Addressing Localized Roughness at the Project Level

by

Gary Higgins

Earth Engineering Consultants, LLC

4396 Greenfield Drive

Windsor, Colorado 80550

Outline

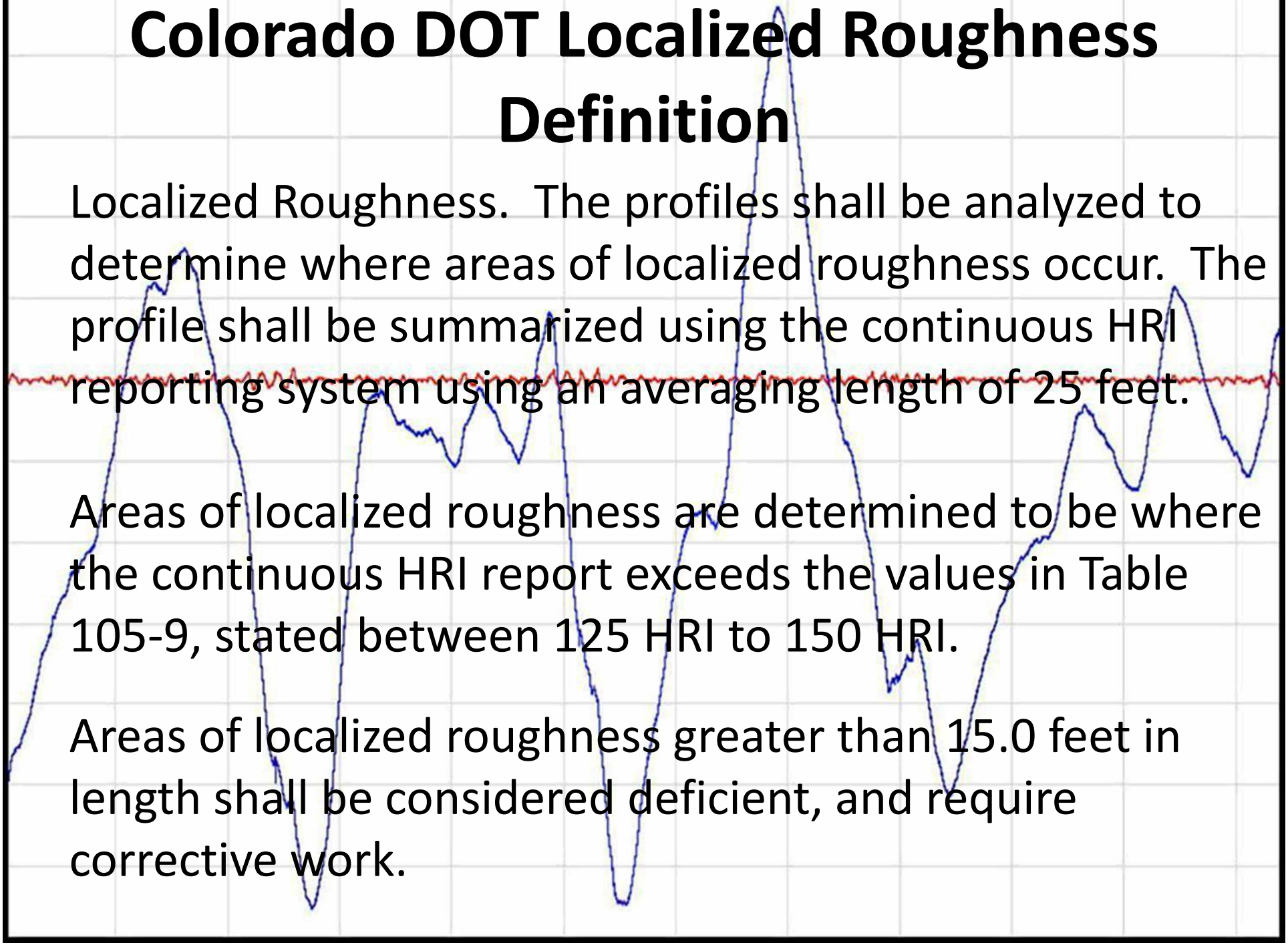
- How effective have we been at correcting localized roughness at the project level?
- Compare localized roughness reports from Colorado 2012 paving projects to ProVAL grinding simulation SAM using actual project data.
- Results indicate identified localized roughness areas are not consistently corrected.
- Is it possible to identify and correct all areas of defined localized roughness?
- Should AASHTO/agency specify a method for locating defined roughness?

Colorado DOT Localized Roughness Definition

Localized Roughness. The profiles shall be analyzed to determine where areas of localized roughness occur. The profile shall be summarized using the continuous HRI reporting system using an averaging length of 25 feet.

Areas of localized roughness are determined to be where the continuous HRI report exceeds the values in Table 105-9, stated between 125 HRI to 150 HRI.

Areas of localized roughness greater than 15.0 feet in length shall be considered deficient, and require corrective work.



Summary of Localized Roughness from Various 2012 Colorado Asphalt Projects*

Deficient locations before grinding		Deficient locations after grinding	% Improvement
Total	706	548	22.38%
125 to 150 HRI	368	331	10.05%
150 to 175 HRI	166	141	15.06%
175 to 200 HRI	79	48	39.24%
Over 200 HRI	93	28	69.89%

*Data provided by Colorado DOT from various projects and multiple certified profilers. Data represents approximately 115 lane miles of new/rehabilitated pavement.

Summary of Localized Roughness ProVAL SAM Prediction *

Deficient locations before grinding		Deficient locations after grinding	% Improvement
Total	706	229	67.56%
125 to 150 HRI	368	123	66.58%
150 to 175 HRI	166	60	63.86%
175 to 200 HRI	79	22	72.15%
Over 200 HRI	93	24	74.19%

*Data provided by CDOT from various projects and multiple certified profilers. Data represents approximately 115 lane miles of new/rehabilitated pavement.

