Macro-Texture Data Collection

- ☐ The amount of available friction and texture depth are primary concerns in evaluating safety characteristics of pavement surface. Currently, the state of the practice involves collection of longitudinal macro-texture data using laser-based devices at highway speeds. The Federal Highway Administration's (FHWA) Long-Term Pavement Performance (LTPP) program has started collection of the longitudinal mean profile depth (MPD) and corresponding root mean squared error (RMS) based on ASTM E1845 since 2013.
- □ Few highway agencies have adopted the collection of the MPD data across the lane width and the LTPP program is also moving towards implementation of laser sensors across the full lane width. This is because the vehicle wander introduces significant variations across the data collection line, which makes the analysis challenging. In addition, the longitudinal MPD does not capture the variation in macro-texture across the lane width.

Transverse

longitudinal



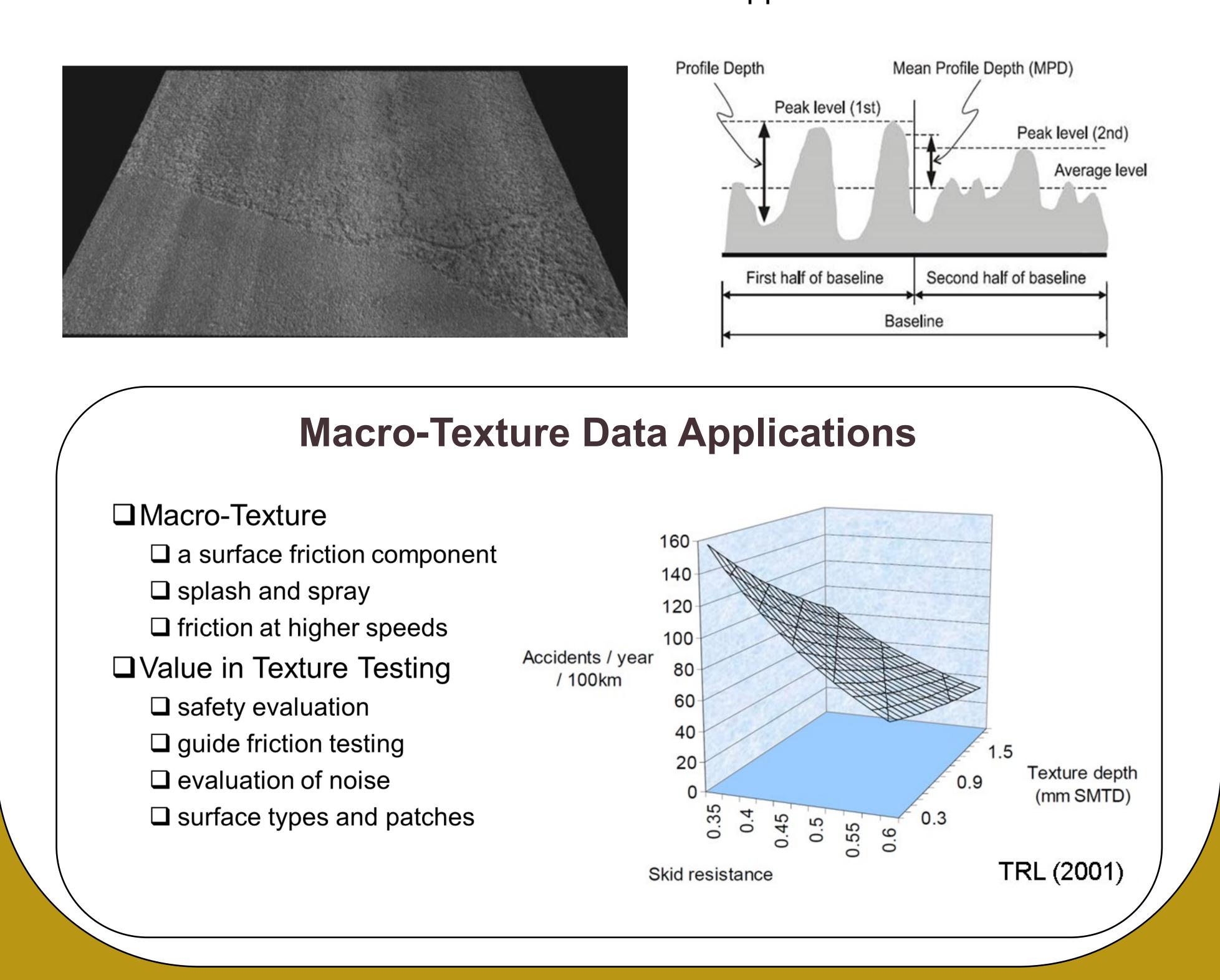
area



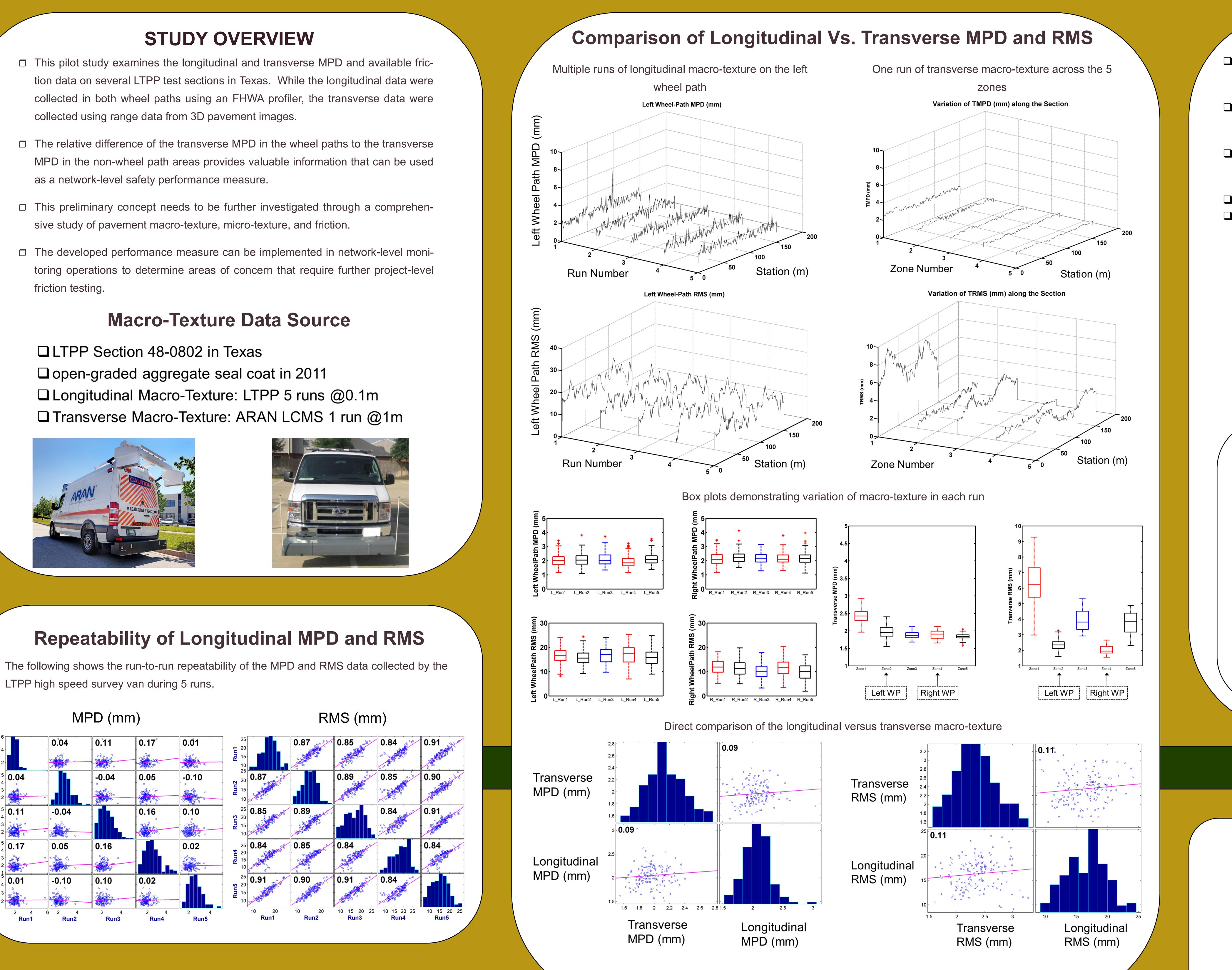
line

Run1

Longitudinal texture depends on vehicle wander Transverse texture: an area as opposed to a line



