

Les clauses d'uni et les mesures correctives avec ProVAL

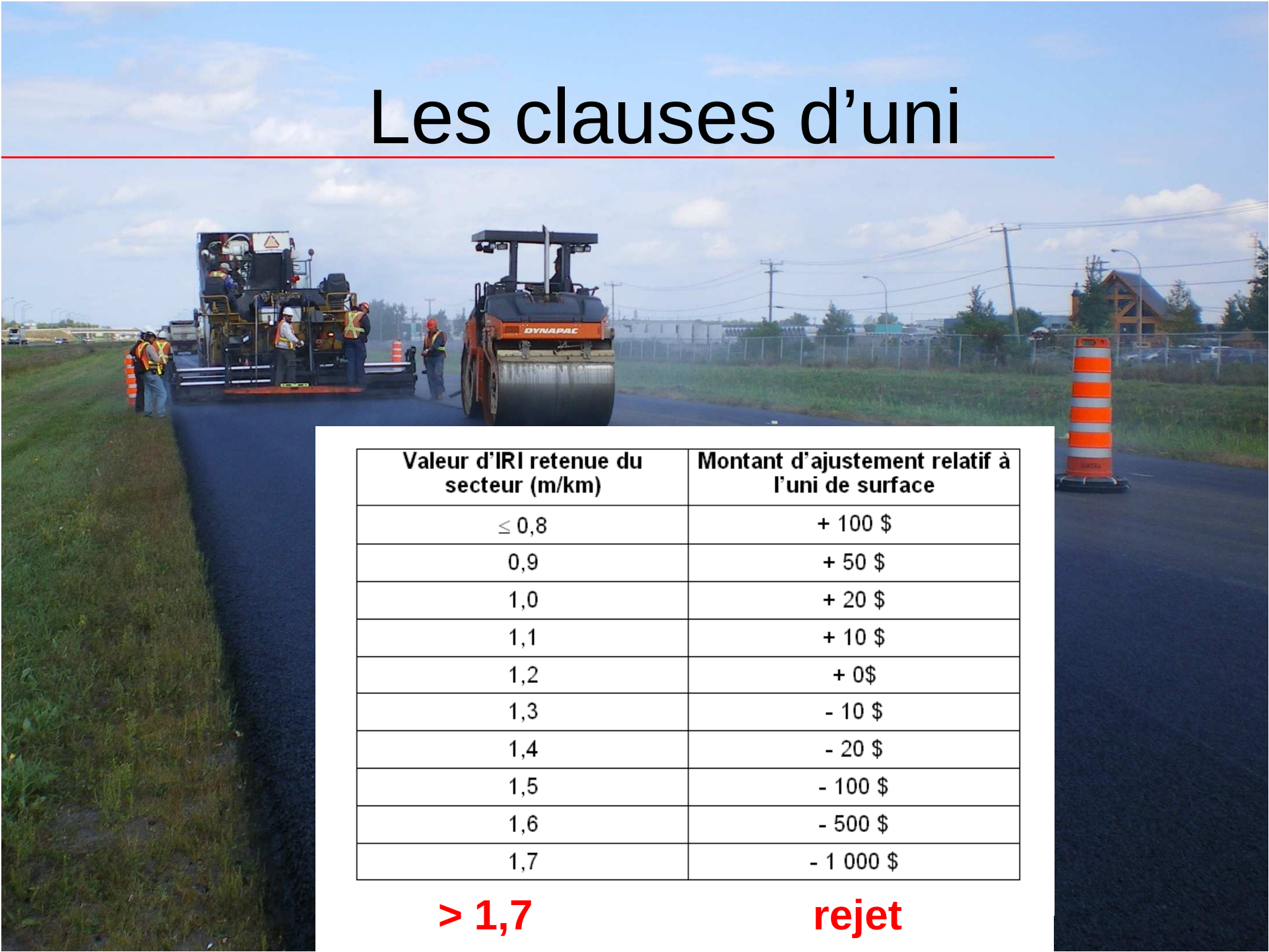
Colloque technique Bitume Québec
25, 26 et 27 novembre 2008

Martin Routhier, ing.

Plan

- Notions théoriques et les clauses d'uni
- Les mesures correctives : quand s'appliquent-elles?
- Simulation de correction avec ProVAL