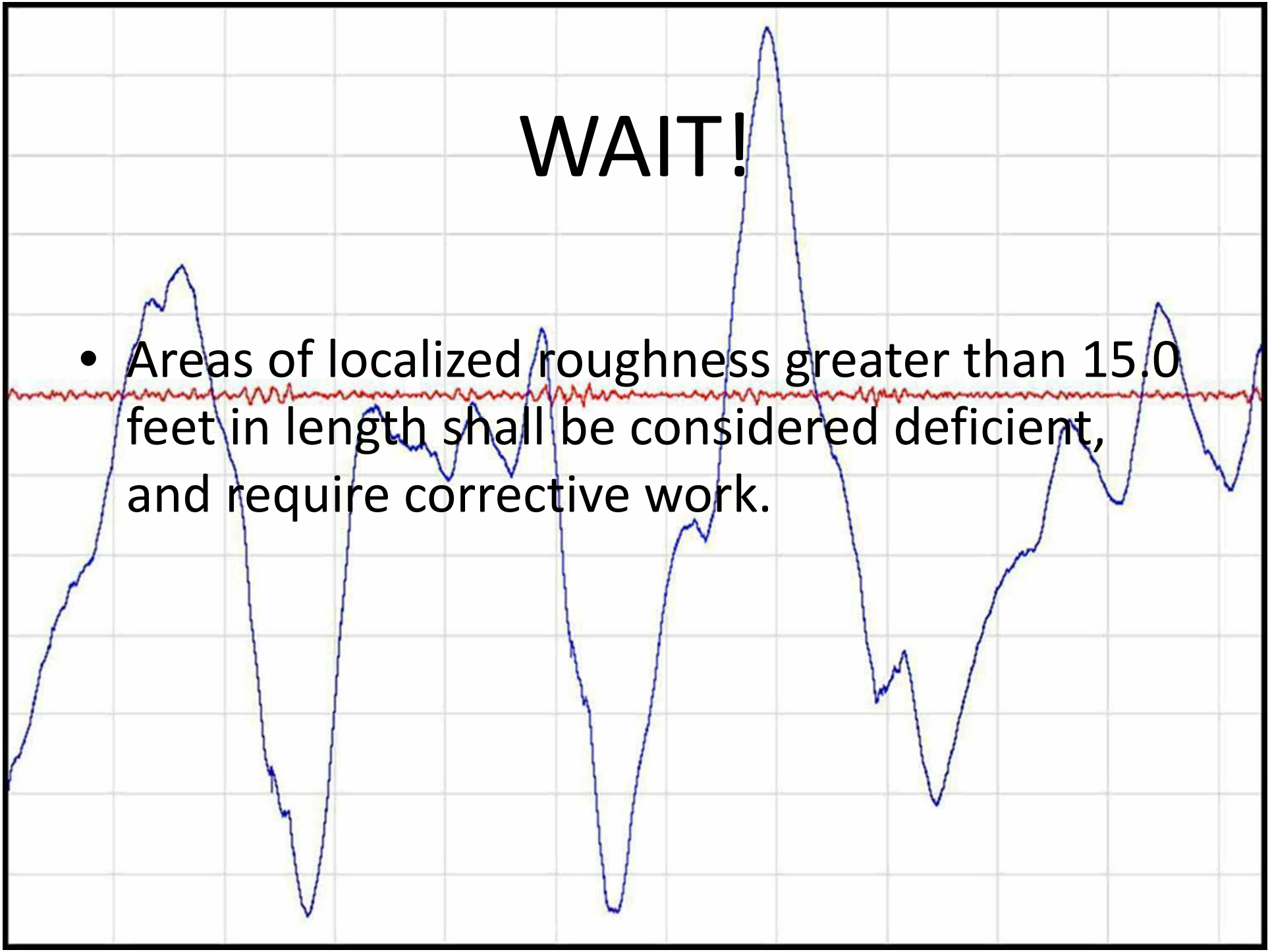
Compare After Grind Localized Roughness to ProVAL SAM Prediction *

Deficient locations before grinding		Deficient locations after grinding from project data (% Improvement)	ProVAL SAM predicted deficient locations after grinding (SAM predicted % Improvement)
Total	706	548 (22.38%)	229 (67.56%)
125 to 150 HRI	368	331 (10.05%)	123 (66.58%)
150 to 175 HRI	166	141 (15.06%)	60 (63.86%)
175 to 200 HRI	79	48 (39.24%)	22 (72.15%)
Over 200 HRI	93	28 (69.89%)	24 (74.19%)

*Data provided by CDOT from various projects and multiple certified profilers. Data represents approximately 115 lane miles of new/rehabilitated pavement.

WAIT!

- Areas of localized roughness greater than 15.0 feet in length shall be considered deficient, and require corrective work.



Localized Roughness Greater Than 15 ft. Length*

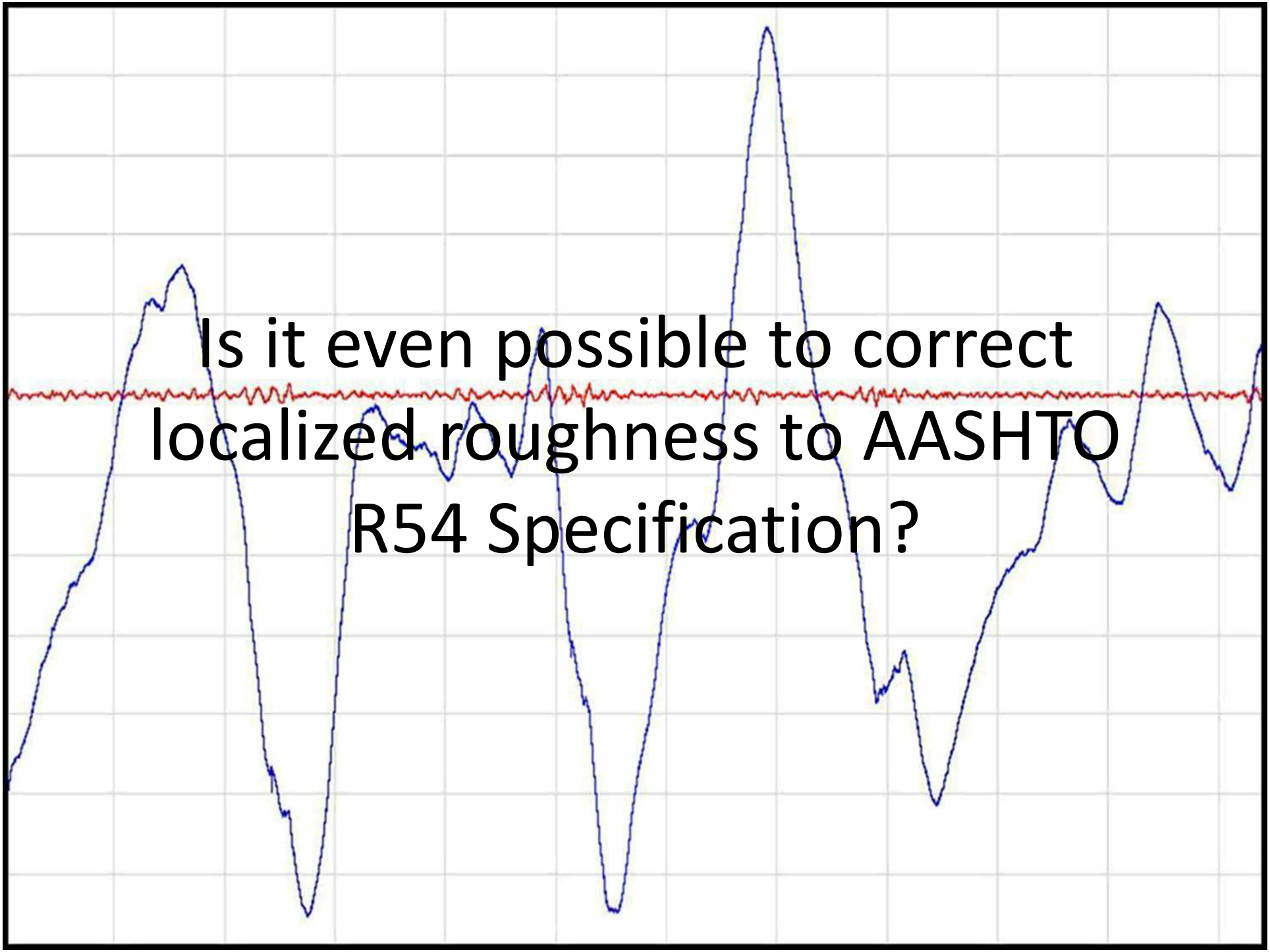
	Deficient locations – No minimum length of roughness	Deficient locations – 15 foot minimum length of roughness	Percent reduction in deficient areas of localized roughness
Total	706	289	59.07%
125 to 150 HRI	368	13	96.47%
150 to 175 HRI	166	105	36.75%
175 to 200 HRI	79	78	0.01%
Over 200 HRI	93	93	0.00%

*Data provided by CDOT from various projects and multiple certified profilers. Data represents approximately 115 lane miles of new/rehabilitated pavement.

