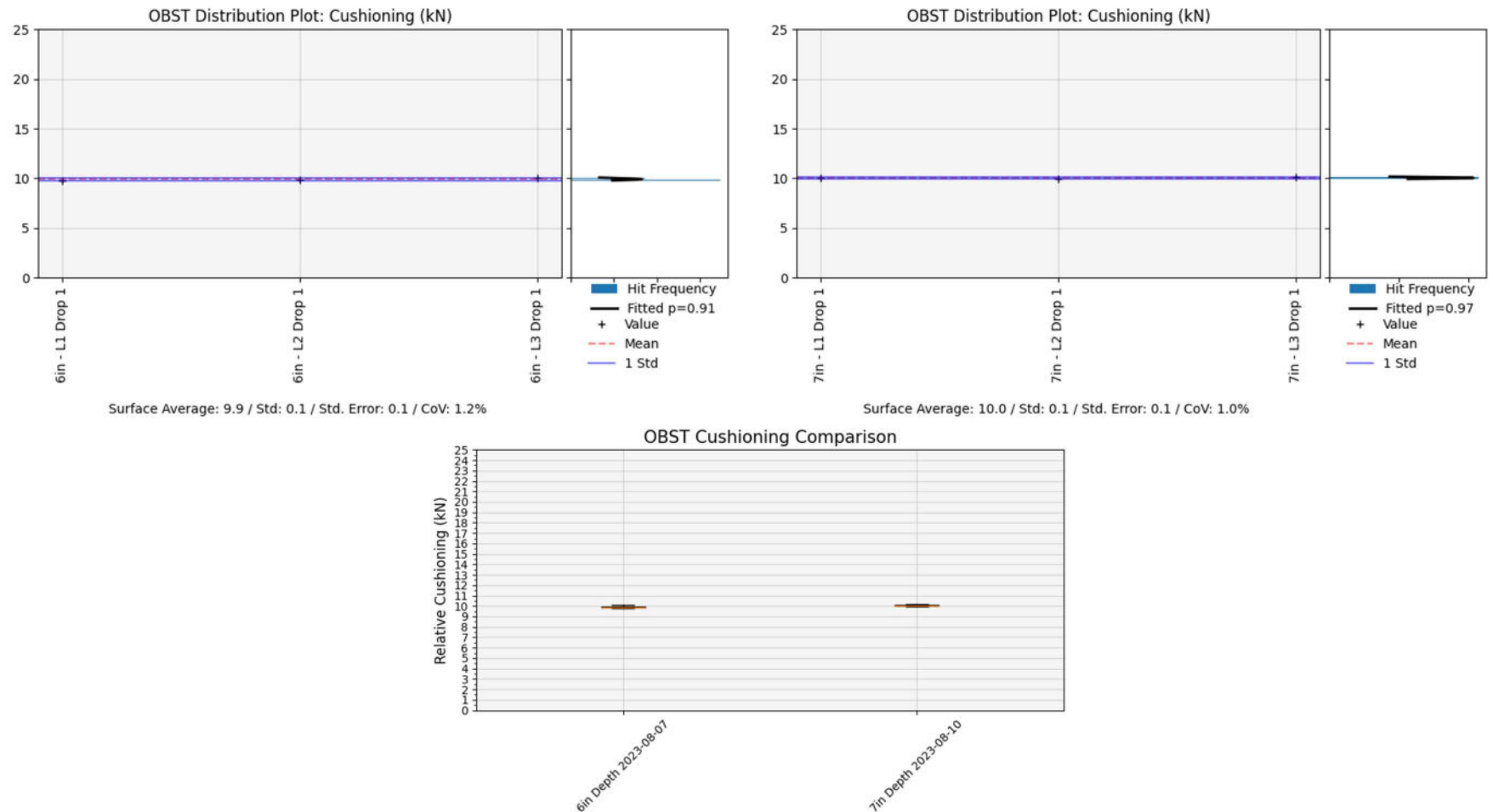
OBST Figure 1: This figure shows the peak Cushioning (peak vertical load) recorded by the OBST (top) with a box and whisker plot comparison to historical data and or other racing surfaces (bottom).