Les clauses d'uni



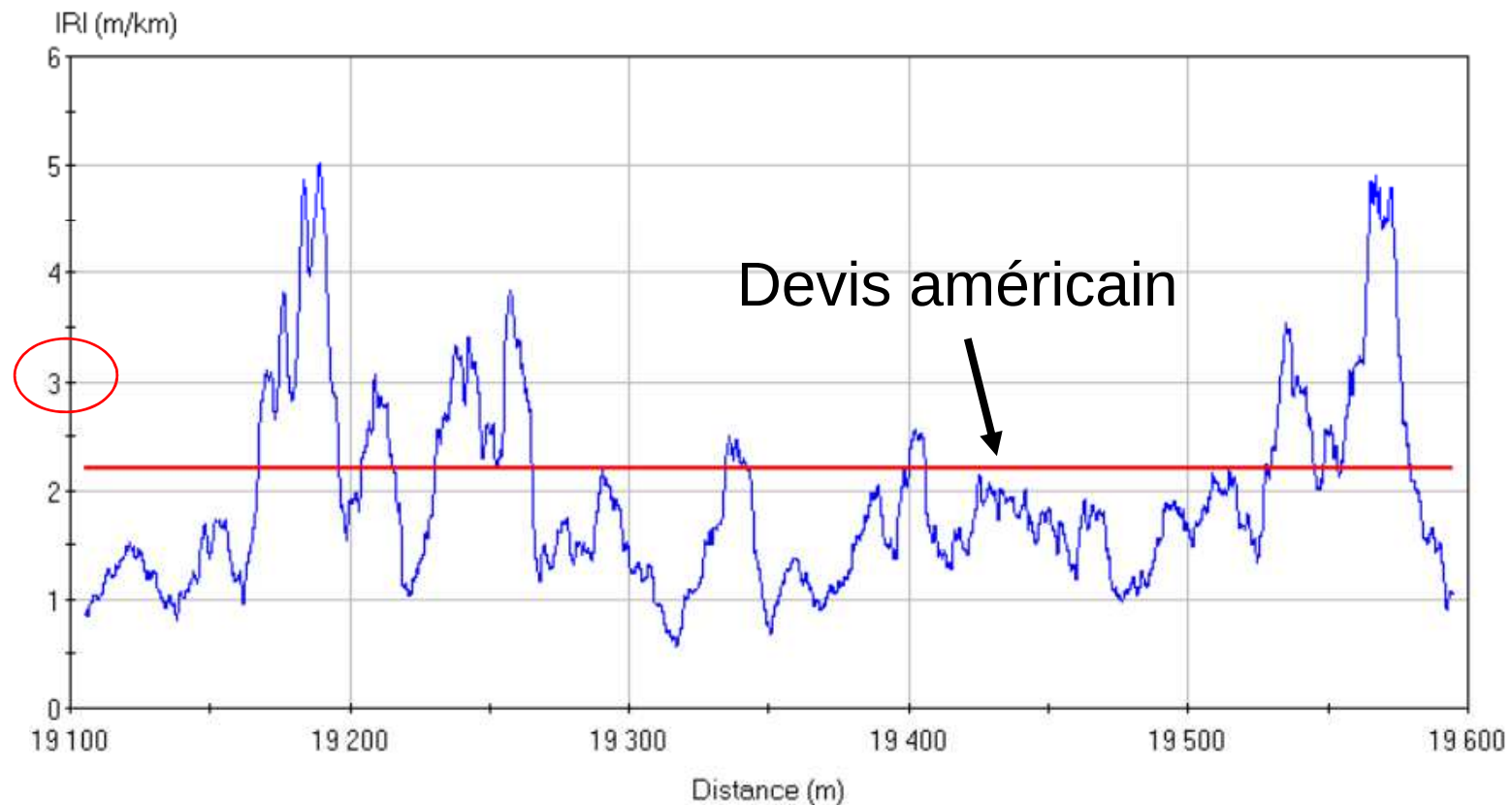
Valeur d'IRI retenue du secteur (m/km)	Montant d'ajustement relatif à l'uni de surface
$\leq 0,8$	+ 100 \$
0,9	+ 50 \$
1,0	+ 20 \$
1,1	+ 10 \$
1,2	+ 0\$
1,3	- 10 \$
1,4	- 20 \$
1,5	- 100 \$
1,6	- 500 \$
1,7	- 1 000 \$

> 1,7

rejet

Orientation MTQ

Les « BUMPS » ou irrégularités du profil

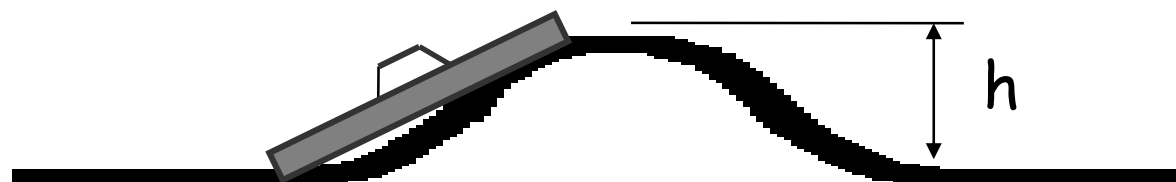
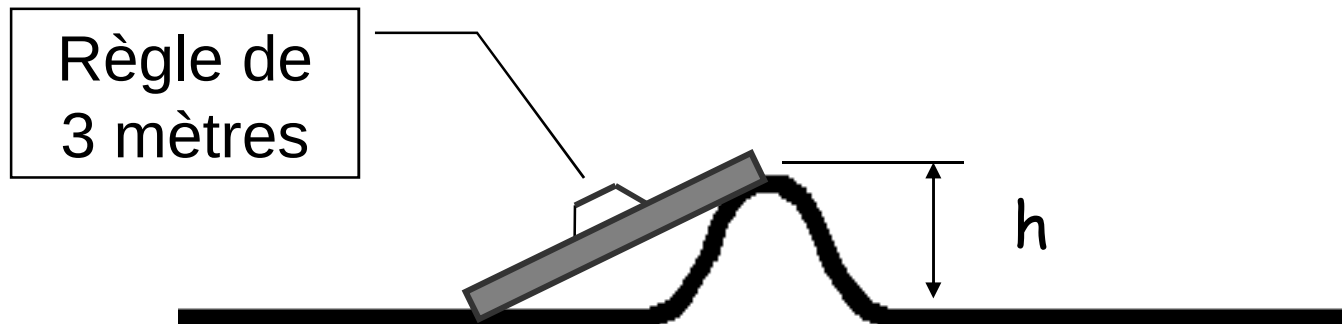


Exemple : joint transversal qui « cogne »



$IRI_{100m} = 1,1$ (10\$ de bonis)