Compare After Grind Localized Roughness Greater Than 15 ft. to ProVAL SAM Prediction*

Deficient locations before grinding		Deficient locations after grinding from project data (% Improvement)	ProVAL SAM predicted deficient locations after grinding (SAM predicted % Improvement)
Total	289	153 (47.06%)	90 (68.86%)
125 to 150 HRI	13	7 (46.15%)	4 (69.23%)
150 to 175HRI	105	71 (32.38%)	40 (61.90%)
175 to 200HRI	78	46 (41.03%)	24 (69.23%)
Over 200 HRI	93	29 (68.82%)	22 (76.34%)

*Data provided by CDOT from various projects and multiple certified profilers. Data represents approximately 115 lane miles of new/rehabilitated pavement.


Is it even possible to correct localized roughness to AASHTO R54 Specification?

Summary of Localized Roughness Earth Engineering Project*

Deficient locations before grinding		Deficient locations after grinding from project data (% Improvement)	ProVAL SAM predicted deficient locations after grinding (SAM predicted % Improvement)
Total	315	150 (52.38%)	138 (56.19%)
125 to 150 HRI	195	103 (47.18%)	92 (52.82%)
150 to 175HRI	48	27 (43.75%)	24 (50.00%)
175 to 200HRI	25	10 (60.00%)	11 (56.00%)
Over 200 HRI	47	10 (78.72%)	11 (76.60%)

*Data collected by Earth Engineering Consultants, LLC personnel. Data represents approximately 26 lane miles of new asphalt pavement.

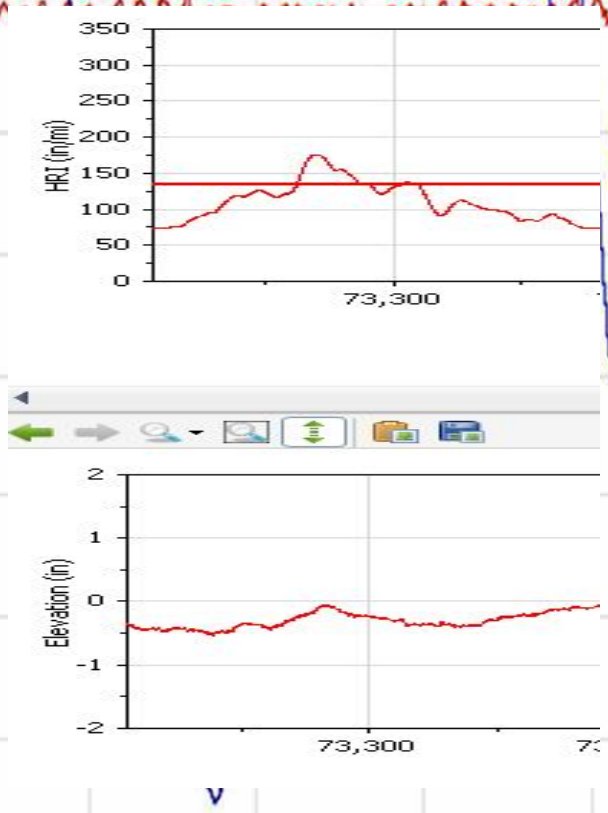
Localized Roughness Compared to ProVAL SAM Prediction*

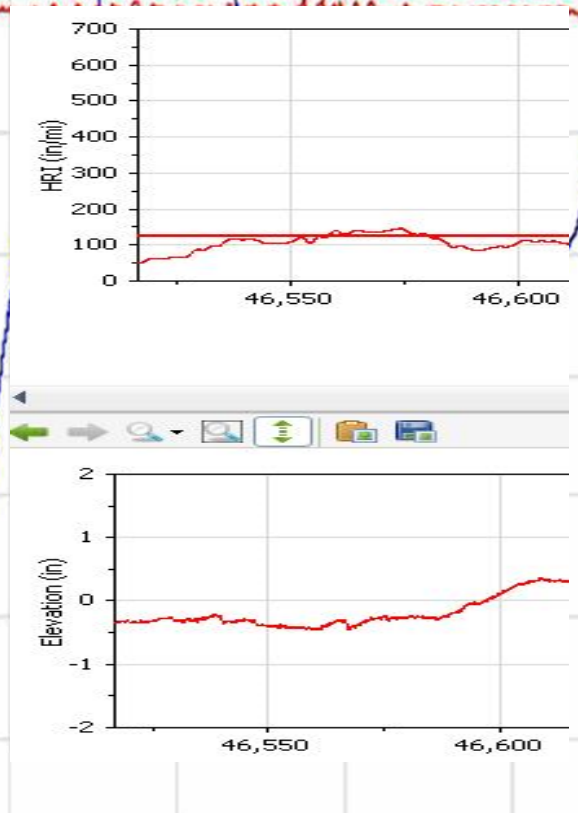
	CDOT Various 2012 Asphalt Projects Percent Improvement of deficient locations using AASHTO R54 definition	**CDOT Various 2012 Asphalt Projects** Percent Improvement of deficient locations using current CDOT definition	**EEC Asphalt Project** Percent Improvement of deficient locations using AASHTO R54 definition
Total	33.12%	68.34%	**93.22%**
125 to 150 HRI	15.10%	72.73%	**89.32%**
150 to 175HRI	23.58%	52.31%	**87.50%**
175 to 200HRI	54.39%	55.56%	**107.14%**
Over 200 HRI	**94.20%**	**90.14%**	**102.78%**

*After grinding field data compared to ProVAL SAM prediction as theoretical maximum for percent improvement calculation.

What is Required to Effectively Address Localized Roughness at the Project Level?

