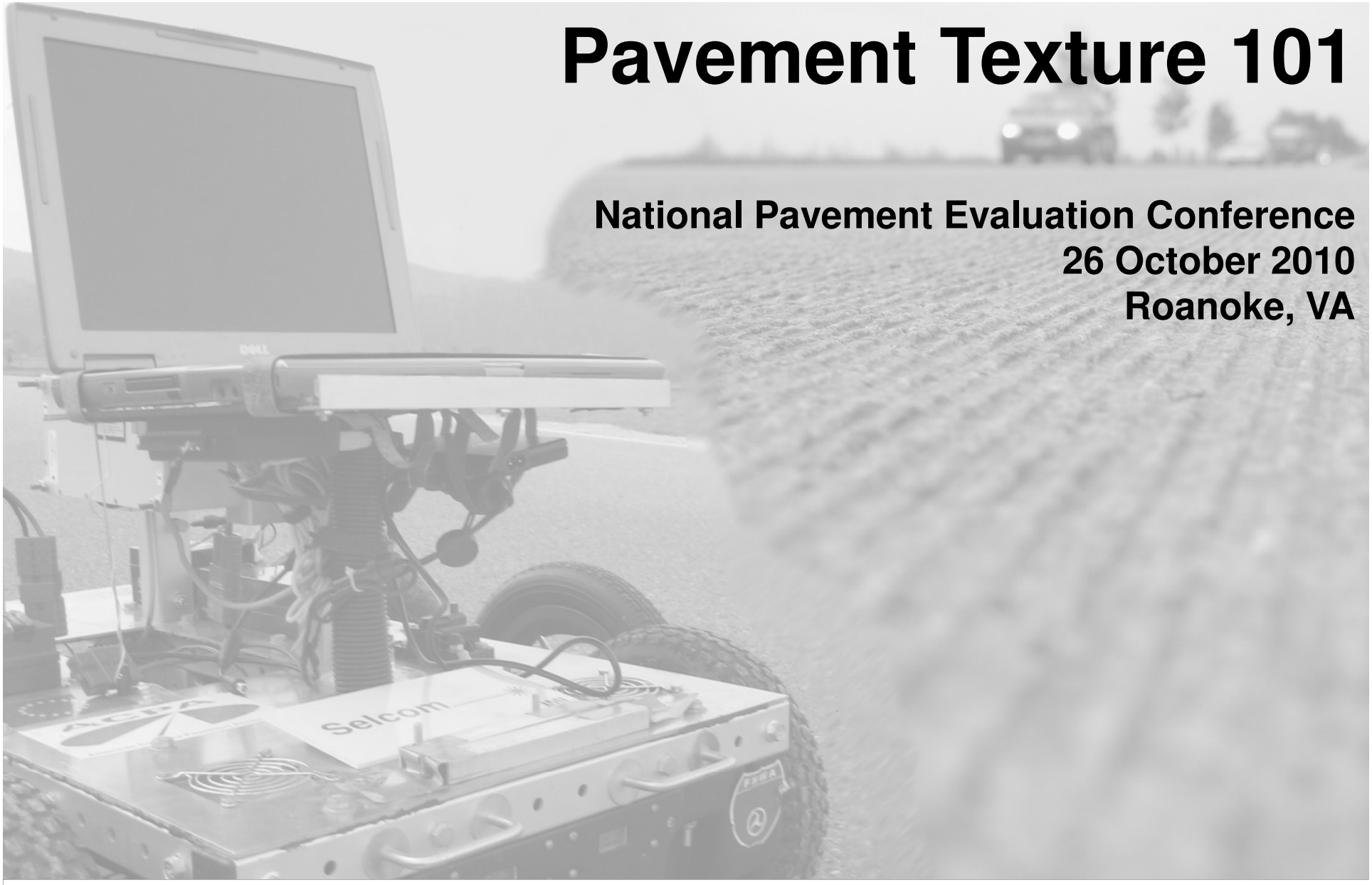
Pavement Texture 101

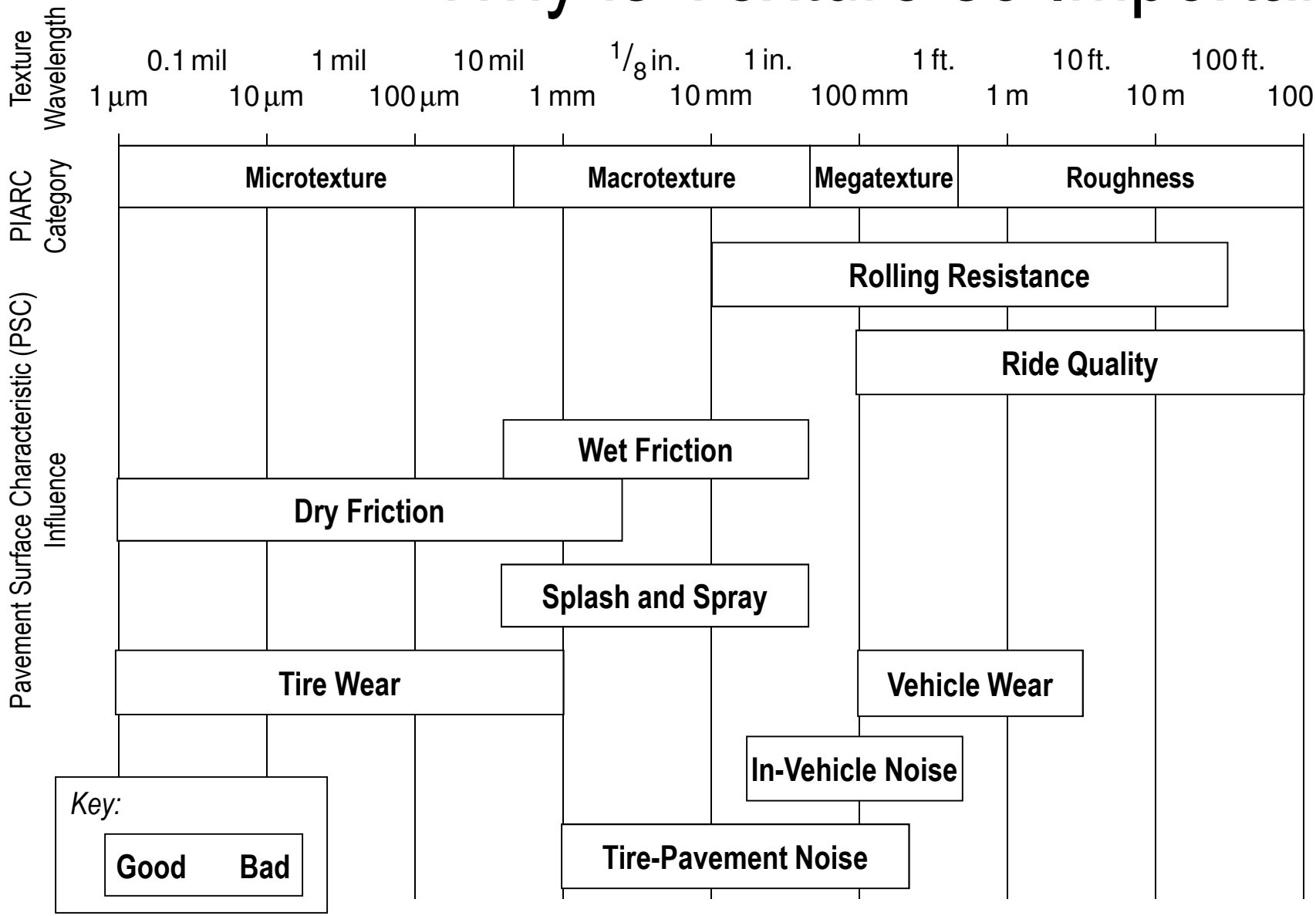


National Pavement Evaluation Conference
26 October 2010
Roanoke, VA

THE TRANSTEC GROUP

Robert Otto Rasmussen, PhD, INCE, PE (TX)

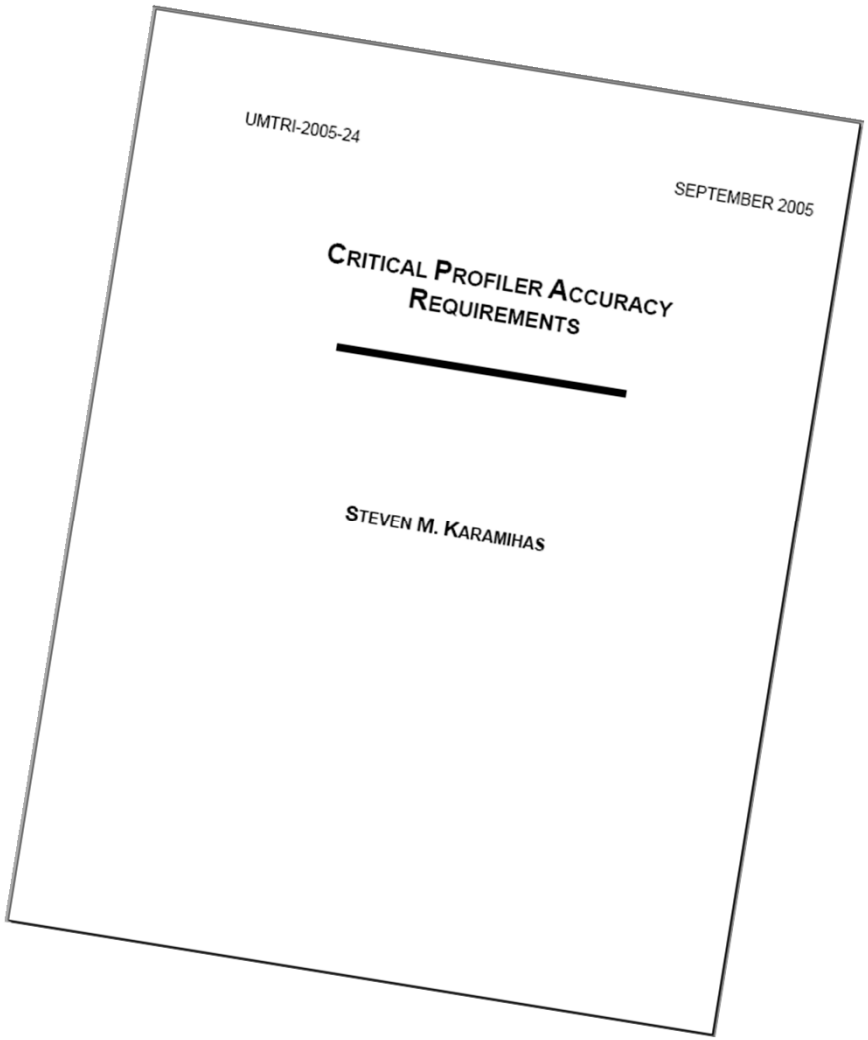
Why is Texture so Important?