...Mais, $IRI_{10m} = 4$



Les mesures correctives

1. Planage/resurfaçage



Les mesures correctives

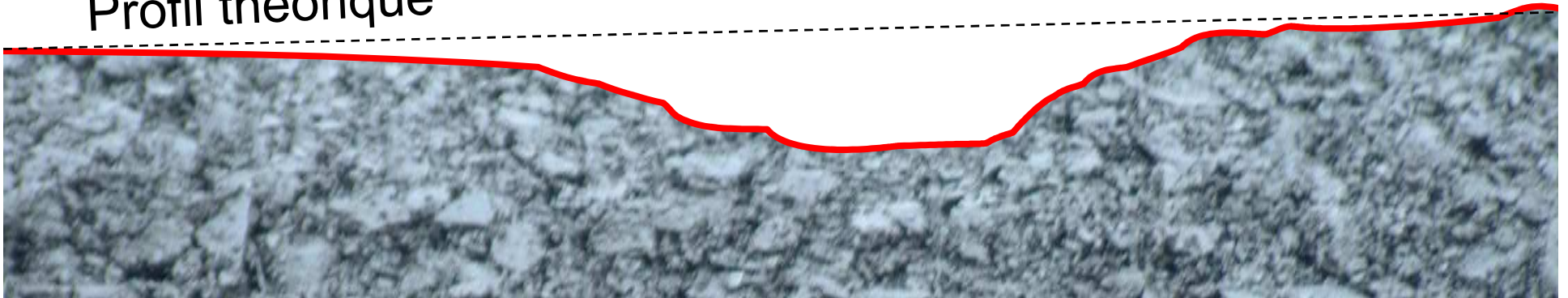
2. Meulage



Impossible de corriger un trou!

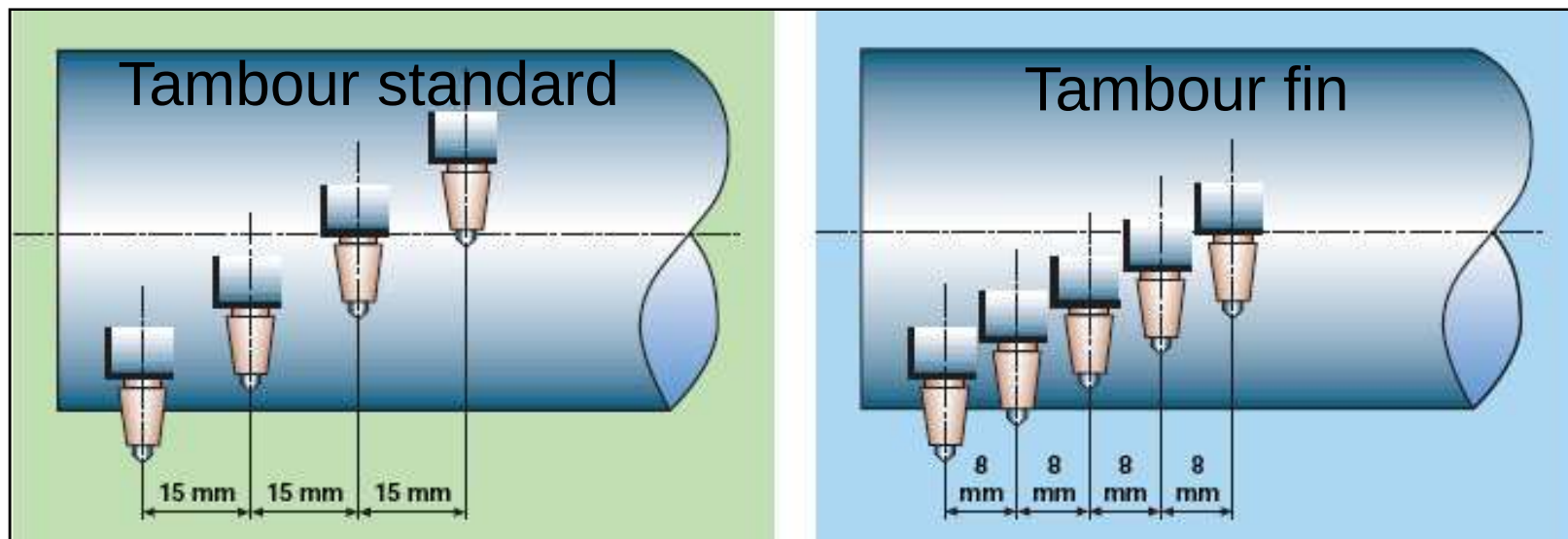


Profil théorique



Les mesures correctives

3. Fraisage fin



Quelle technique utilisée?

	Planage/ resurfaçage	Meulage	Fraisage fin
Quand?	Uni mauvais en général	Présence d'irrégularités localisées « bumps »	
IRI	100 mètres (fixe)	10 mètres (continu)	
Outil d'analyse	-	Logiciel ProVAL	

La correction par meulage ou fraisage fin exige
de connaître avec précision les endroits
« problématiques »

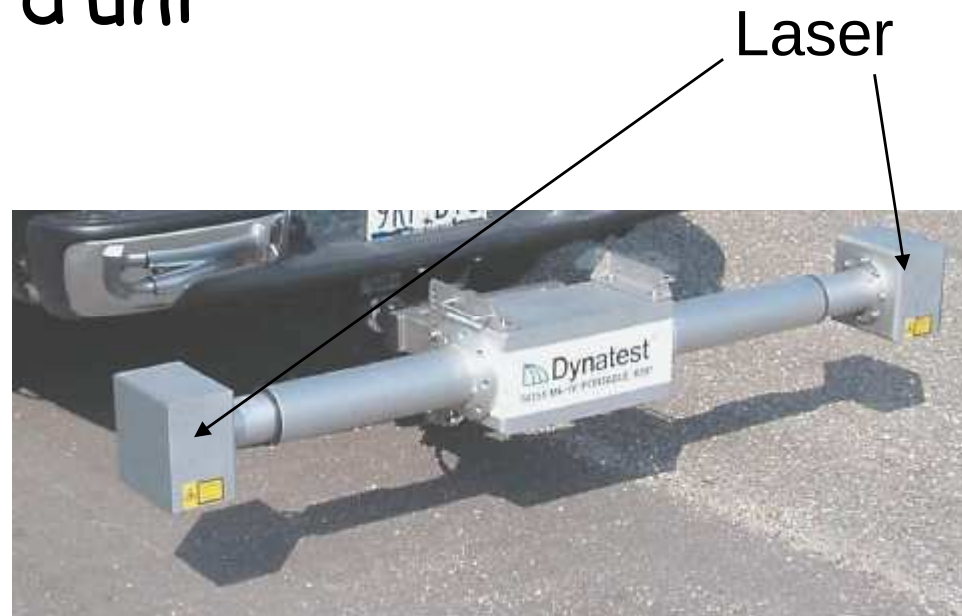


Pourquoi **PROVAL** ?