1) Localized roughness definition – Must be clear





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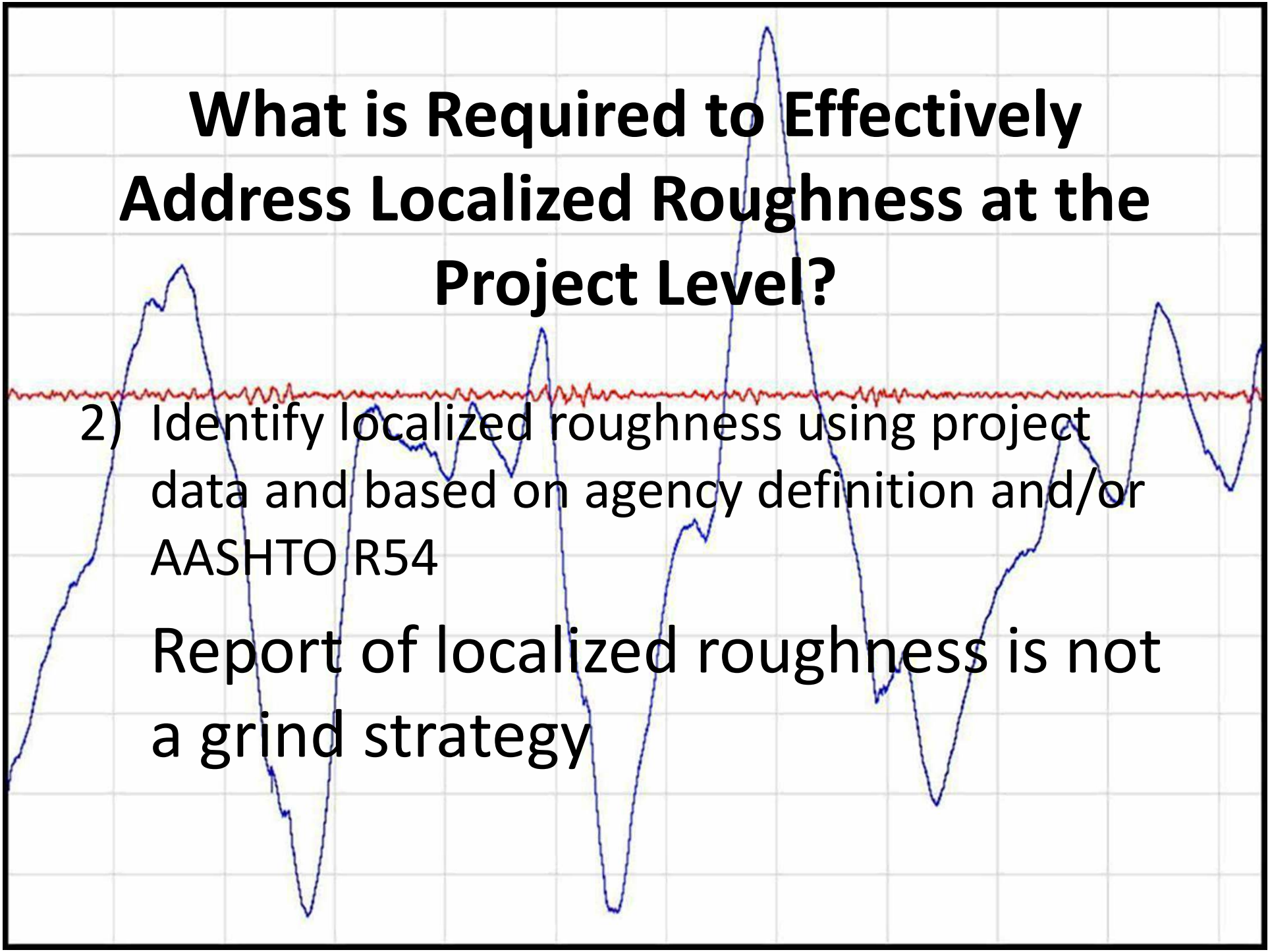
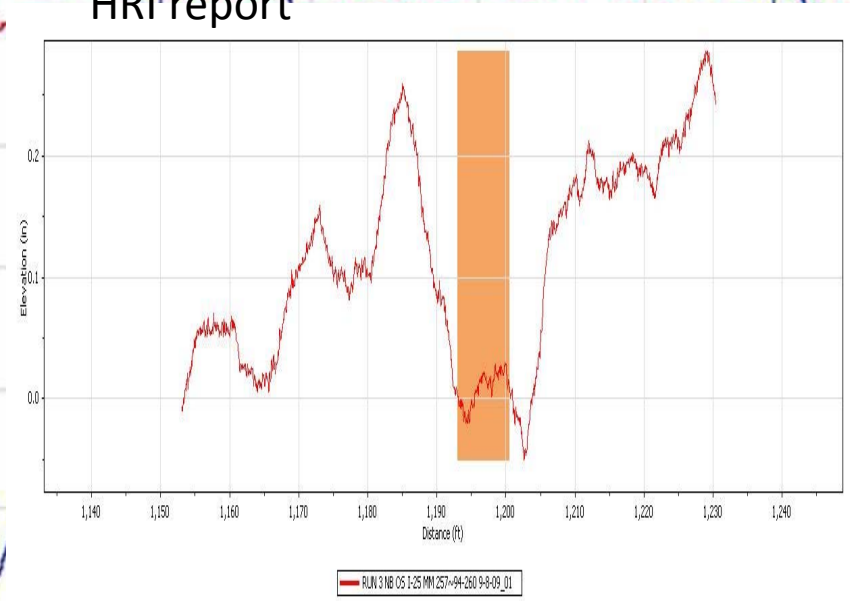


2) Identify localized roughness using project data and based on agency definition and/or AASHTO R54

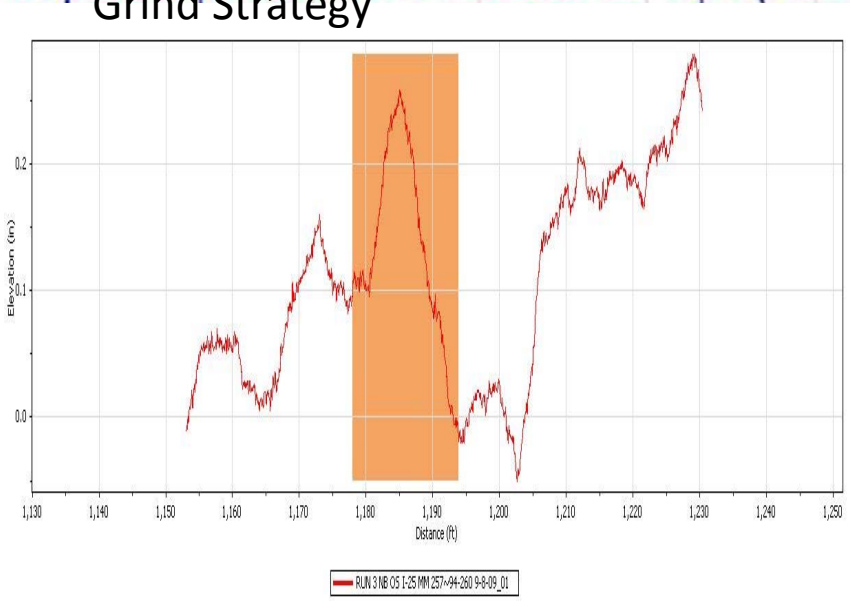
Report of localized roughness is not a grind strategy

Misunderstood
“There is Nothing There!”