Source: PIARC

Why is Texture so Important?

- RELEVANCE is key



- Texture “frequency”
- Texture “depth”
- Texture “geometry”

- Tire dynamics
- Drainage
- Aerodynamic

Why is Texture so Important?

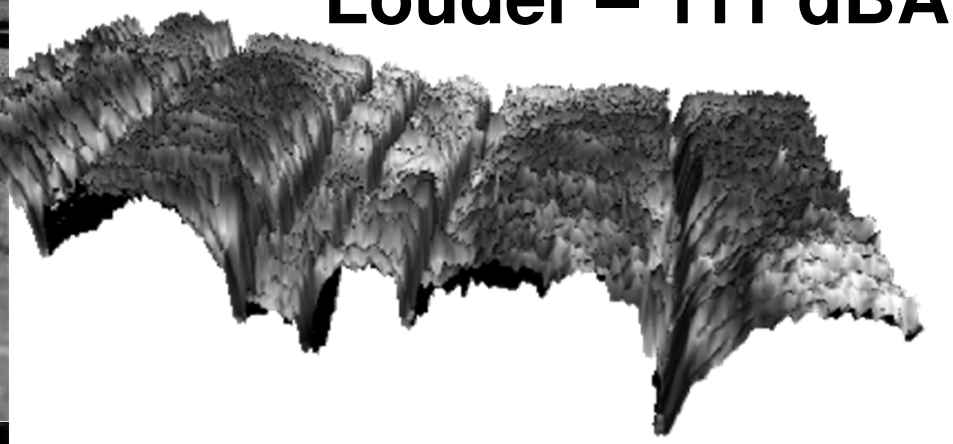
- Tire-Pavement Noise is affected by Texture
- Relationship is complex (more on this tomorrow)

Bad

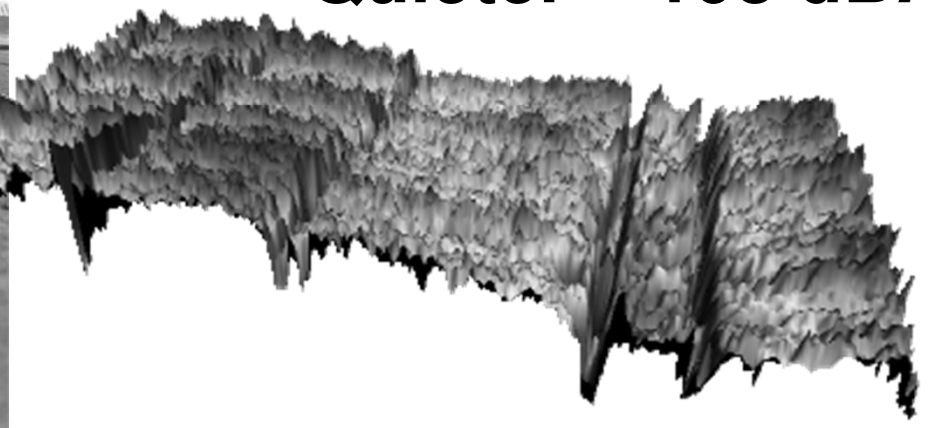
Good

Why is Texture so Important?

Louder – 111 dBA

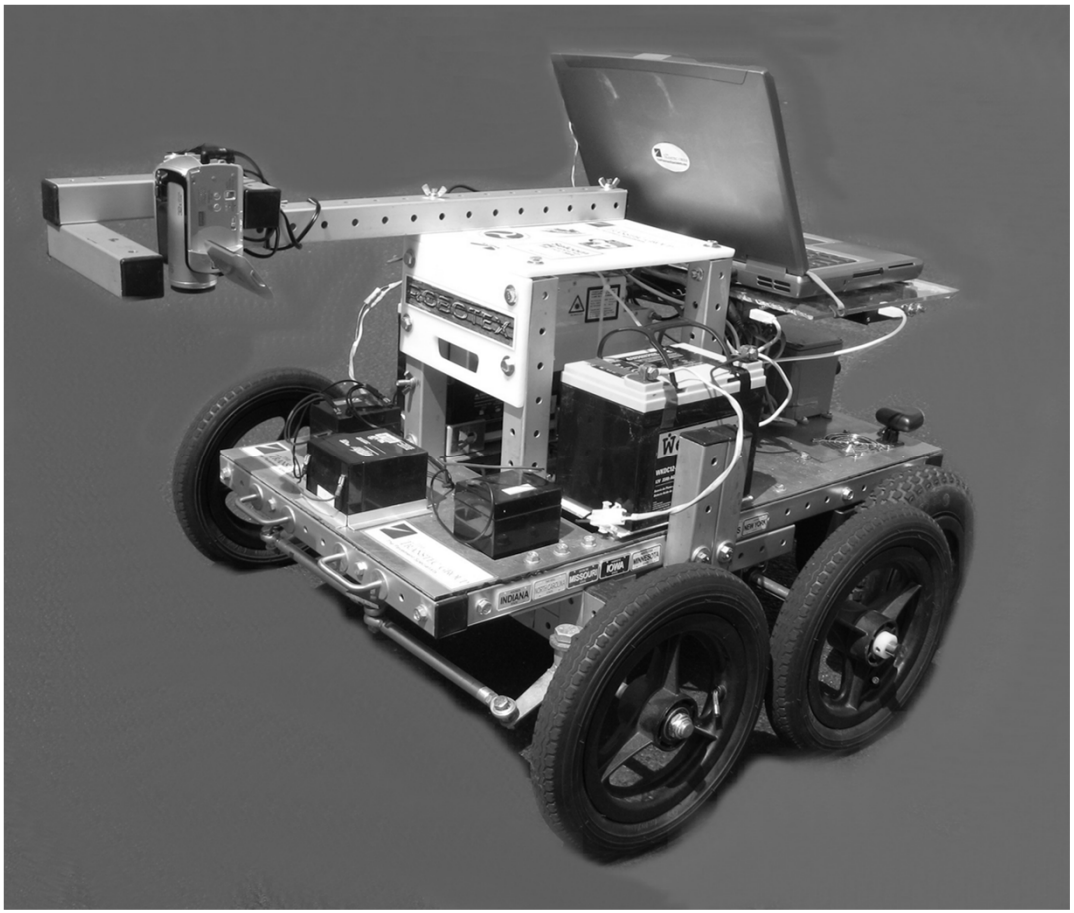


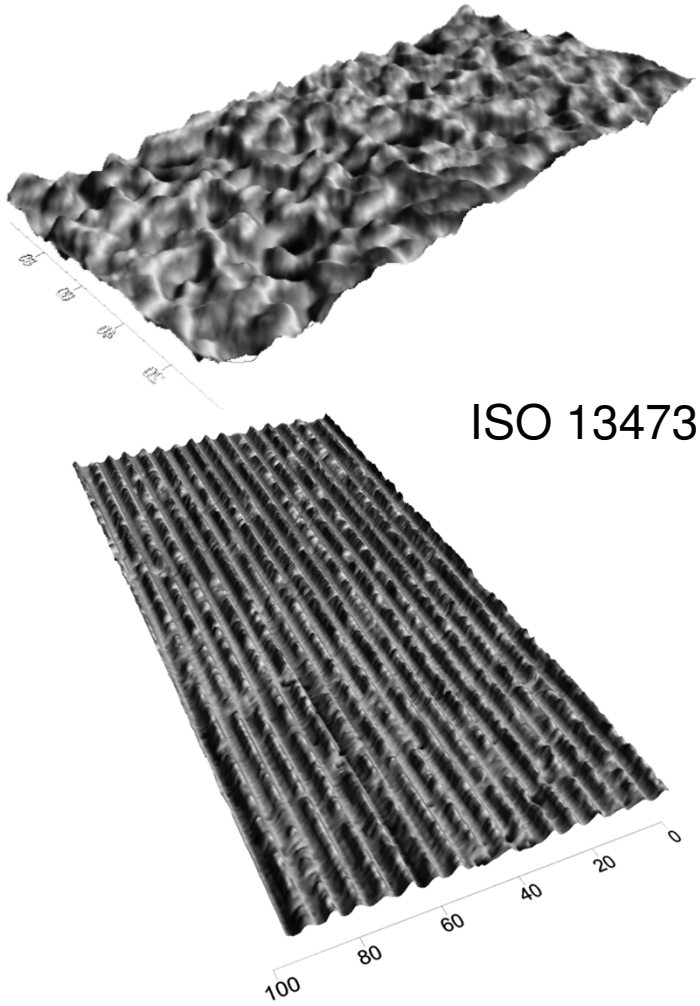
Quieter – 103 dBA



Measuring Texture using RoboTex 2.0

- Built around LMI-Selcom RoLine Sensor
- Laser height sensor, inertial referencing
- GPS, DMI encoder, video log