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OBST "Slide":   Racing Depths 6in & 7in

Surface Average: 1.3 / Std: 0.1 / Std. Error: 0.0 / CoV: 4.1%   Surface Average: 1.3 / Std: 0.0 / Std. Error: 0.0 / CoV: 1.2%
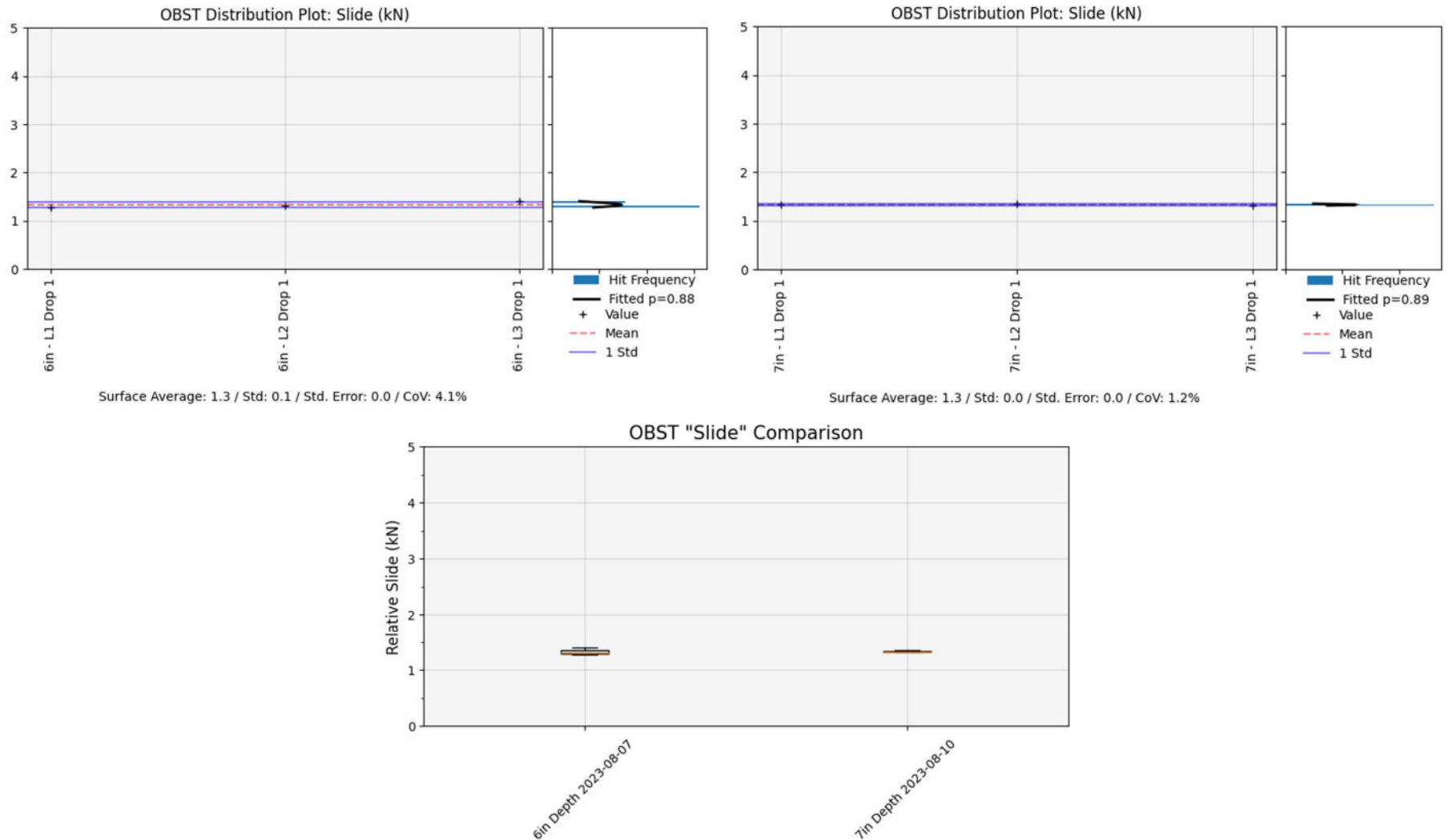
OBST Figure 2: This figure shows the peak Slide (peak fore-aft load) recorded by the OBST (top) with a box and whisker plot comparison to historical data and or other racing surfaces (bottom).