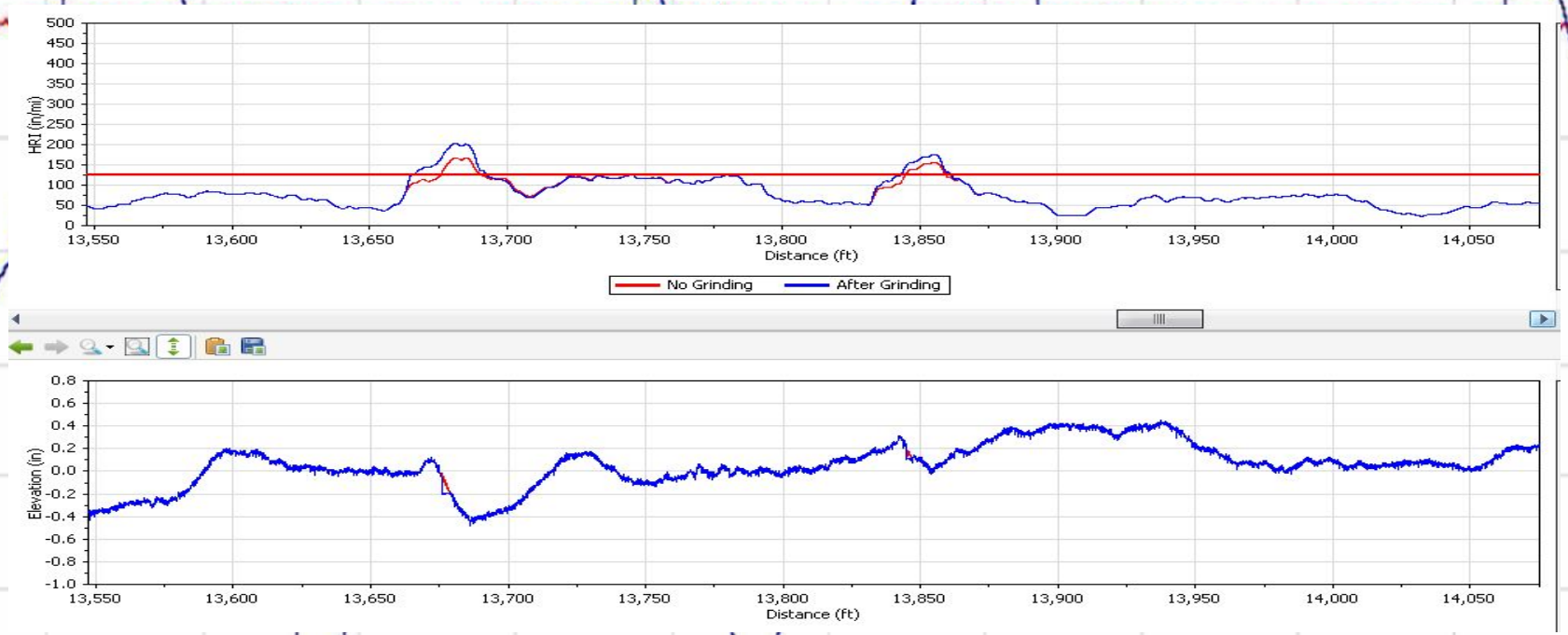
Localized roughness per Continuous HRI report



Localized roughness per ProVAL Grind Strategy

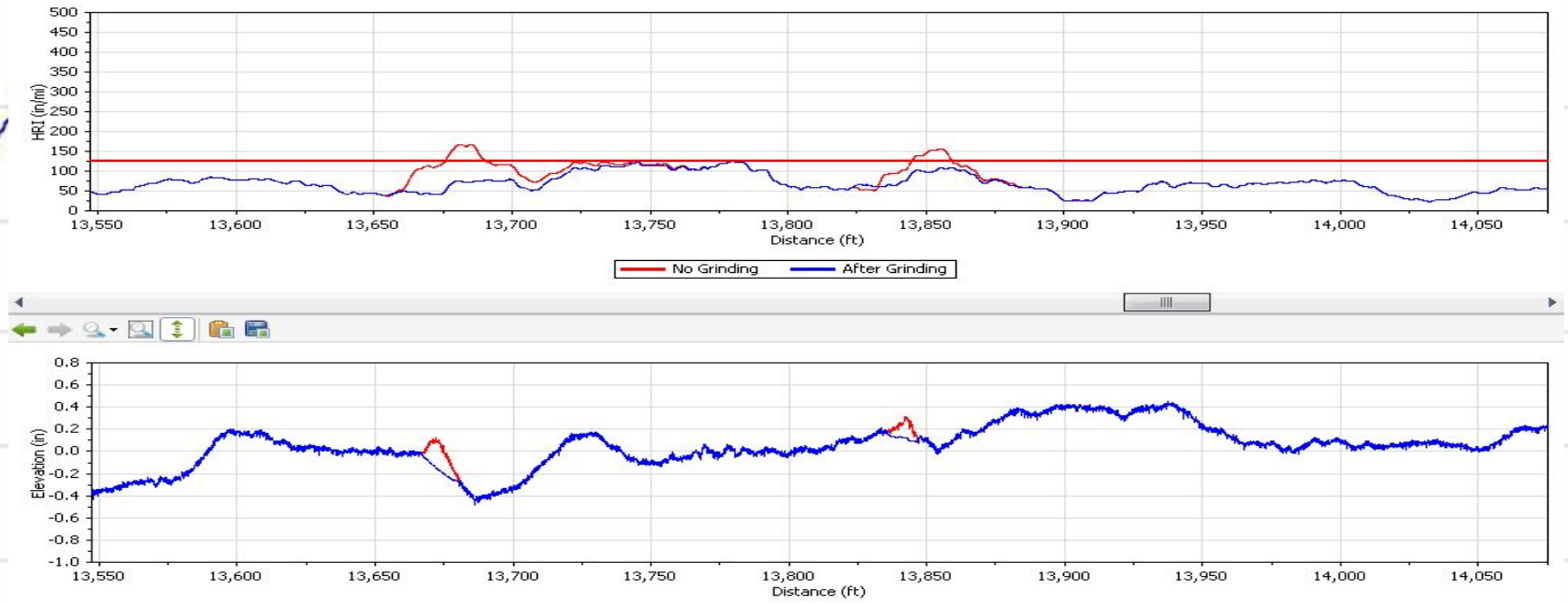


Misunderstood
“ProVAL Makes the Roughness Worse!”



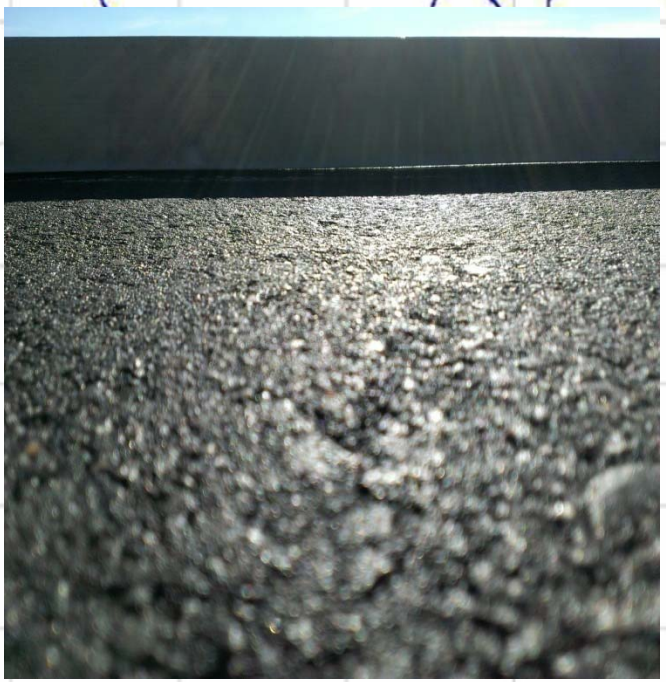
What is Required to Effectively Address Localized Roughness at the Project Level?