Describing Texture

- Height (Amplitude)
- Spacing
- Functional
- Spectral

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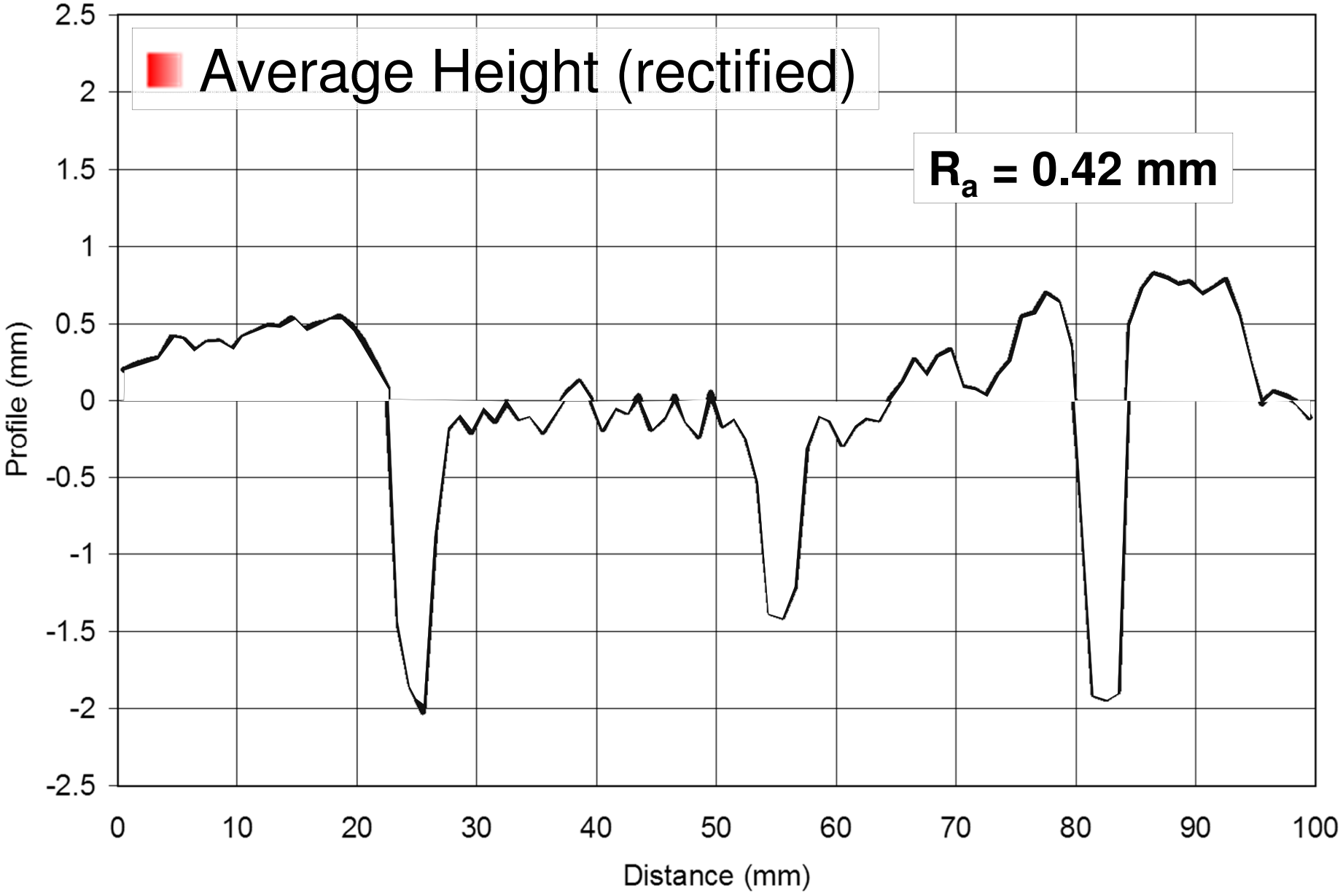
Describing Texture – Height



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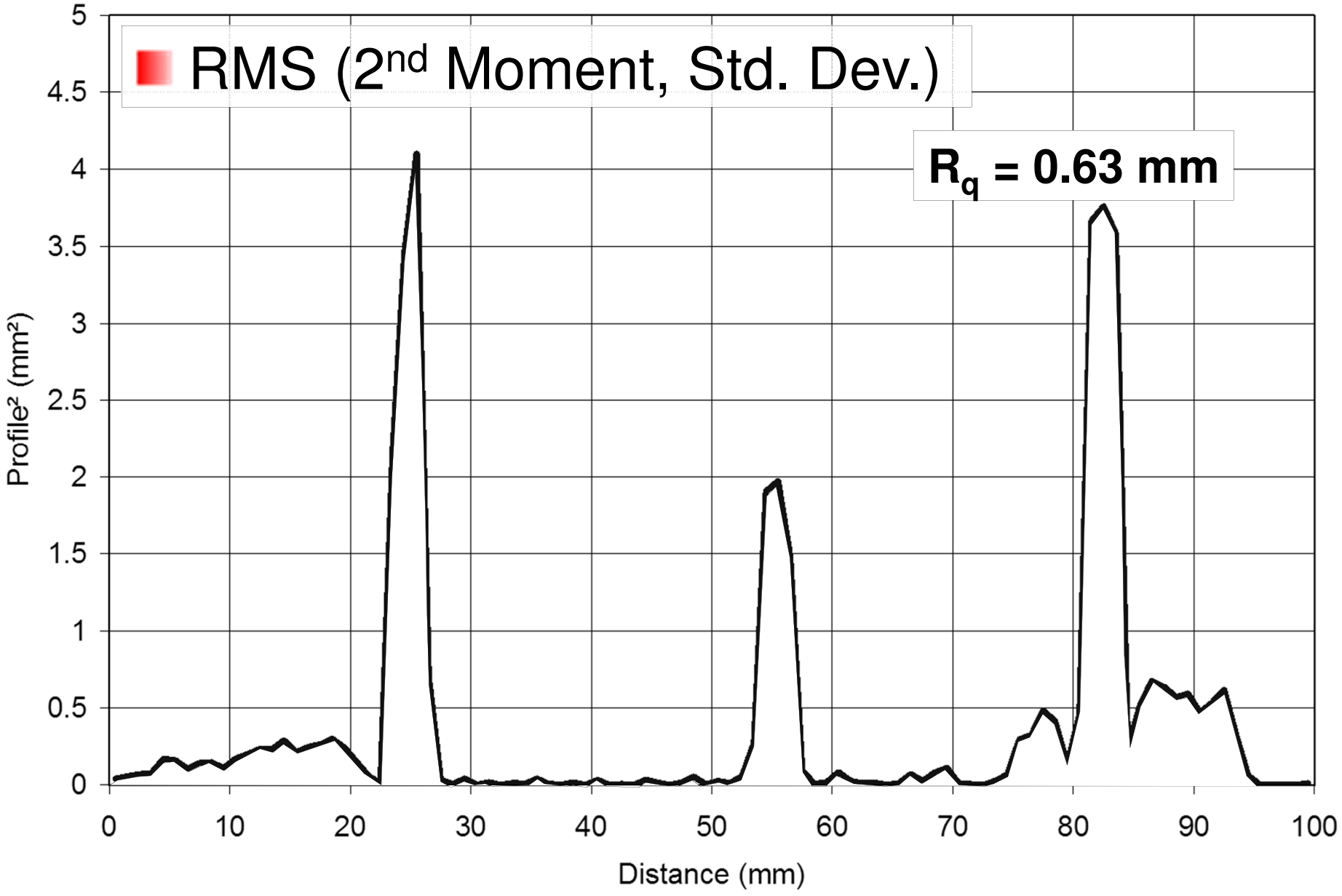

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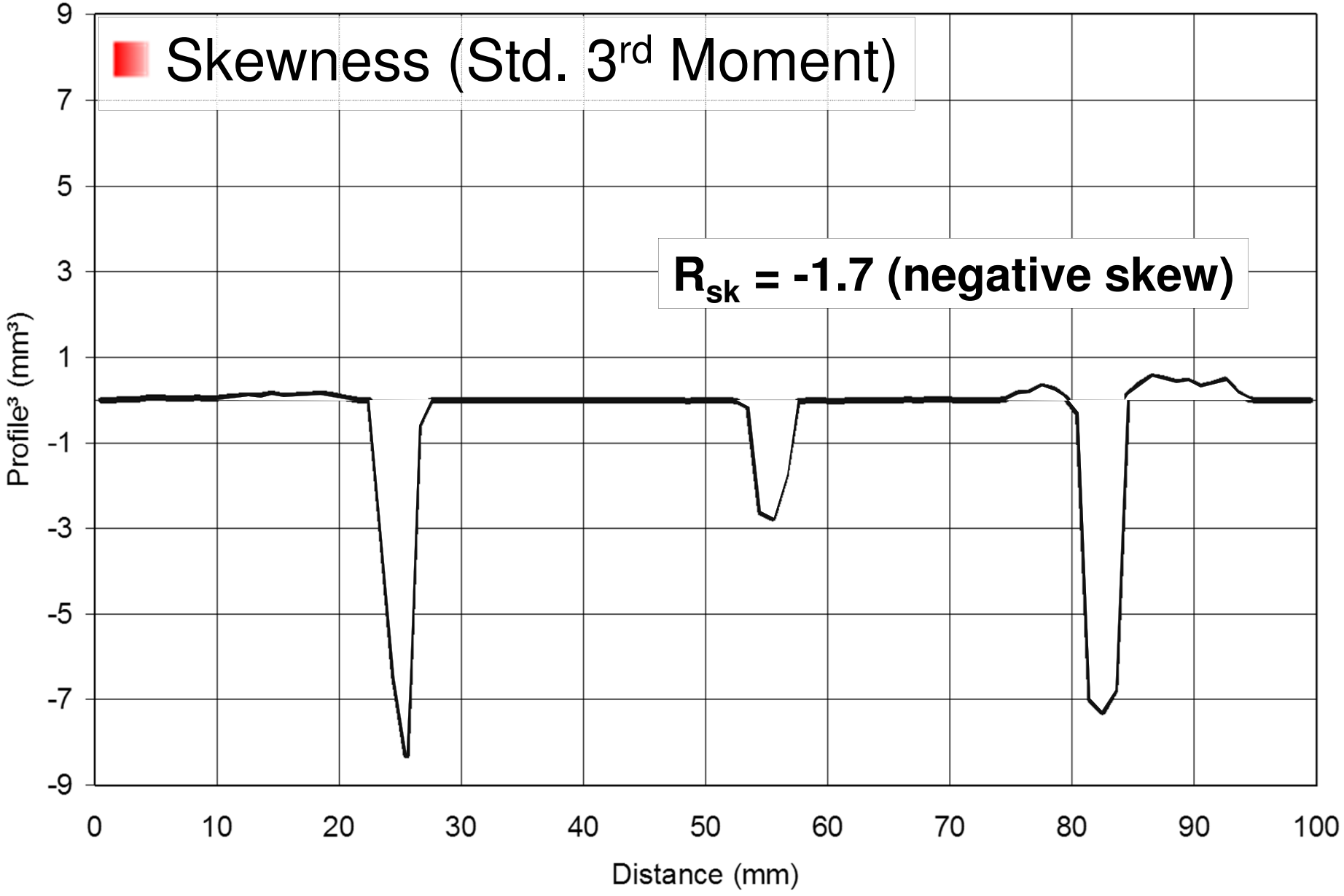