- Base d'interprétation et d'analyse commune
- Optimiser les corrections (où, profondeur, simulation de l'IRI, coûts...)
- Logiciel éprouvé et gratuit : www.roadprofile.com

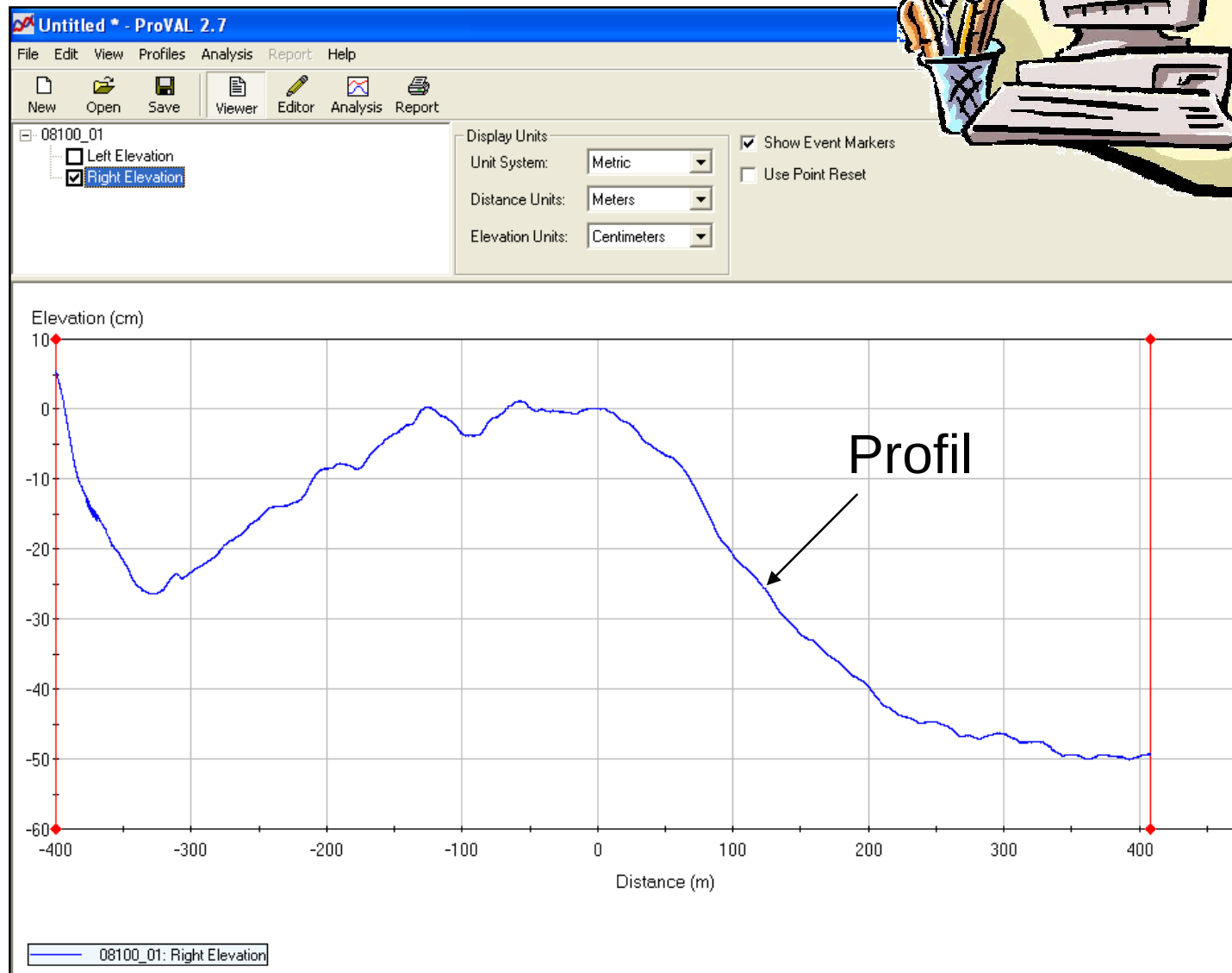
Étapes à suivre

1. Relevé d'uni



Profilomètre inertiel *Dynatest Mark IV*

2. Analyse du relevé



Untitled * - ProVAL 2.7

File Edit View Profiles Analysis Report Help

New Open Save Viewer Editor Analysis Report

Smoothness Assurance

Inputs Analysis Grinding Grinding Results Warnings

Input Set: User Defined

Smoothness Specifications

Ride Quality Index: IRI

Ride Quality Threshold (m/km): 1.7

Continuous Short Interval (m): 10

☒ Fixed Interval Report

Fixed Interval (m): 100

☐ Continuous Long Interval Report

Ride Quality Threshold (m/km): 1.7

Continuous Long Interval (m): 100

Profile Selection

File: LENTE_03 - 8630.0 to 128

Channel: Left Elevation

☐ Use Point Reset

☒ Apply 250mm Filter

Histogram

Lower Bound (m/km): 0

Upper Bound (m/km): 1.7

Class Interval (m/km): .1

Comparison

Analysis Type: Raw Profile

Pre-Processor Filter: None

Short Cutoff Wavelength:

Long Cutoff Wavelength:

Straightedge Wheelbase (ft): 10

Wheel Offsets...