3) Grind strategy – Absolutely, who should generate report? RE, Contractor or Profiler Operator/Consultant?



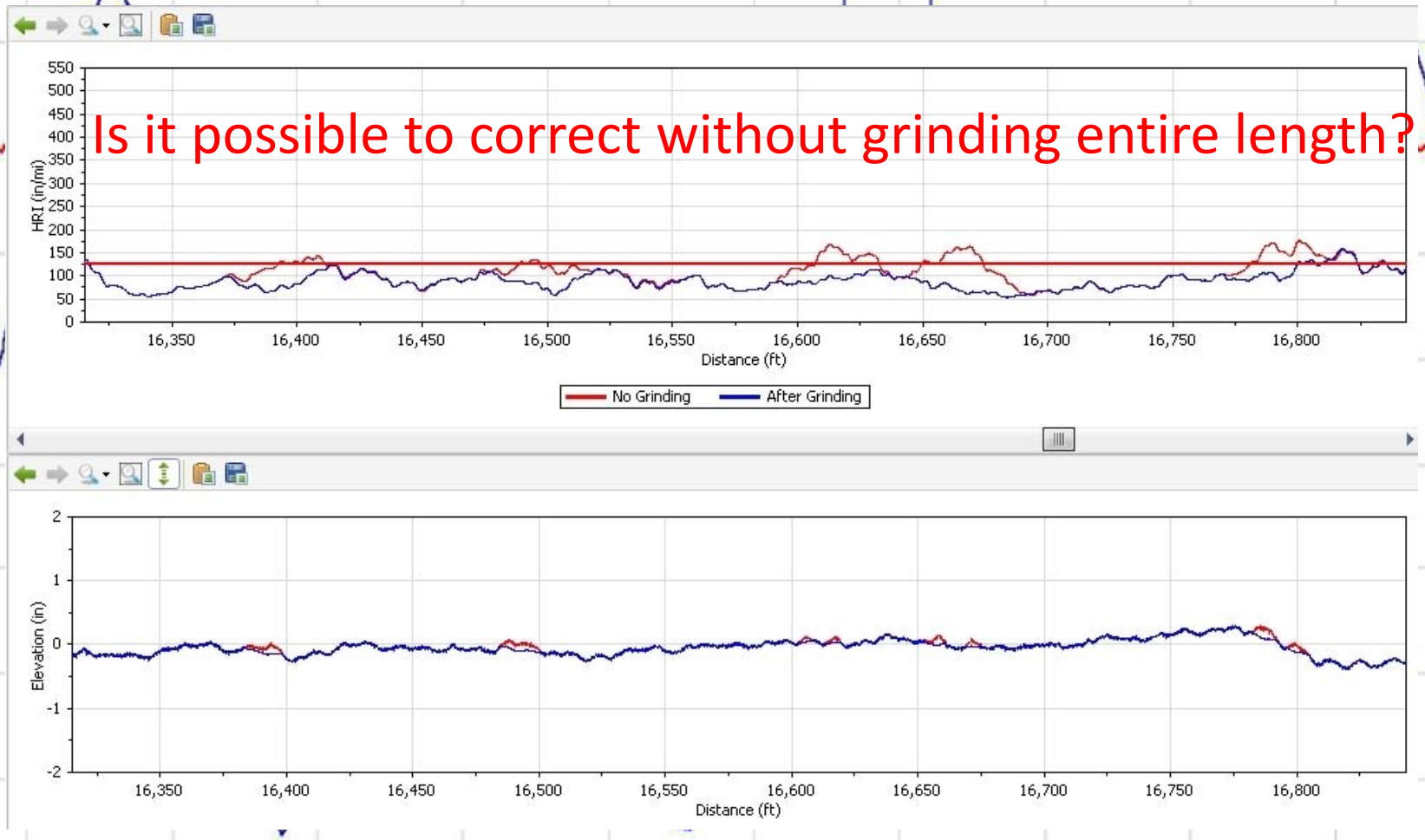
What is Required to Effectively Address Localized Roughness at the Project Level?

4) Field locate roughness for grinding: who should perform; Straight edge; Profiler; RE?