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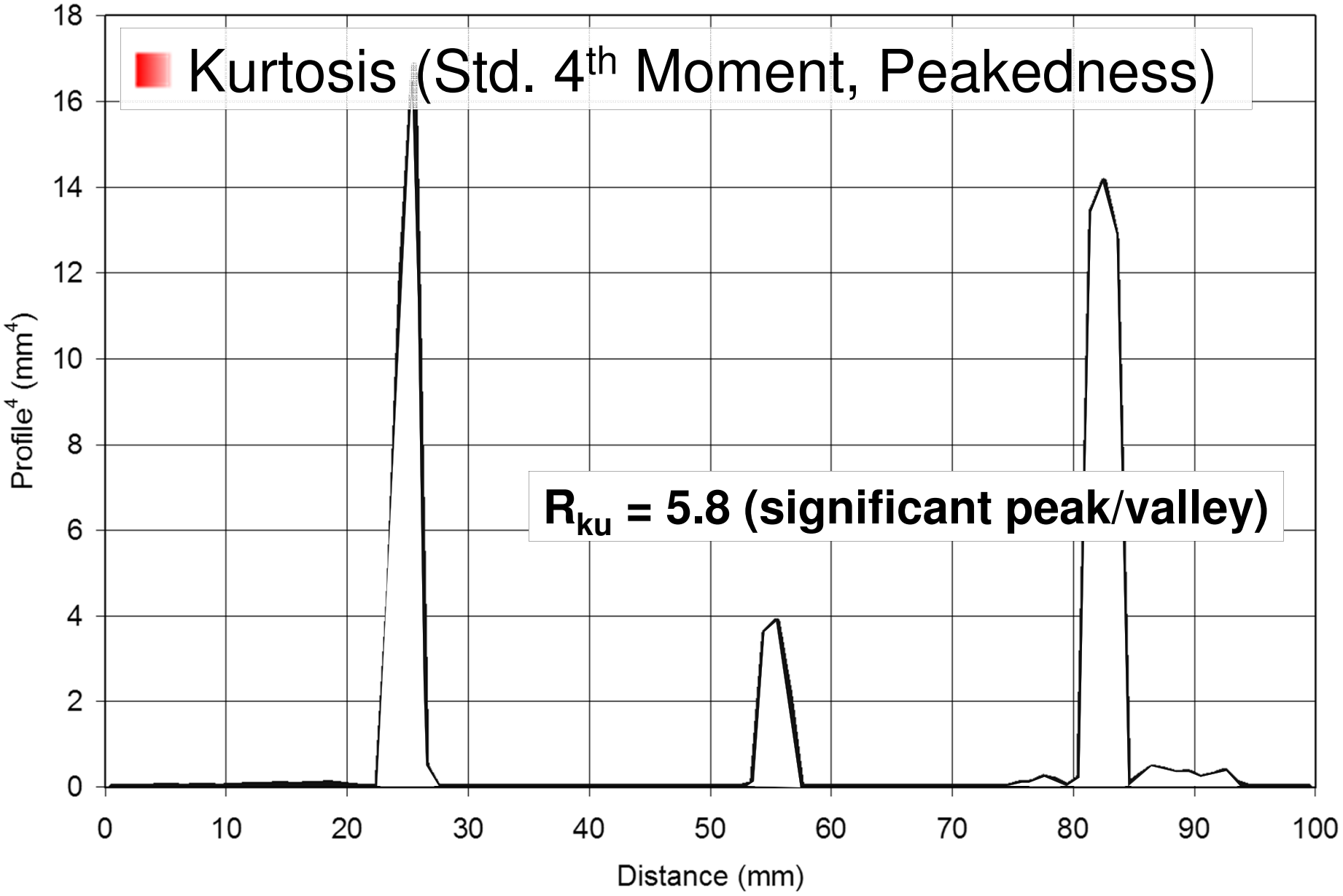

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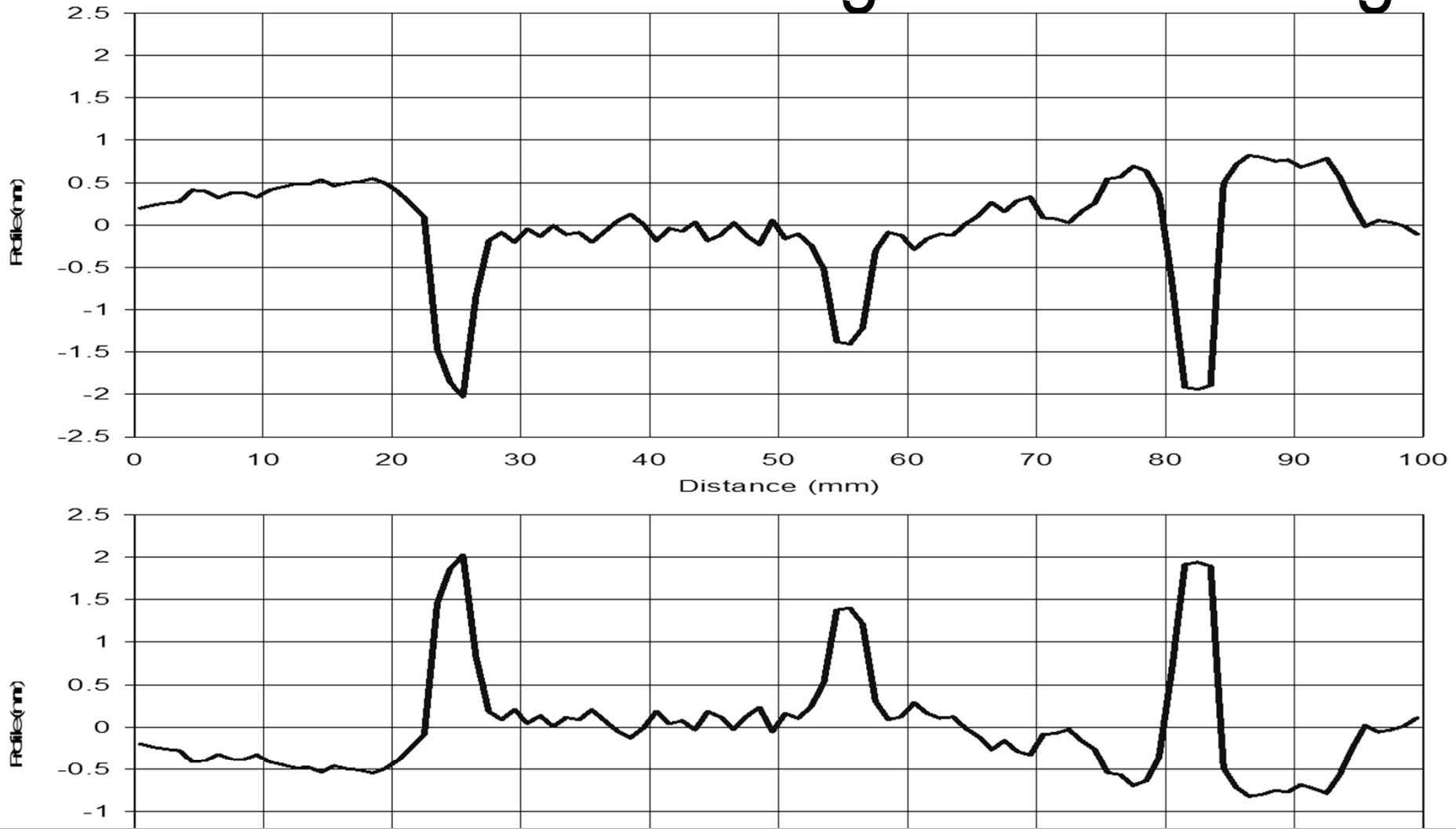
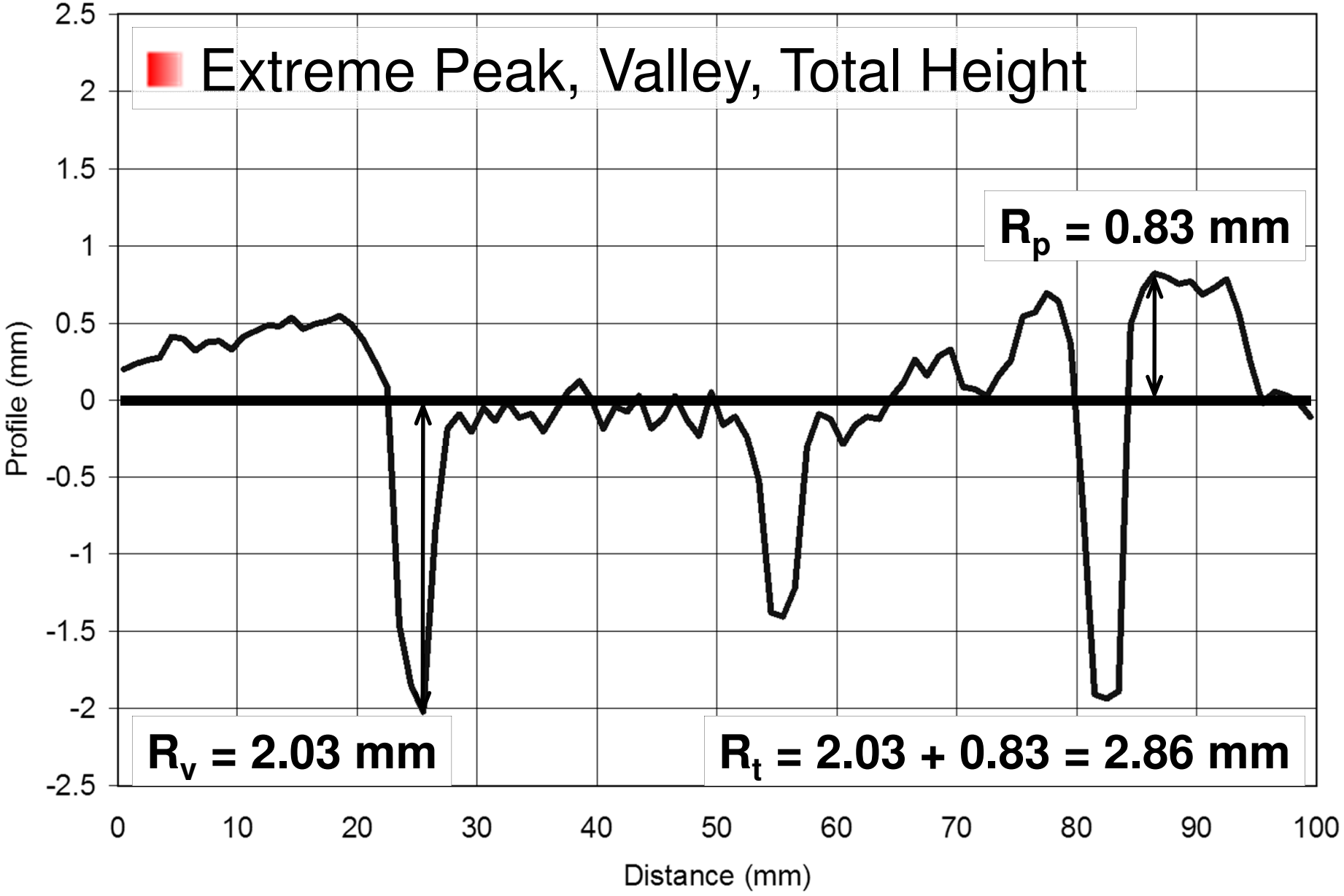