Analyze

IRI en continu : 10 m

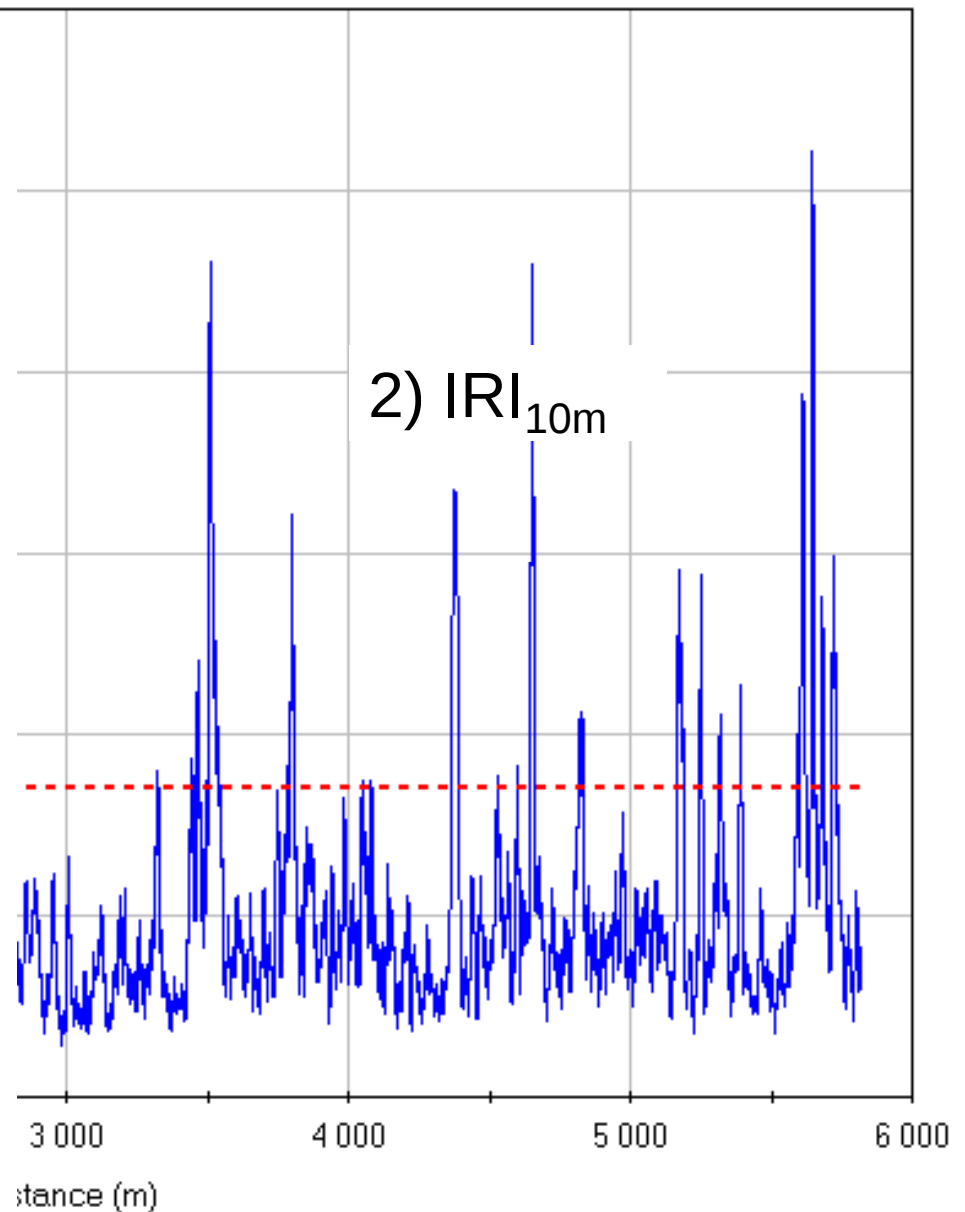
Intervalle fixe : 100 m

IRI (m/km)

1) IRI_{100m} format EXCEL

	A	B	C
1	Location (m)	IRI (m/km)	
2	0 to 100	1.126	
3	100 to 200	0.733	
4	200 to 300	1.543	
5	300 to 400	0.783	
6	400 to 500	1.027	
7	500 to 600	0.581	
8	600 to 700	0.854	
9	700 to 800	0.737	
10	800 to 900	0.676	
11	900 to 1000	1.327	
12	1000 to 1100	0.768	
13	1100 to 1200	0.73	
14	1200 to 1300	0.531	
15	1300 to 1400	0.712	
16	1400 to 1500	1.018	
17	1500 to 1600	0.662	
18	1600 to 1700	0.688	
19	1700 to 1800	0.709	
20	1800 to 1900	0.798	
21	1900 to 2000	1.165	
22	2000 to 2100	1.177	
23	2100 to 2200	0.81	
24	2200 to 2300	0.765	
25	2300 to 2400	1.342	
26	2400 to 2500	1.094	
27	2500 to 2600	1.306	
28	2600 to 2700	1.066	
29	2700 to 2800	0.7	
30	2800 to 2900	0.821	
31	2900 to 3000	0.608	

2) IRI_{10m}



3. Déterminer où meuler

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File Edit View Profiles Analysis Report Help