Identify Surface Features for Grinding

Straight edge will not differentiate area requiring grinding

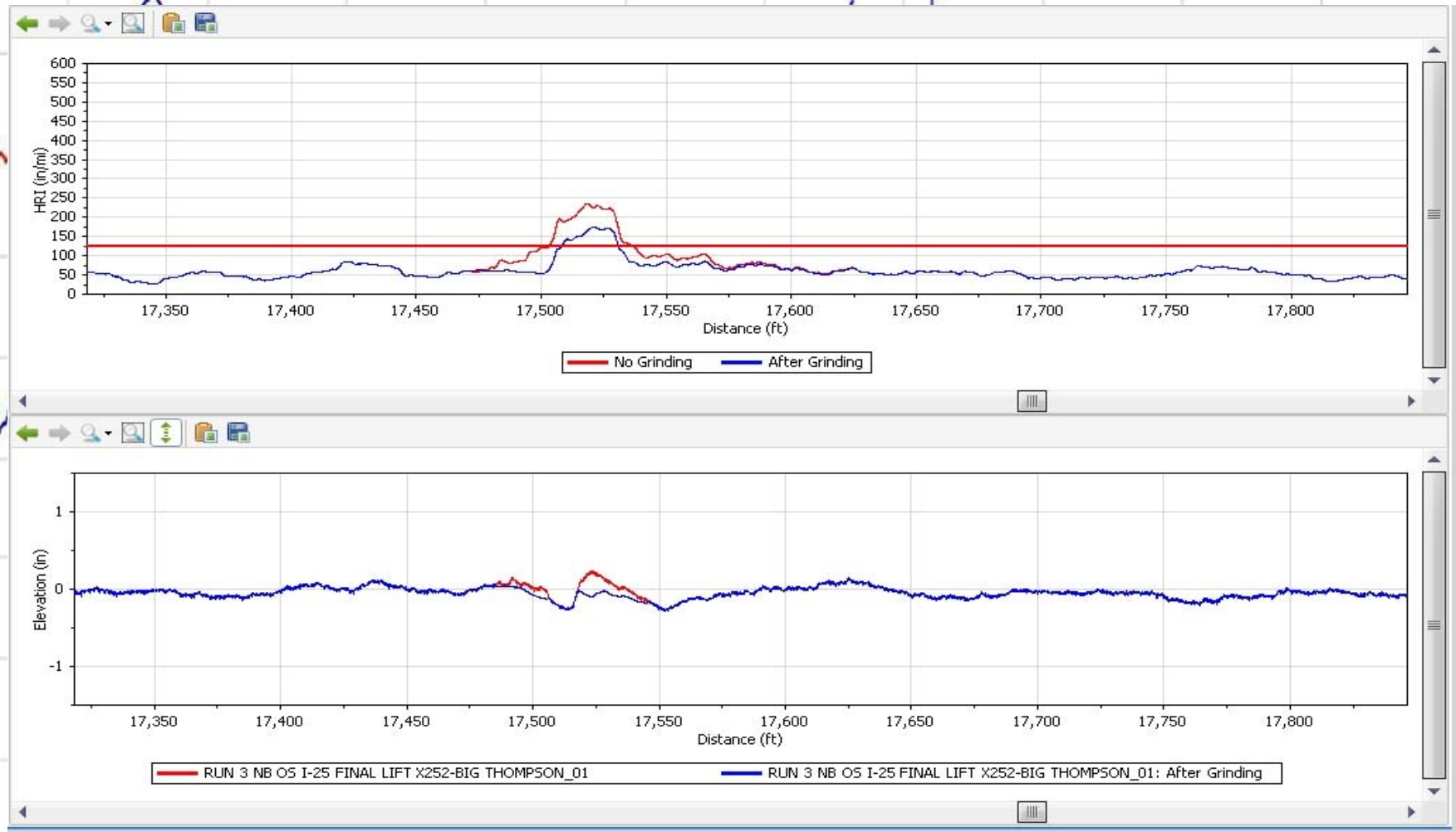


What is Required to Effectively Address Localized Roughness at the Project Level?

5) Grind and re-profile - check after grind surface features for results and effective grinding

How Do You Know Where To Start And Stop Grind

Visual Confirmation



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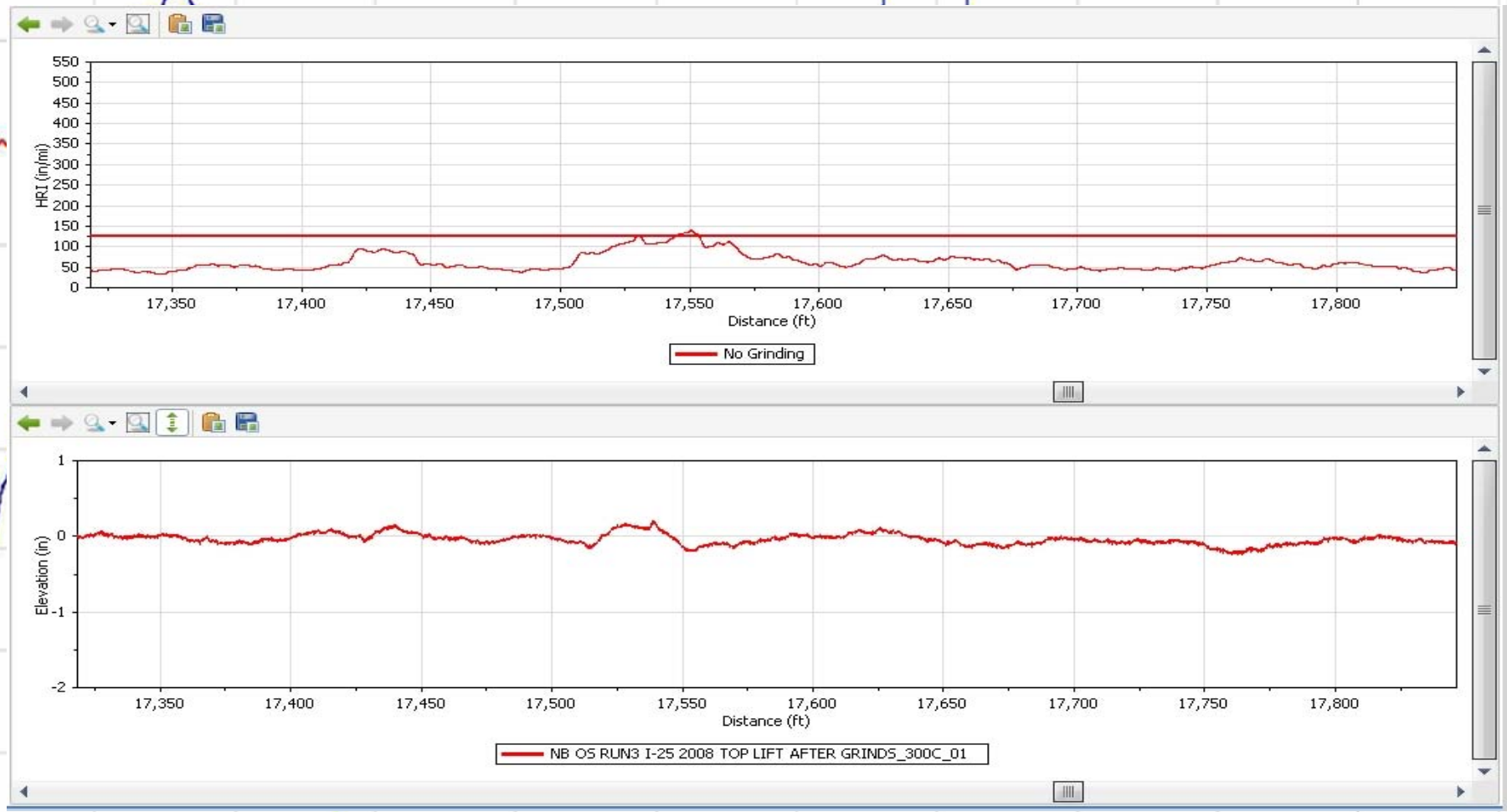