Same Average Height, RMS, Kurtosis, but...

Skewness is opposite sign.

Describing Texture – Height



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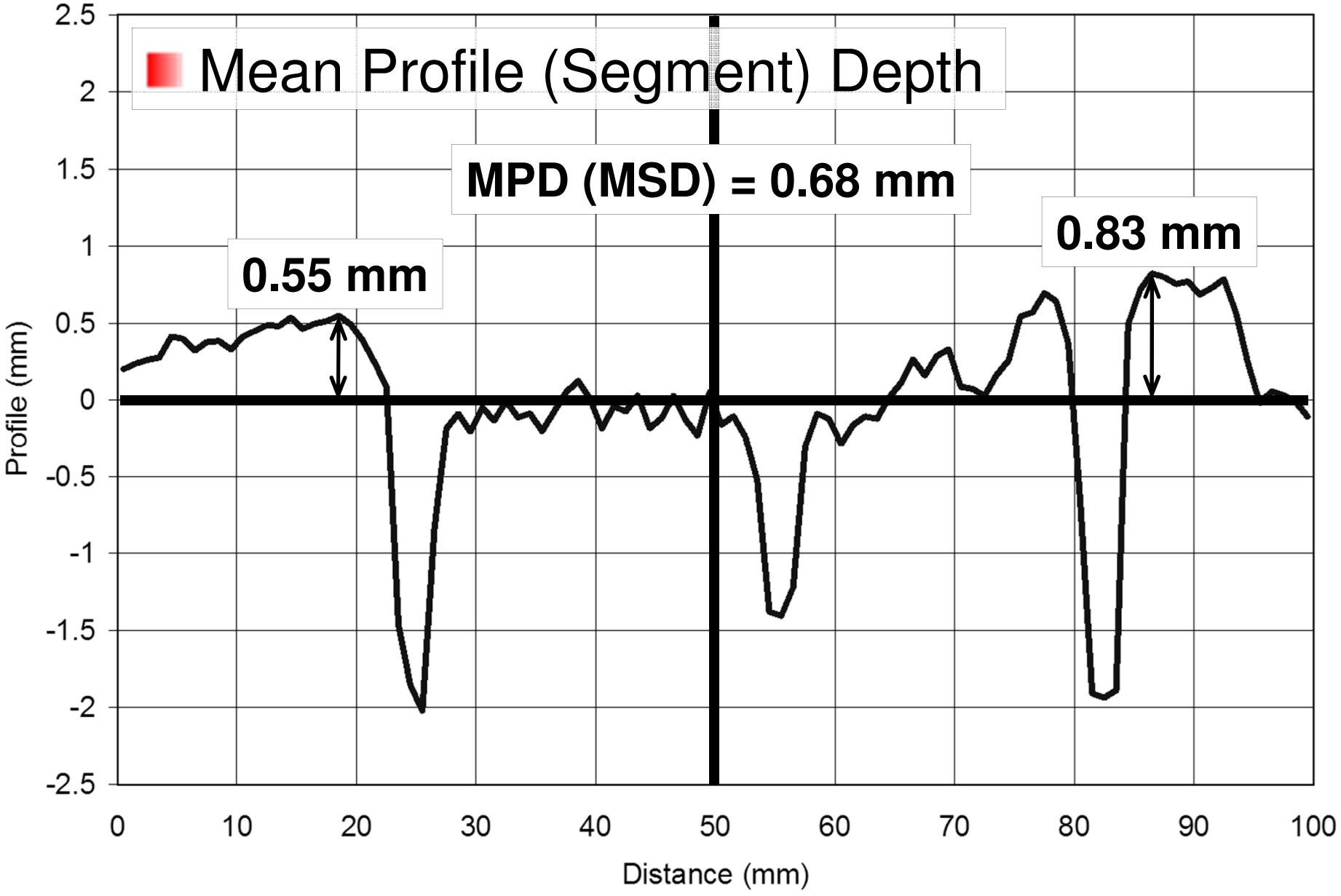

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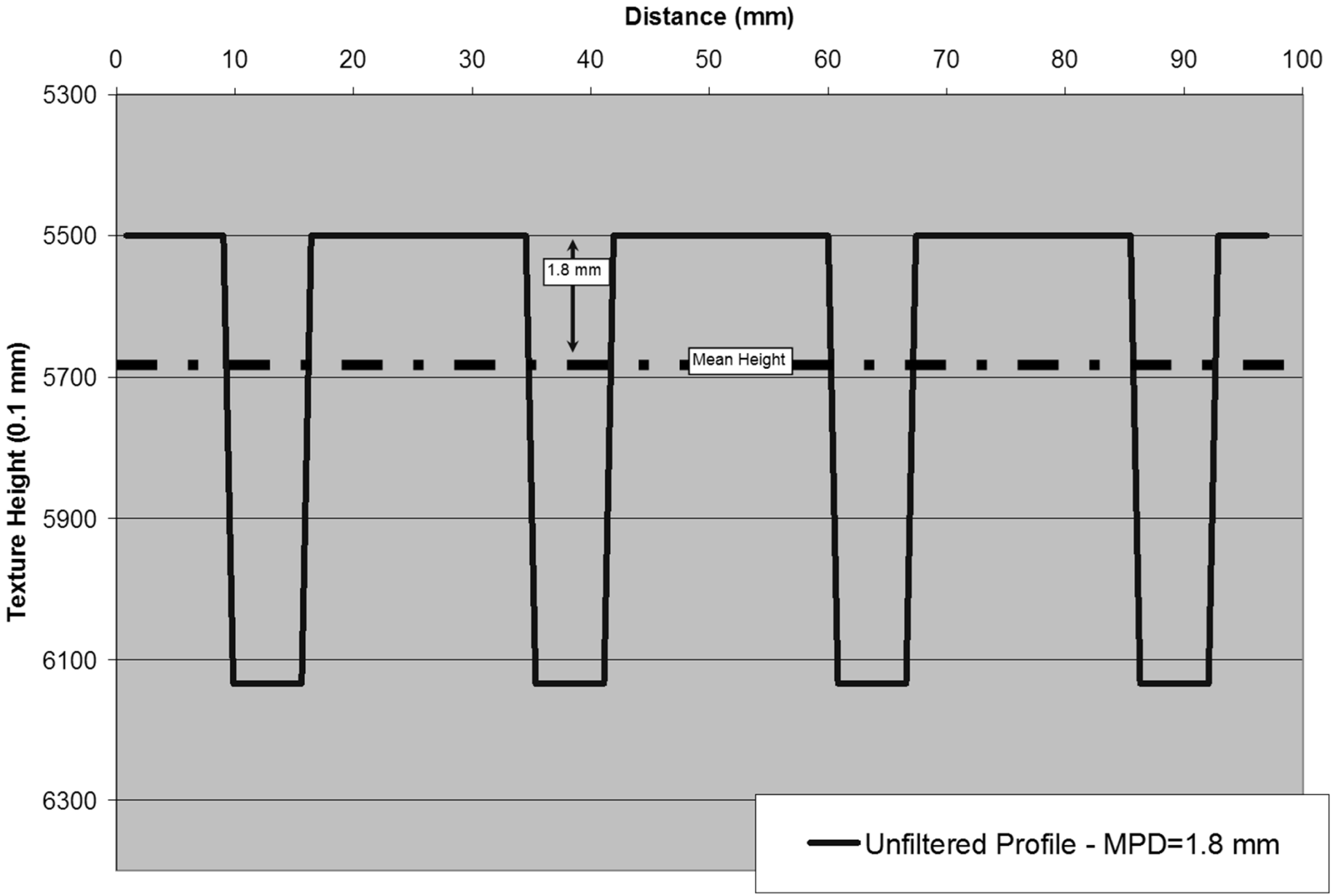