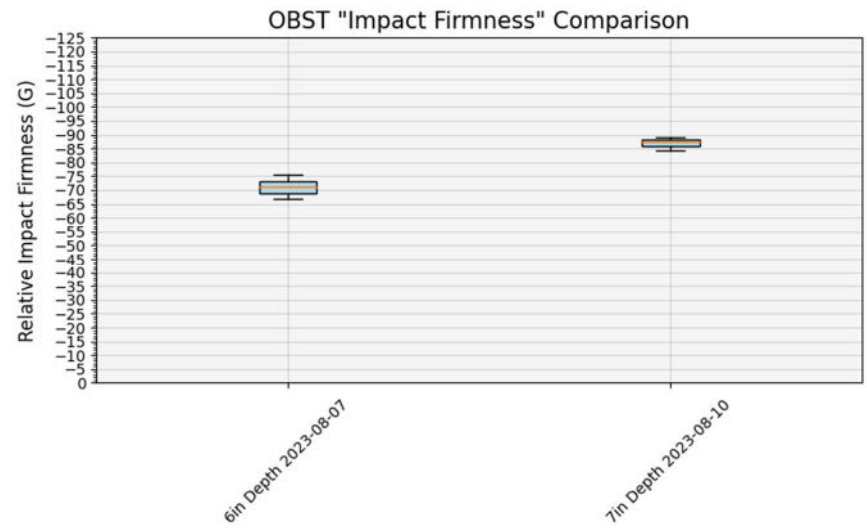Racing Surfaces Testing Laboratory

OBST "Impact Firmness": Racing Depths 6in & 7in

OBST Figure 3: This figure shows the peak Impact Firmness (peak vertical deceleration) recorded by the OBST (top) with a box and whisker plot comparison to historical data and or other racing surfaces (bottom).
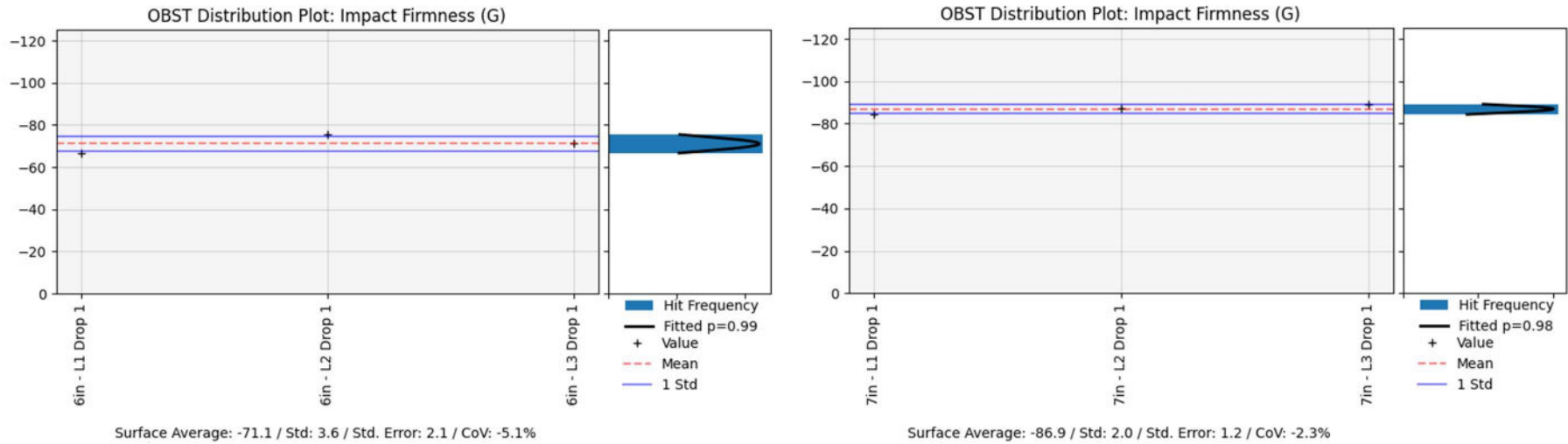
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Measurement Comparisons