A Transverse Pavement Macro-Texture Performance Index for Network-Level Safety Evaluations



Transversal Macro-Texture Index

Combine MPD and RMS information:

 $CoV = \frac{MMD}{MPD}$

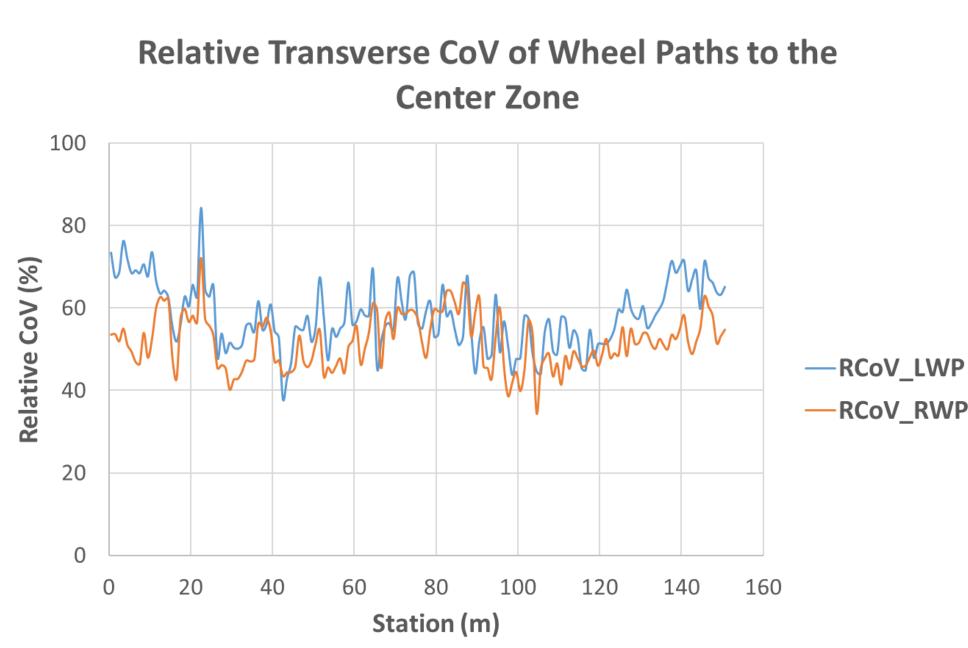
Relative transverse CoV of left wheel path:

$$RCoV_{LWP}(\%) = 100 \times \frac{CoV_{LWP}}{CoV_{C}}$$

Relative transverse CoV of right wheel path:

$$RCoV_{RWP}(\%) = 100 \times \frac{CoV_{RWP}}{CoV_{C}}$$

Wheel path macro-texture benchmarked to the center Potentially indicating traffic abrasion



CONCLUSIONS:

- Longitudinal RMS is more robust compared to MPD.
- □ Study of noise, spikes, filters, speed, outliers is needed on the transverse macrotexture data.
- Transverse RMS highlights the difference between wheel paths and other surface areas better than ASTM MPD.
- Longitudinal texture data cannot capture all of the transverse macro-texture information (insignificant correlation).
- Transverse macro-texture index combines MPD and RMS and benchmarks the texture of the wheel paths to the center, indicating traffic abrasion.
- Further investigation of relative texture index, friction, and micro-texture on a larger variety of pavement surfaces is needed.

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MPD represents µ of texture distribution RMS represents б in texture distribution Both are needed to explain the distribution