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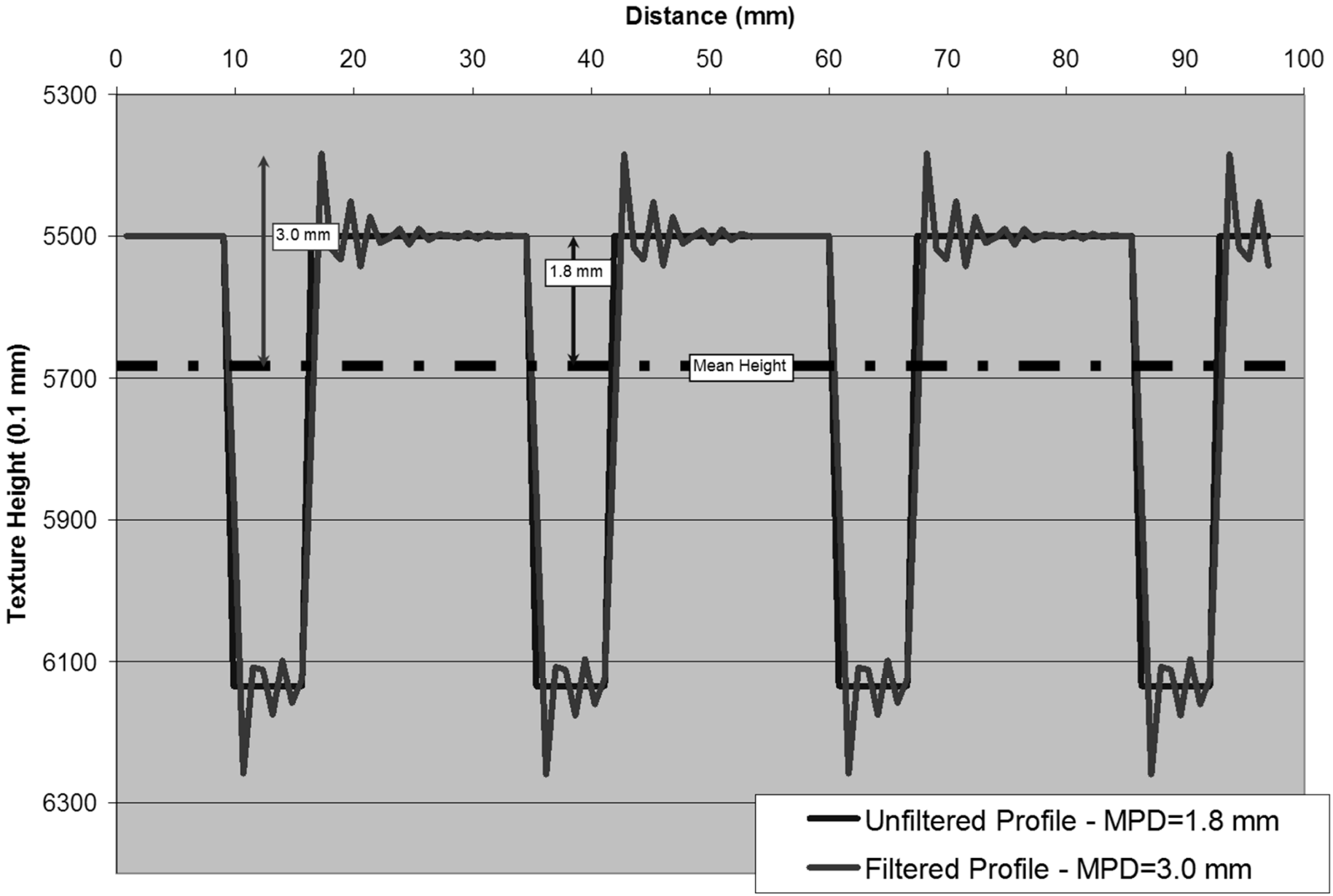

Describing Texture – Height

Skewness, Kurtosis, and MPD are sensitive to “extreme” peaks and/or valleys...

...both real or artifacts from the measurement or analysis.

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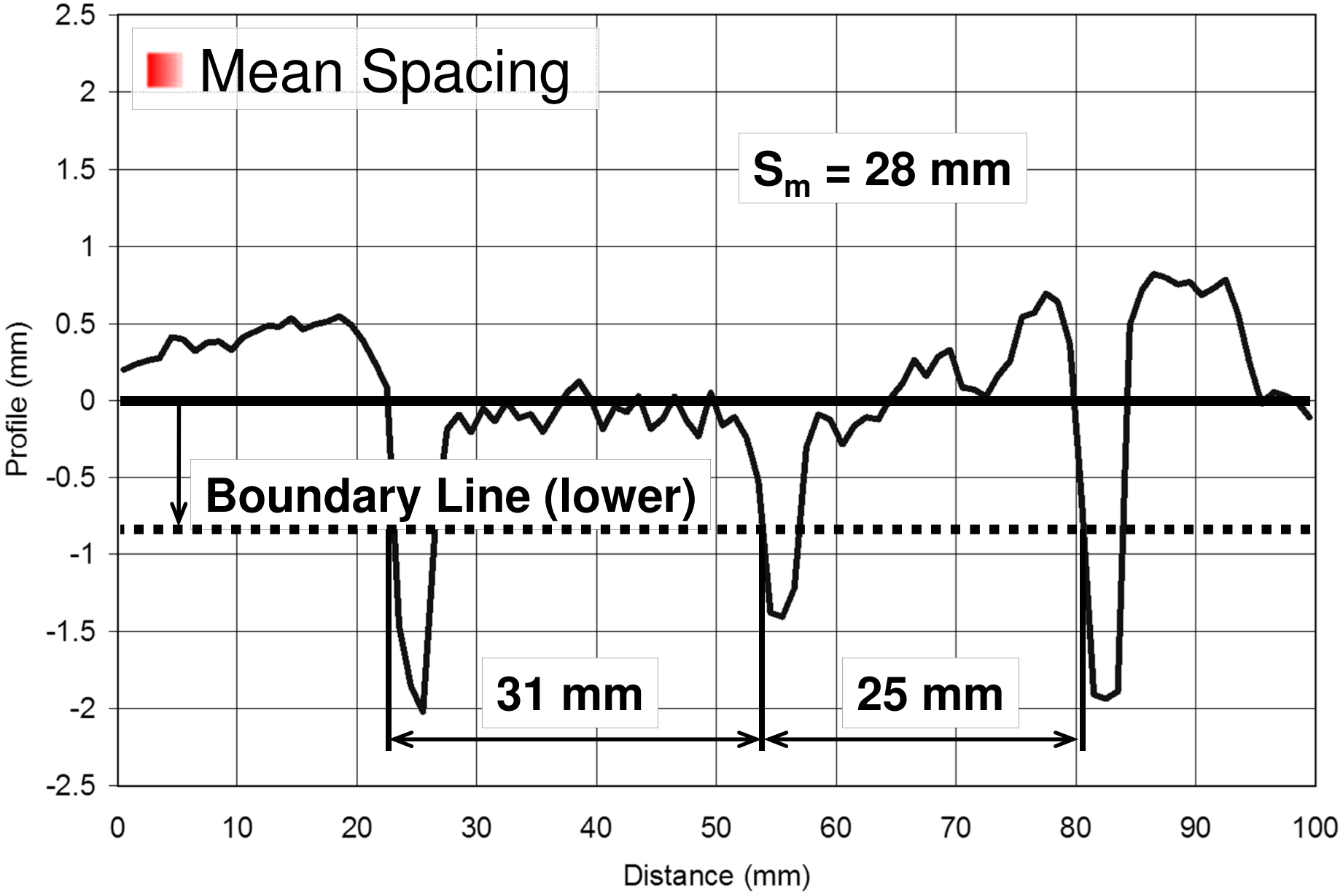
Describing Texture – Spacing



Describing Texture

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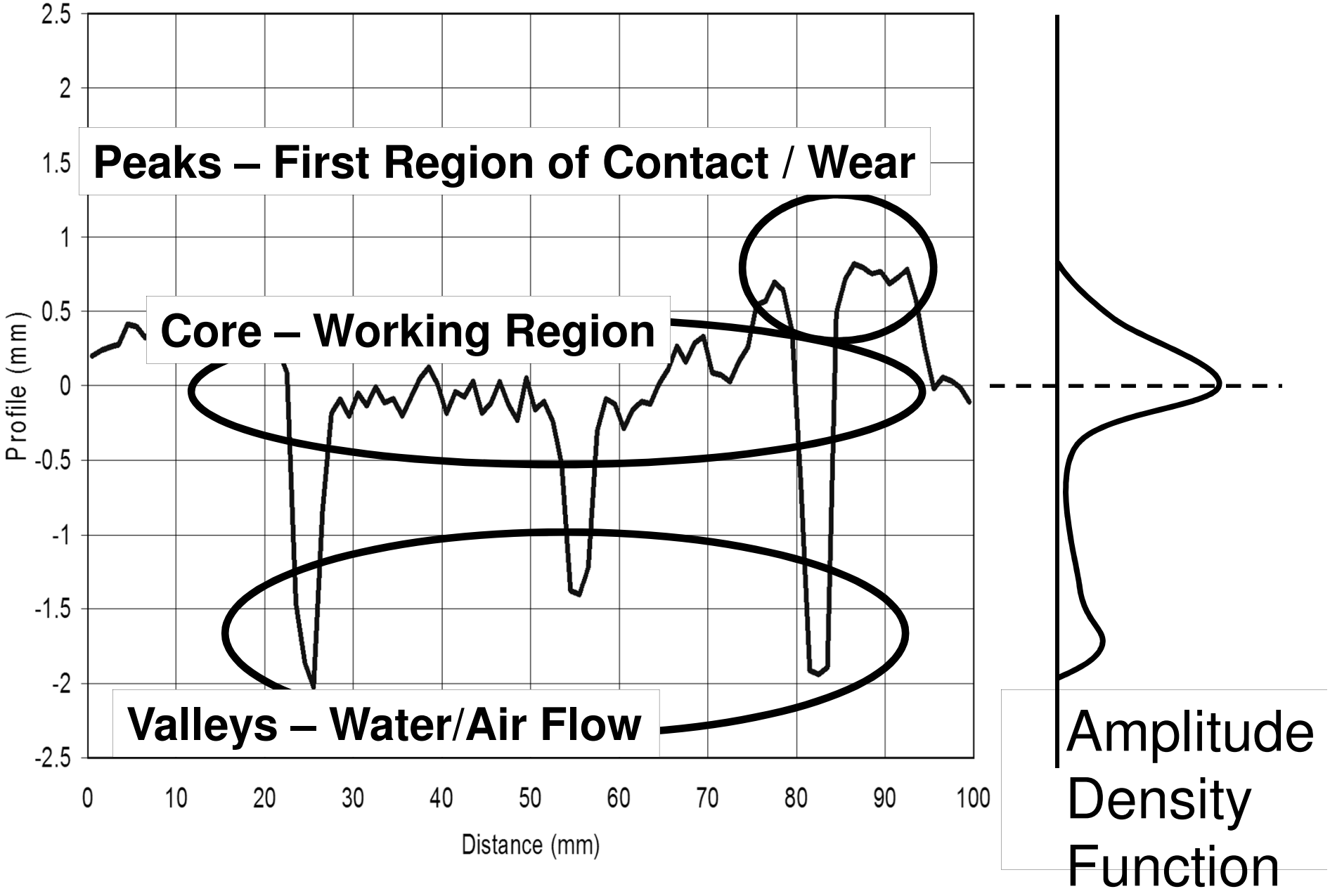
Describing Texture – Functional