The OBST data is compared to Temperature data collected with a Resistance Temperature Detector (RTD).

OBST vs RTD Probe: Racing Depths 6in & 7in

|	Cushioning (kN)	Slide (kN)	Impact Firmness (G)	Surface Temp. (F)
Overall Average	10.0 +/- 0.1	1.3 +/- 0.0	-79.0 +/- 8.5	78.7 +/- 0.4
6in Depth Average	9.9 +/- 0.1	1.3 +/- 0.1	-71.1 +/- 3.6	79.9 +/- 0.4
7in Depth Average	10.0 +/- 0.1	1.3 +/- 0.0	-86.9 +/- 2.0	78.6 +/- 0.3

MC Table 1: This table shows the average and standard deviation values recorded by the OBST and Rainier Penetrometer or hand depth measurements paired with TDR.

"Location"	Cushioning (kN)	Slide (kN)	Impact Firmness (G)	Surface Temp. (F)
6in – L1	9.8	1.3	-66.6	78.9
6in – L2	9.9	1.3	-75.5	78.3
6in – L3	10.1	1.4	-71.1	79.4
7in – L1	10.0	1.3	-84.3	78.2
7in – L2	9.9	1.4	-87.3	78.8
7in – L3	10.2	1.3	-89.2	78.7

MC Table 2: This table shows the values recorded by the OBST and the Temperature values recorded with a RTD for each location tested.
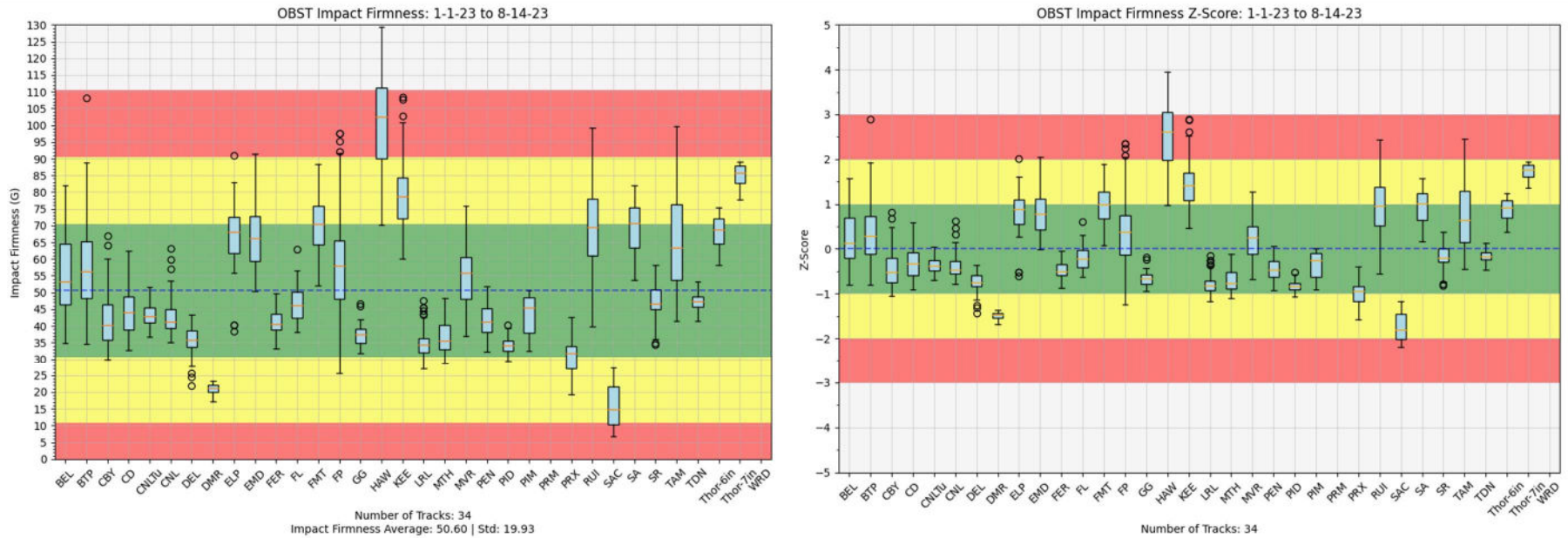
OBST "Cushioning" Comparisons: 6in & 7in Racing Depths to 32 Other Racetracks
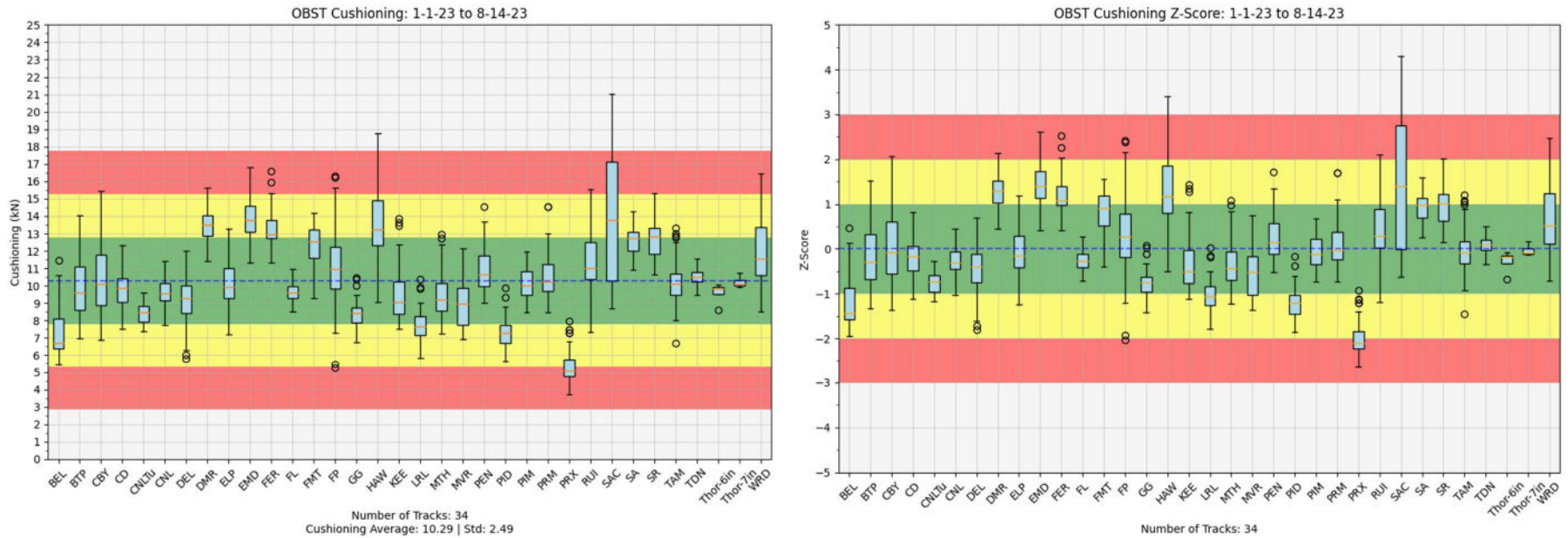
OBST Figure 4: This figure shows a box-and-whisker plot of Cushioning (vertical load) recorded by the OBST compared to other racing surfaces (left), and a box-and-whisker plot of Z-scores compared to other racing surfaces (right).