New Open Save Viewer Editor Analysis Report

Smoothness Assurance

Inputs Analysis Grinding Grinding Results Warnings

Grinding Strategy: Default Strategies... Enable All Disable All

Total Grinding Length (ft): 6057

Enabled	Start (m)	Stop (m)	Direction	Head Height (mm)
Yes	8633.6	8637.8	Forward	0
Yes	8646.5	8658.6	Forward	0
Yes	8663.8	8665.3	Forward	0
Yes	8672.3	8687.3	Forward	0
Yes	8691.0	8694.3	Forward	0
Yes	8698.4	8700.4	Forward	0
Yes	8769.2	8783.7	Forward	0
Yes	8792.8	8805.8	Forward	0
Yes	8814.6	8822.5	Forward	0
Yes	8828.2	8831.7	Forward	0
Yes	8839.8	8841.7	Forward	0
Yes	8844.2	8855.6	Forward	0
Yes	8860.6	8864.1	Forward	0
Yes	8868.9	8873.0	Forward	0
Yes	8878.5	8889.3	Forward	0
Yes	8890.4	8892.9	Forward	0
Yes	8896.3	8901.5	Forward	0
Yes	8913.4	8927.4	Forward	0
Yes	8934.5	8942.2	Forward	0
Yes	8943.3	8945.8	Forward	0
Yes	9025.7	9028.6	Forward	0
Yes	9031.8	9035.8	Forward	0
Yes	9046.5	9056.8	Forward	0
Yes	9062.8	9064.9	Forward	0
Yes	9066.0	9069.3	Forward	0
Yes	9071.5	9081.4	Forward	0
Yes	9092.1	9097.8	Forward	0

Grinder

Grinder Type: User-Defined

Max Grinding Depth: 335 mm

Head Position: .547

Wheelbase: 5.3 m

Tandem Spread: 1.46 m

Short Wavelength Cutoff: 0.25 m

Selected Grinding Location

☒ Enabled

Starting Point: 8633.6 m

Stopping Point: 8637.8 m

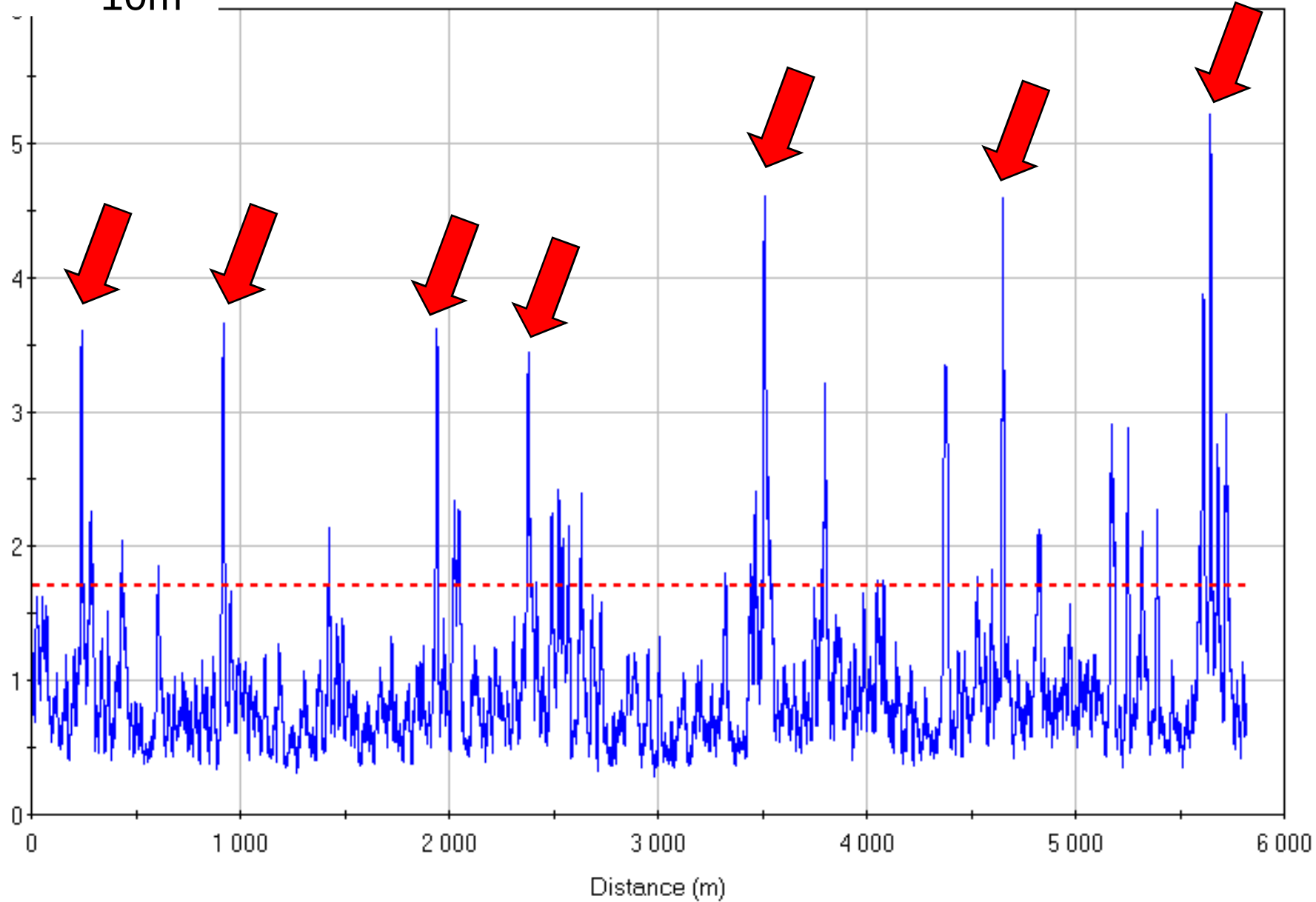
Head Height: 0 mm

Direction: Forward

Set Values

Grind

IRI_{10m}



4. Simulation du meulage

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File Edit View Profiles Analysis Report Help