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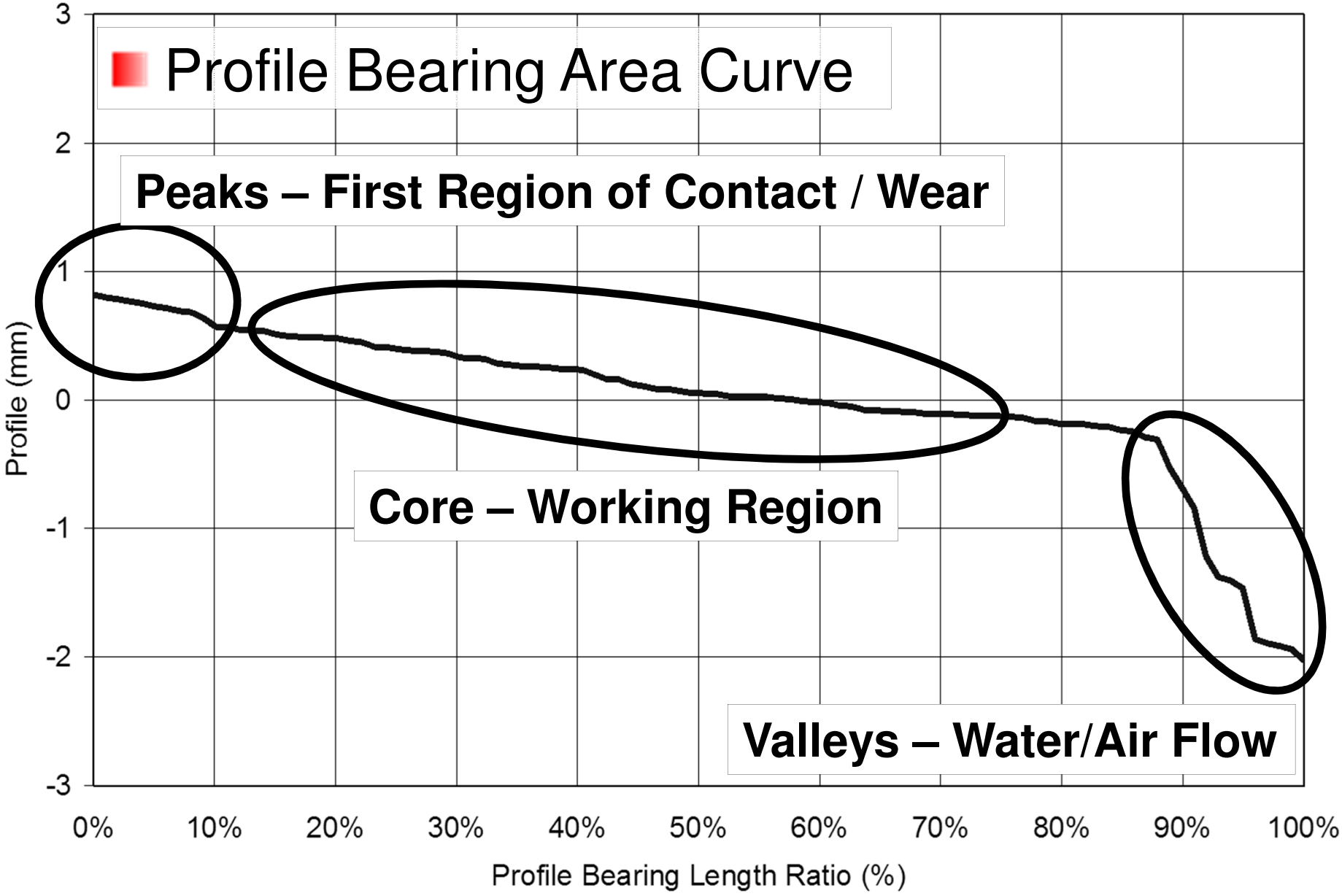

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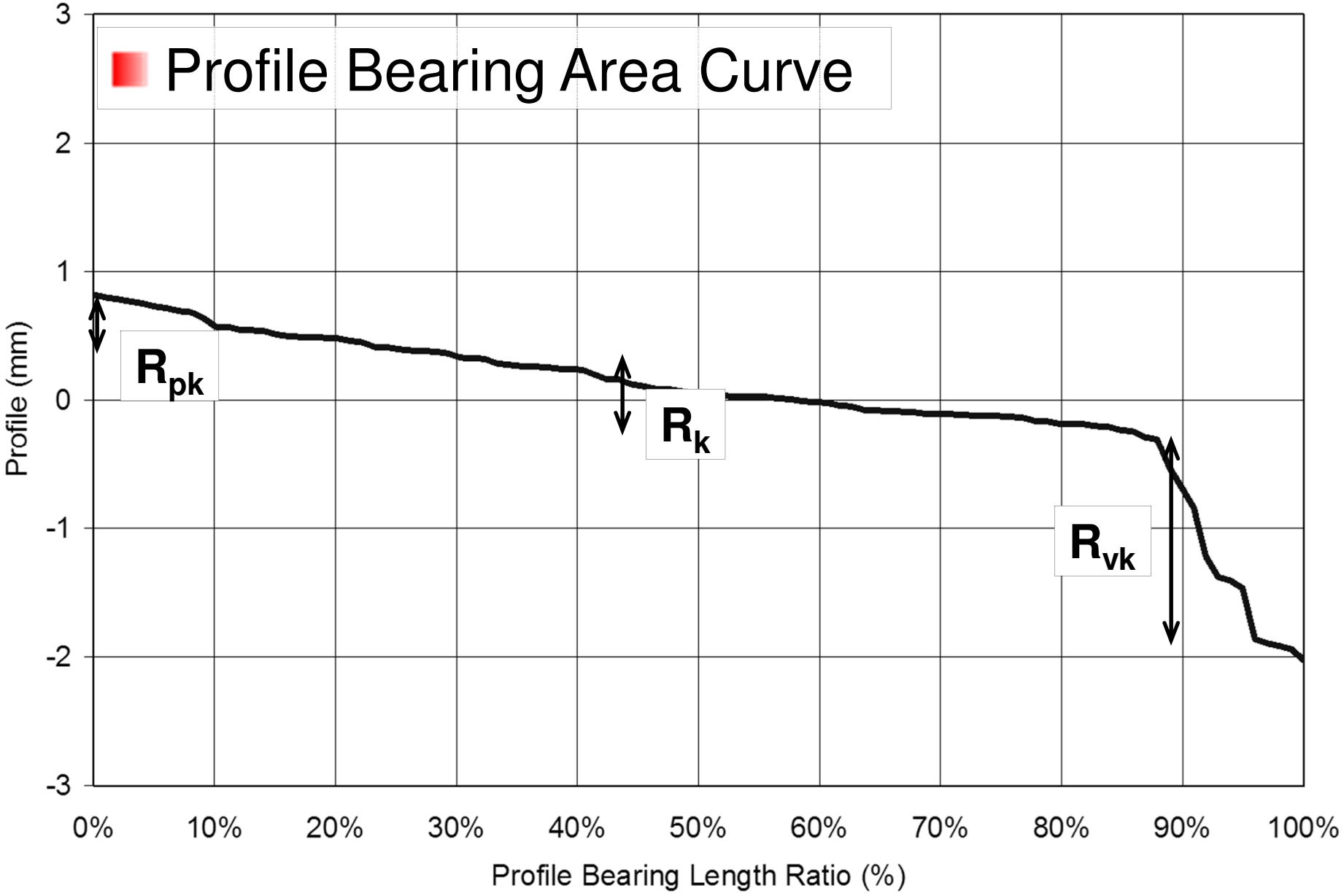