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OBST "Impact Firmness" Comparisons: 6in & 7in Racing Depths to 32 Other Racetracks

OBST Figure 5: This figure shows a box-and-whisker plot of Impact Firmness (vertical deceleration) recorded by the OBST compared to other racing surfaces (left), and a box-and-whisker plot of Z-scores compared to other racing surfaces (right).

OBST "Slide" Comparisons: 6in & 7in Racing Depths to 32 Other Racetracks
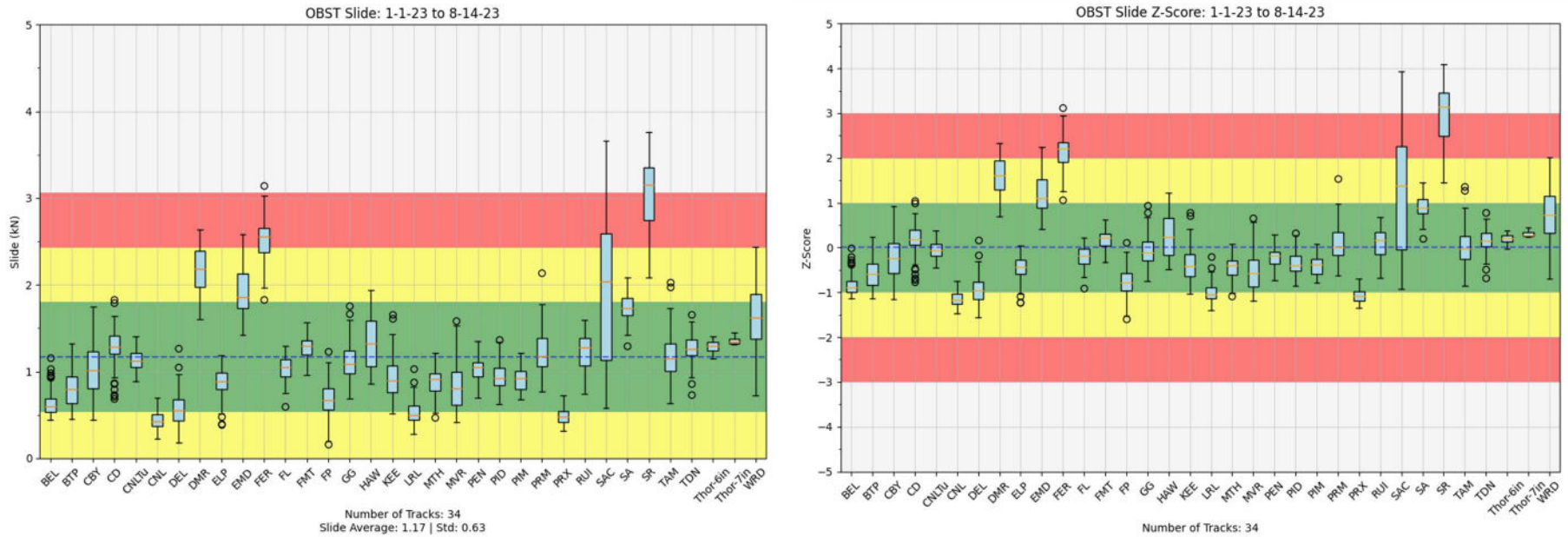
OBST Figure 6: This figure shows a box-and-whisker plot of Slide (fore-aft load) recorded by the OBST compared to other racing surfaces (left), and a box-and-whisker plot of Z-scores compared to other racing surfaces (right).

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