New Open Save Viewer Editor Analysis Report

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Yes	8698.4	8700.4	Forward	0
Yes	8769.2	8783.7	Forward	0
Yes	8792.8	8805.8	Forward	0
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Yes	8828.2	8831.7	Forward	0
Yes	8839.8	8841.7	Forward	0
Yes	8844.2	8855.6	Forward	0
Yes	8860.6	8864.1	Forward	0
Yes	8868.9	8873.0	Forward	0
Yes	8878.5	8889.3	Forward	0
Yes	8890.4	8892.9	Forward	0
Yes	8896.3	8901.5	Forward	0
Yes	8913.4	8927.4	Forward	0
Yes	8934.5	8942.2	Forward	0
Yes	8943.3	8945.8	Forward	0
Yes	9025.7	9028.6	Forward	0
Yes	9031.8	9035.8	Forward	0
Yes	9046.5	9056.8	Forward	0
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Yes	9066.0	9069.3	Forward	0
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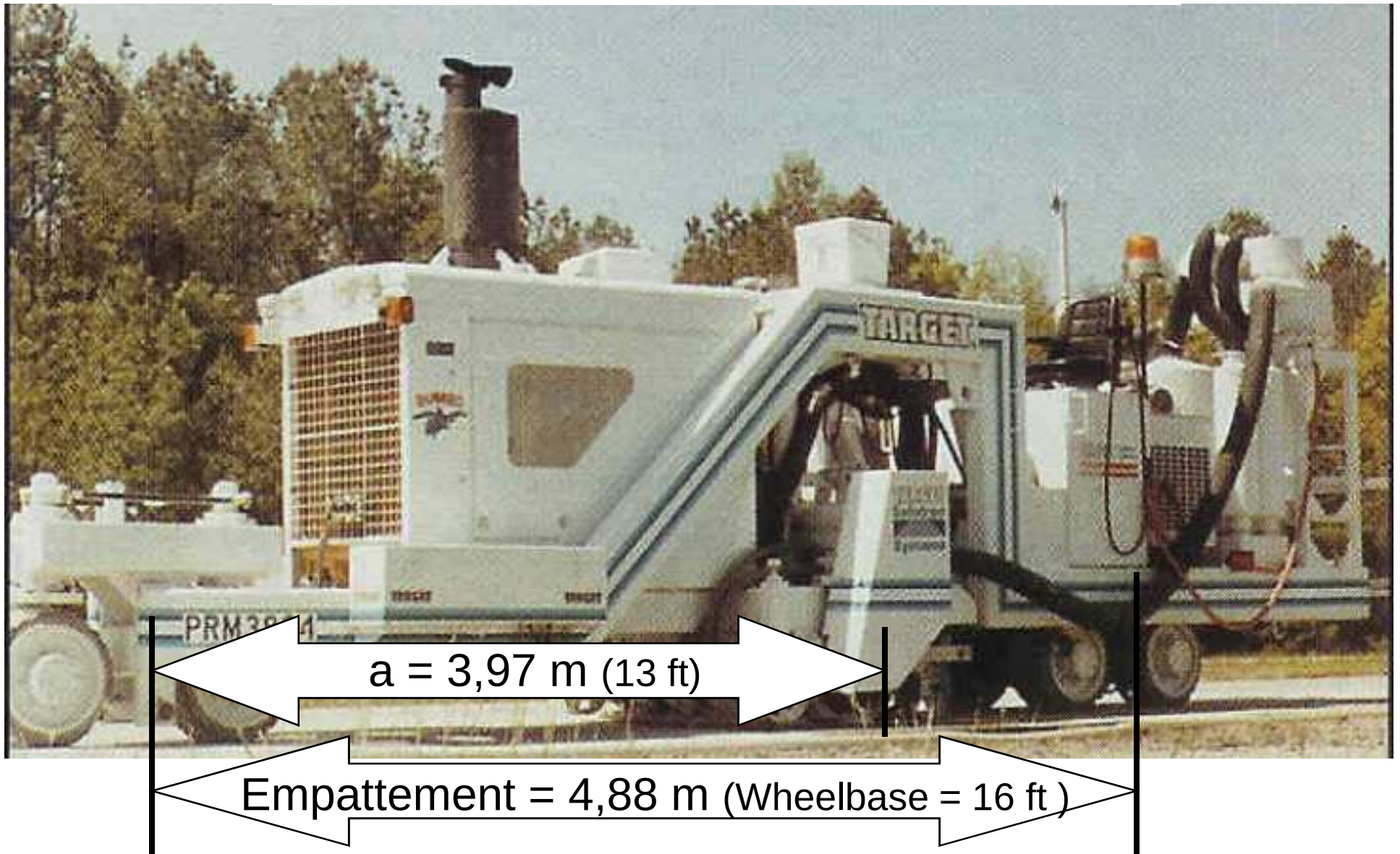
Head Height: 0 mm