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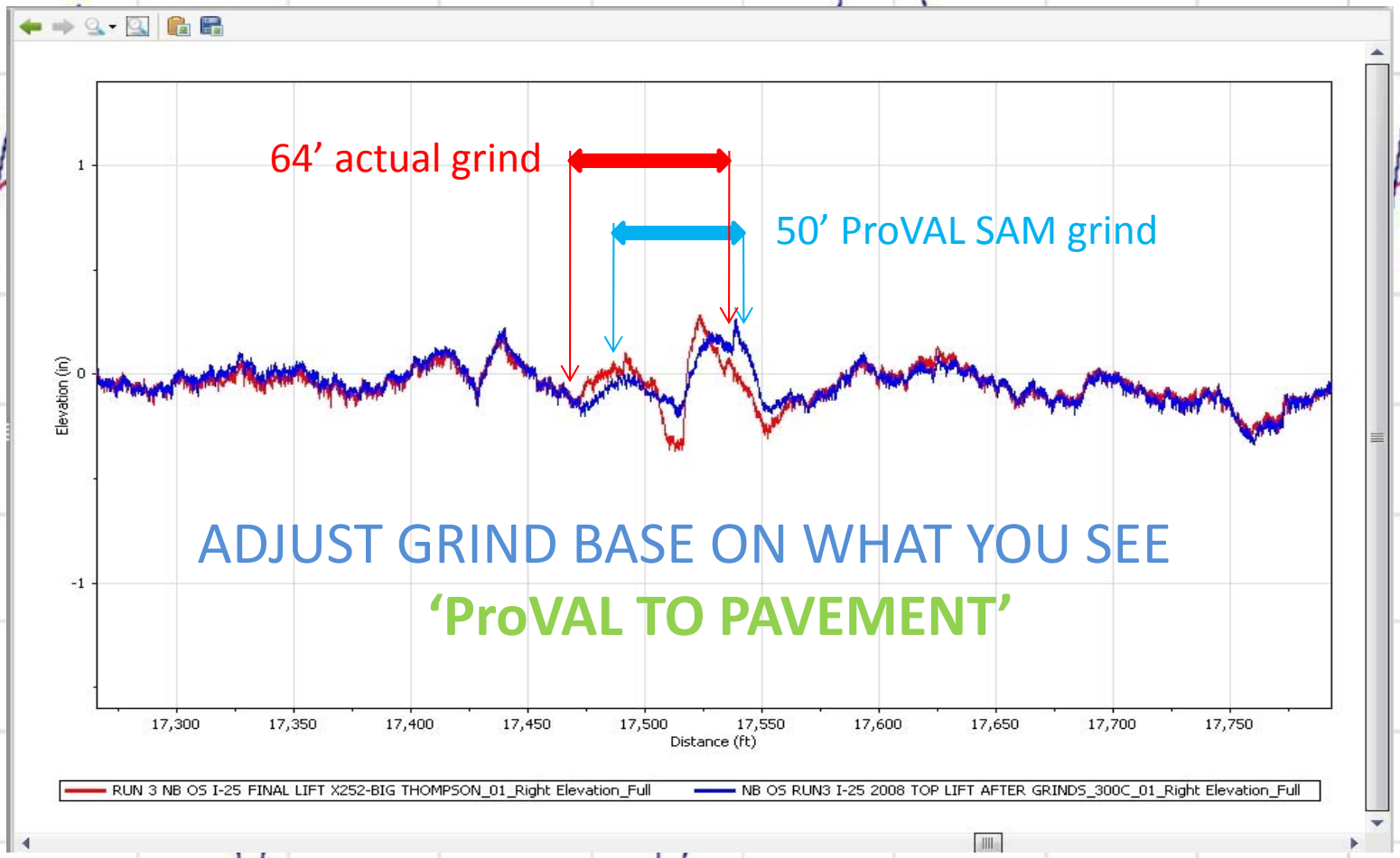
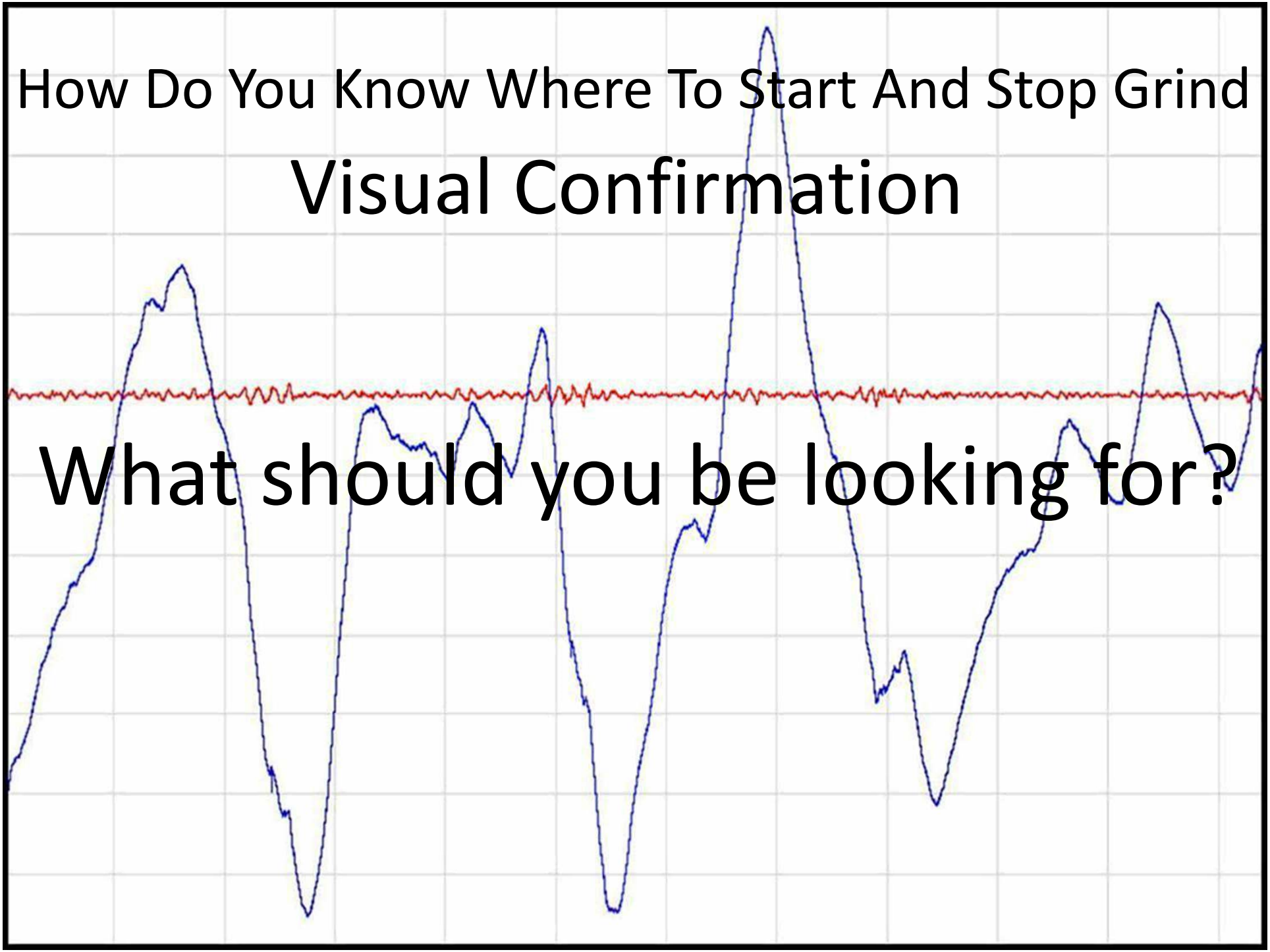
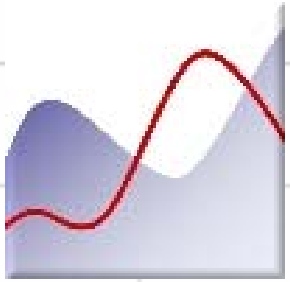



How Do You Know Where To Start And Stop Grind
Visual Confirmation
What should you be looking for?

If you are replacing

INTERNATIONAL CYBERNETICS

Where technology meets the road



with

TO FIND LOCALIZED ROUGHNESS
YOU NEED AN ADDITIONAL TRAINING COURSE
'ProVAL to Pavement'
A Method for Field Identification
of Localized Roughness

QUESTIONS?