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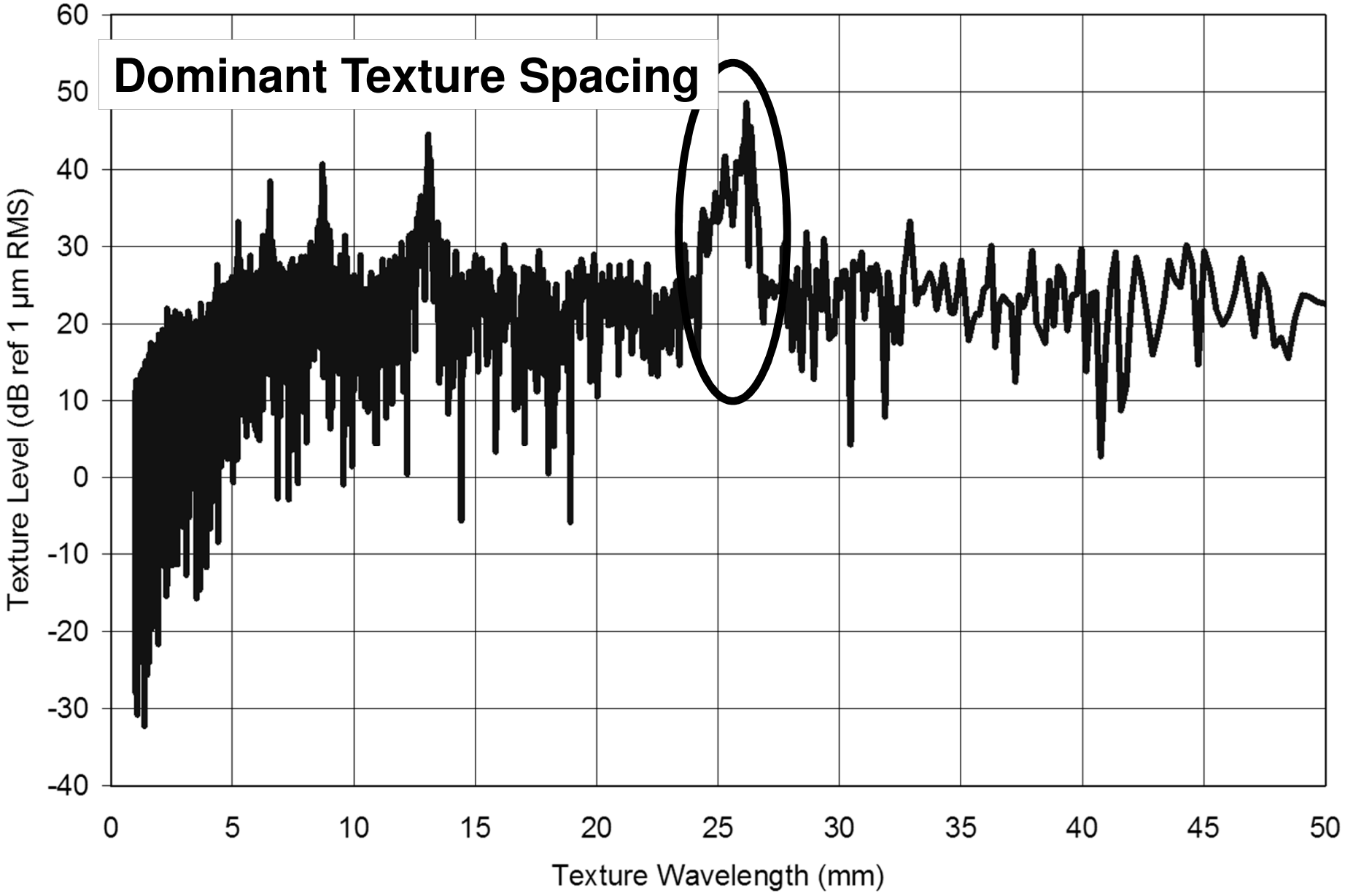

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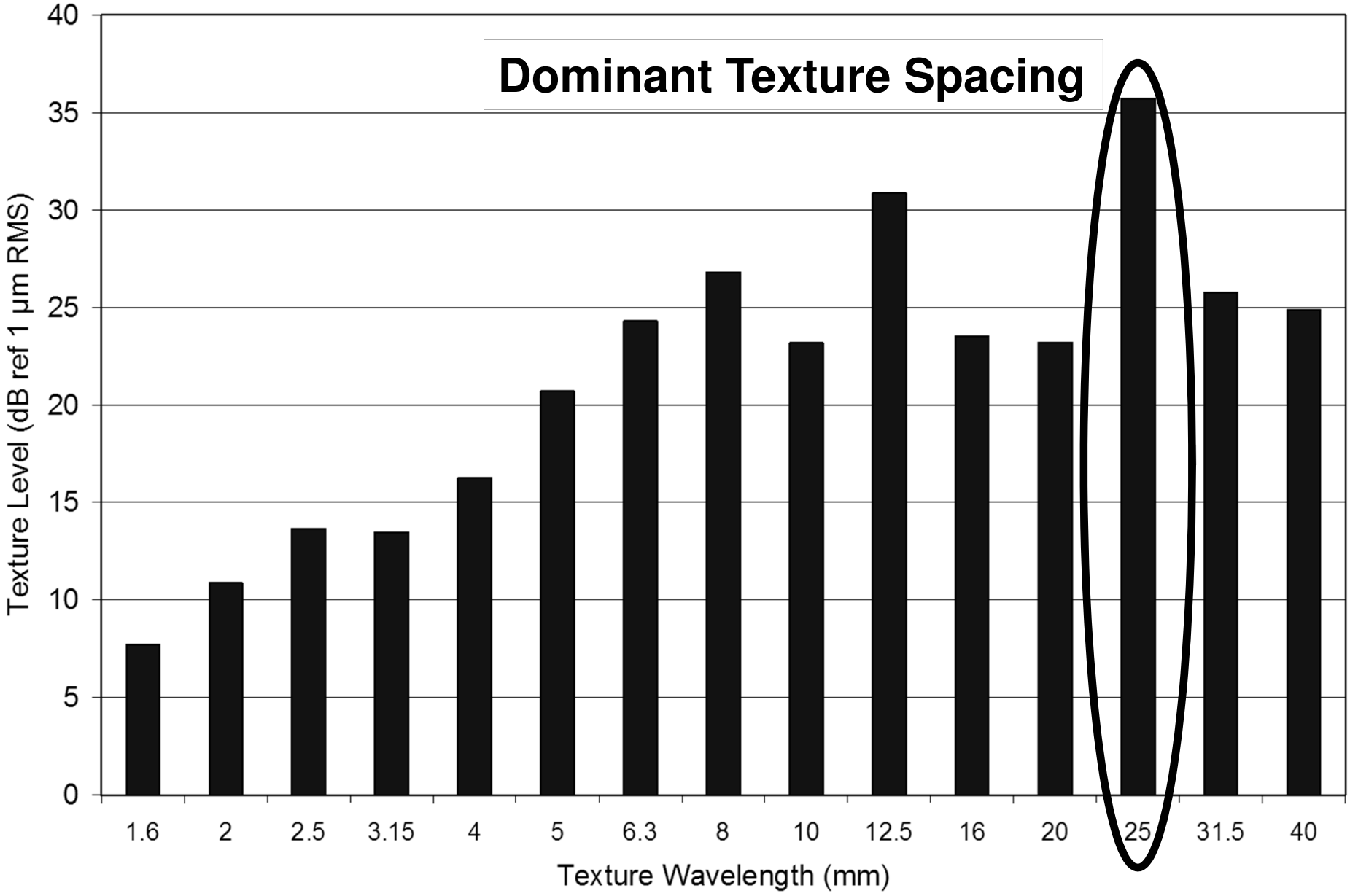
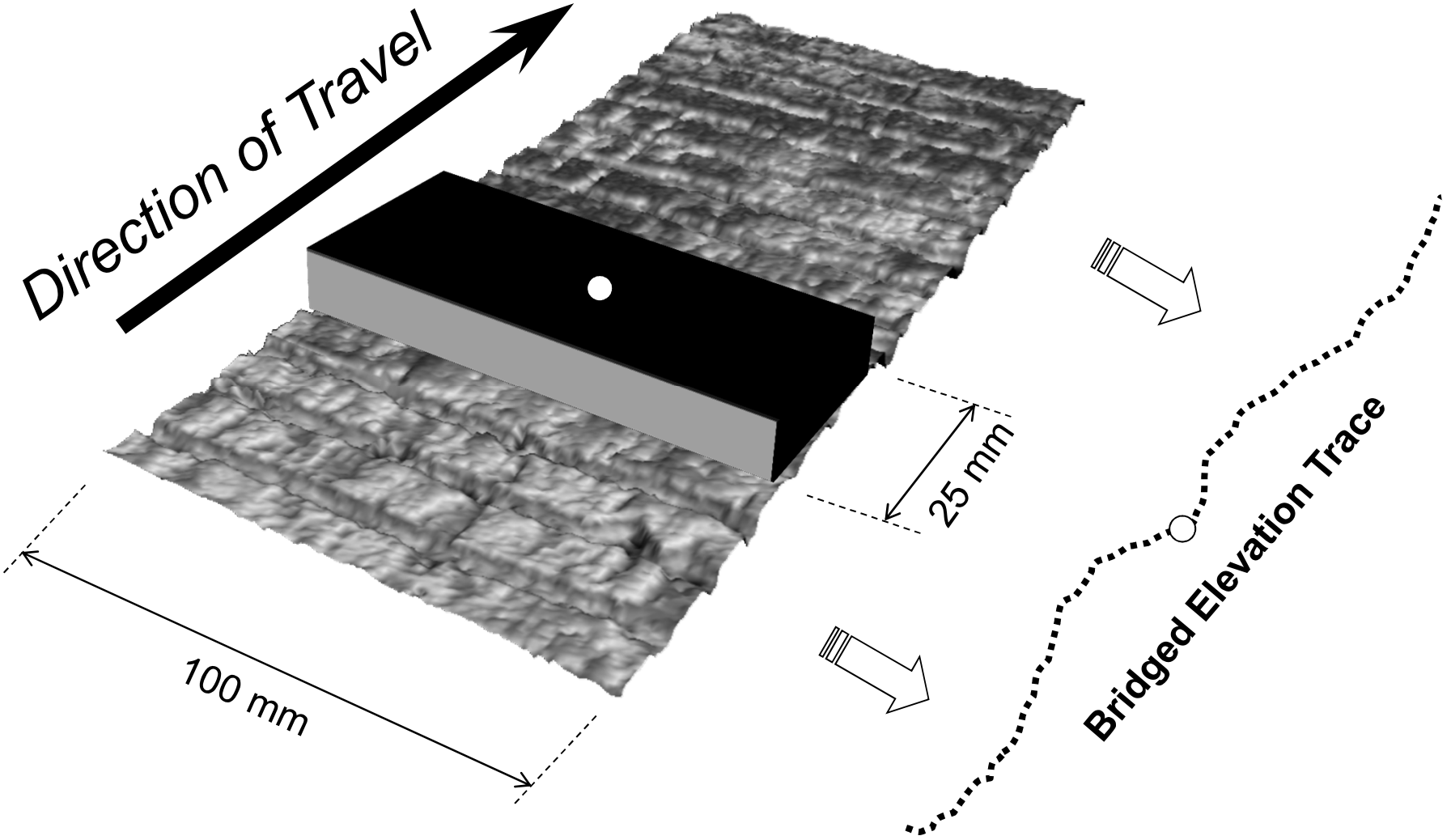


Describing Texture – Spectral

- Envelopment Filtering



Some Closing Thoughts

- Limitations of “Peak” Metrics
  - Relevance
  - Measurement and filtering artifacts
- Envelopment Filtering
  - Relevant to response of interest
  - Impregnation of tire
  - Void spaces below tire
- 2D versus 3D
  - Anisotropic textures
  - Bi-directional or areal metrics
- Extreme surfaces
  - Porous surfaces and/or deep texture
  - Glossy surfaces

Thank You!!!