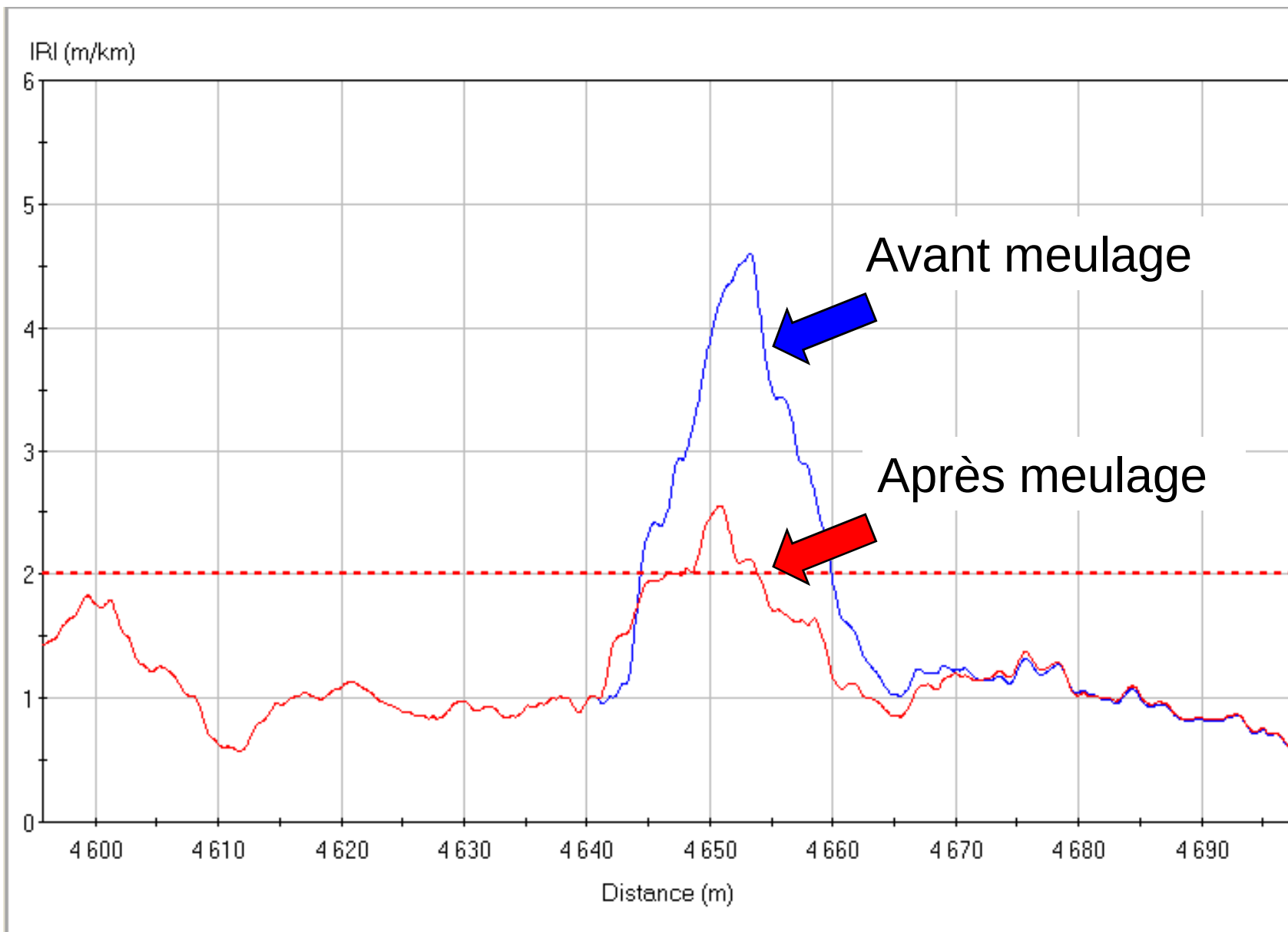
Direction: Forward

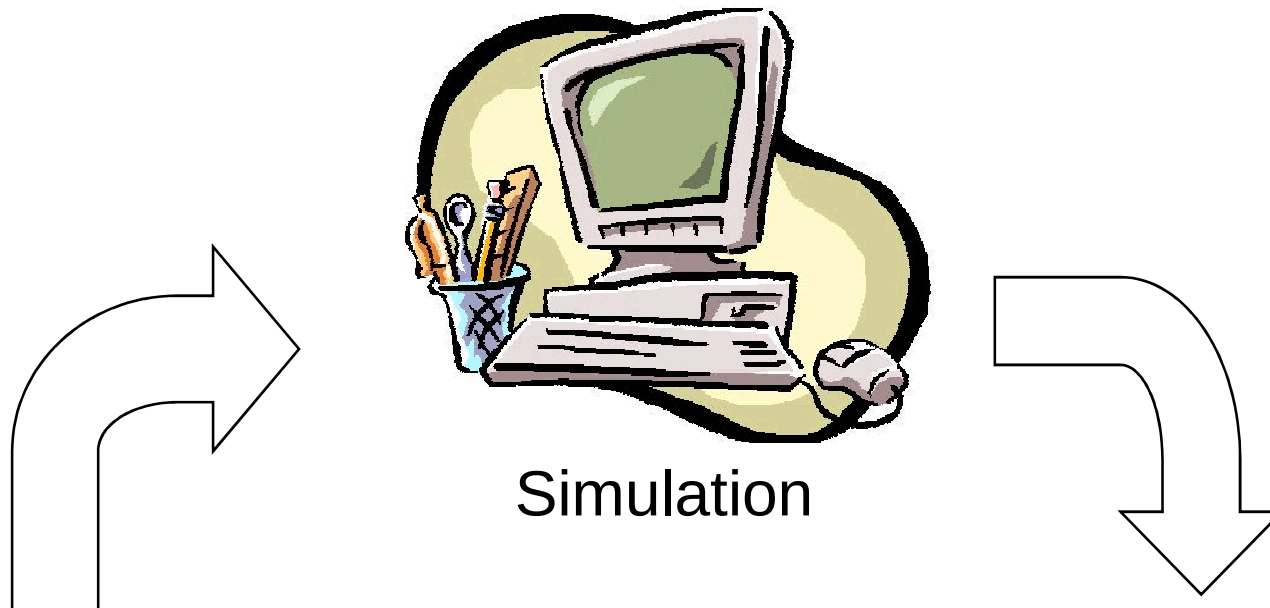
Set Values

Grind

Exemple : Dimensions meuleuse *PRM 3804*







Optimisation



Relevé profilométrique



Correction par meulage

Actions futurs

- Formation ProVAL à l'interne
- Potentiel du planage pour la correction de profil en avant projet (analyse avec ProVAL, guidage, etc.)
- Essais à l'été 2009.