

# 28th Annual RPUG Conference

San Diego, CA November 1-4



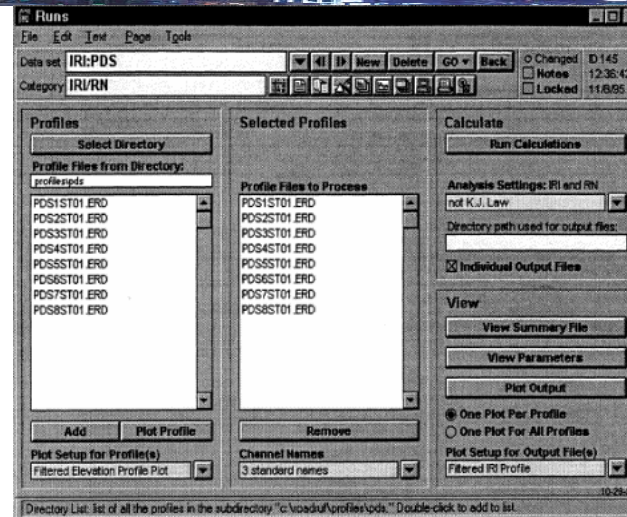
## ProVAL - Past and Future

By

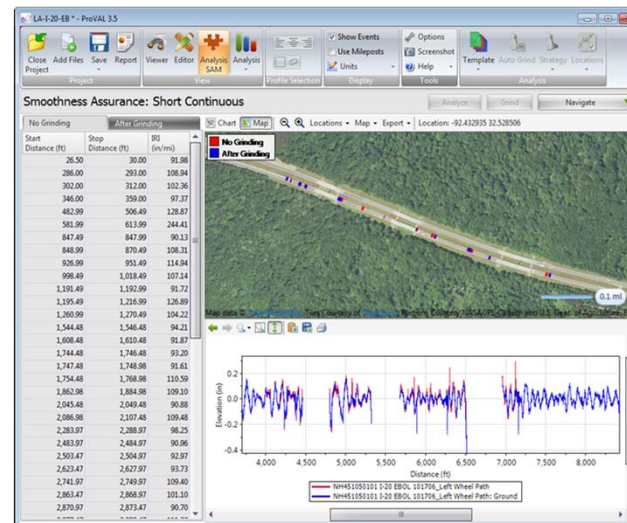
George K. Chang, PhD, PE, Transtec Group

# Profiling Software

- RoadRuf 1990's

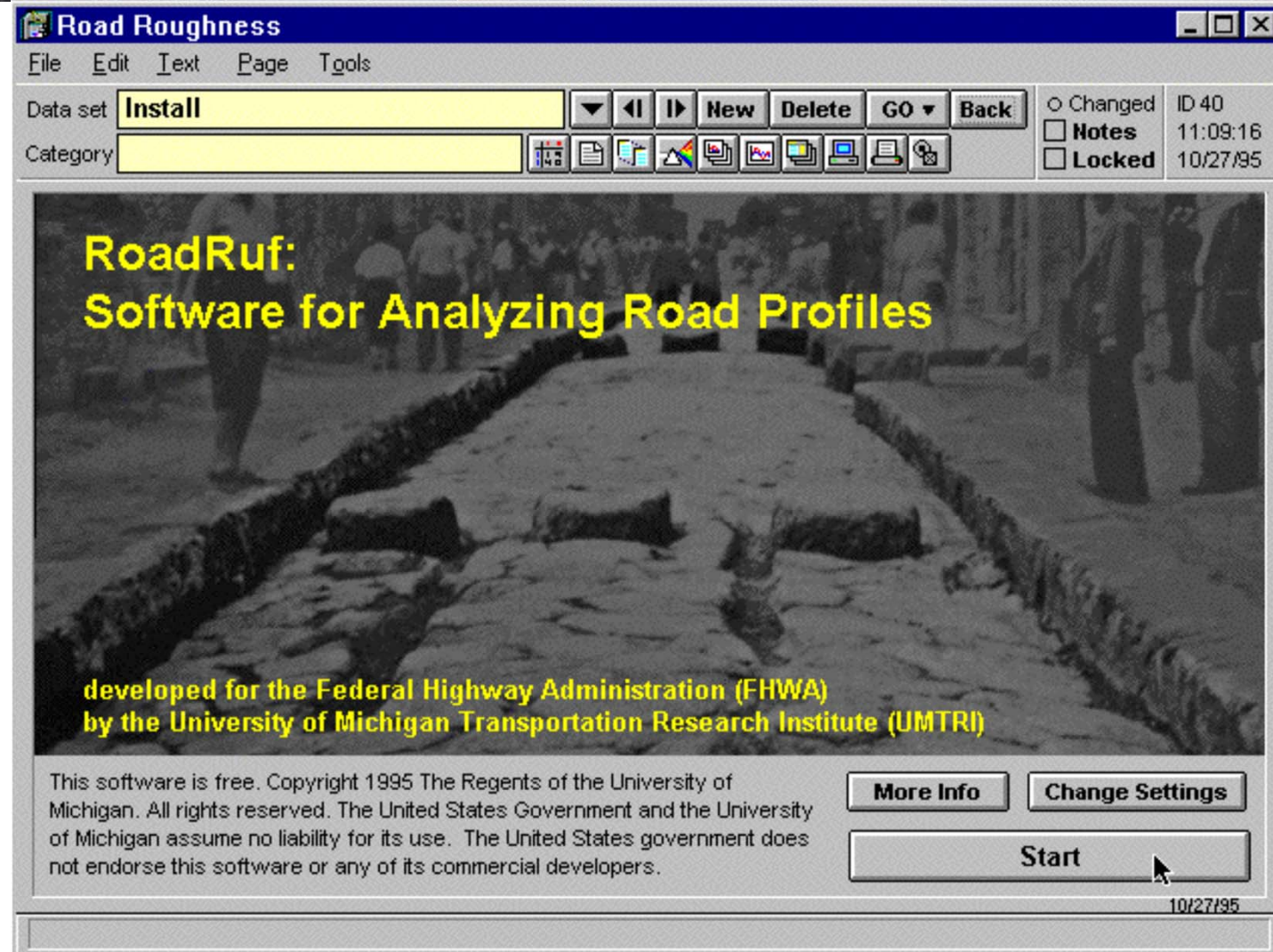


- ProVAL 2001 ~





# RoadRuf



# RoadRuf

**Road Roughness Analyses**

File Edit Text Page Tools Analyses

Data set **IRI and RN Default** [Navigation] New Delete GO Back

Analysis **IRI / RN Filter** [Icons]

Changed ID 198  
 Notes 3:50:37  
 Locked 9/17/96

**List of Profiles to Process**  Editable List

[Empty List Box]

Add Individual Files to List Plot Input Profiles

Add All Files from a Directory

Remove Selected Profiles

**Run IRI / RN Filter**

**View Table of Results**

Show More Options

Use the arrow buttons at the top to browse through existing setups and find a setup for the analysis you want to run.

Use the buttons at the left to make a list of ERD files with road profiles.

To view profiles graphically, highlight files in the list, then click the button **Plot Input Profiles**.

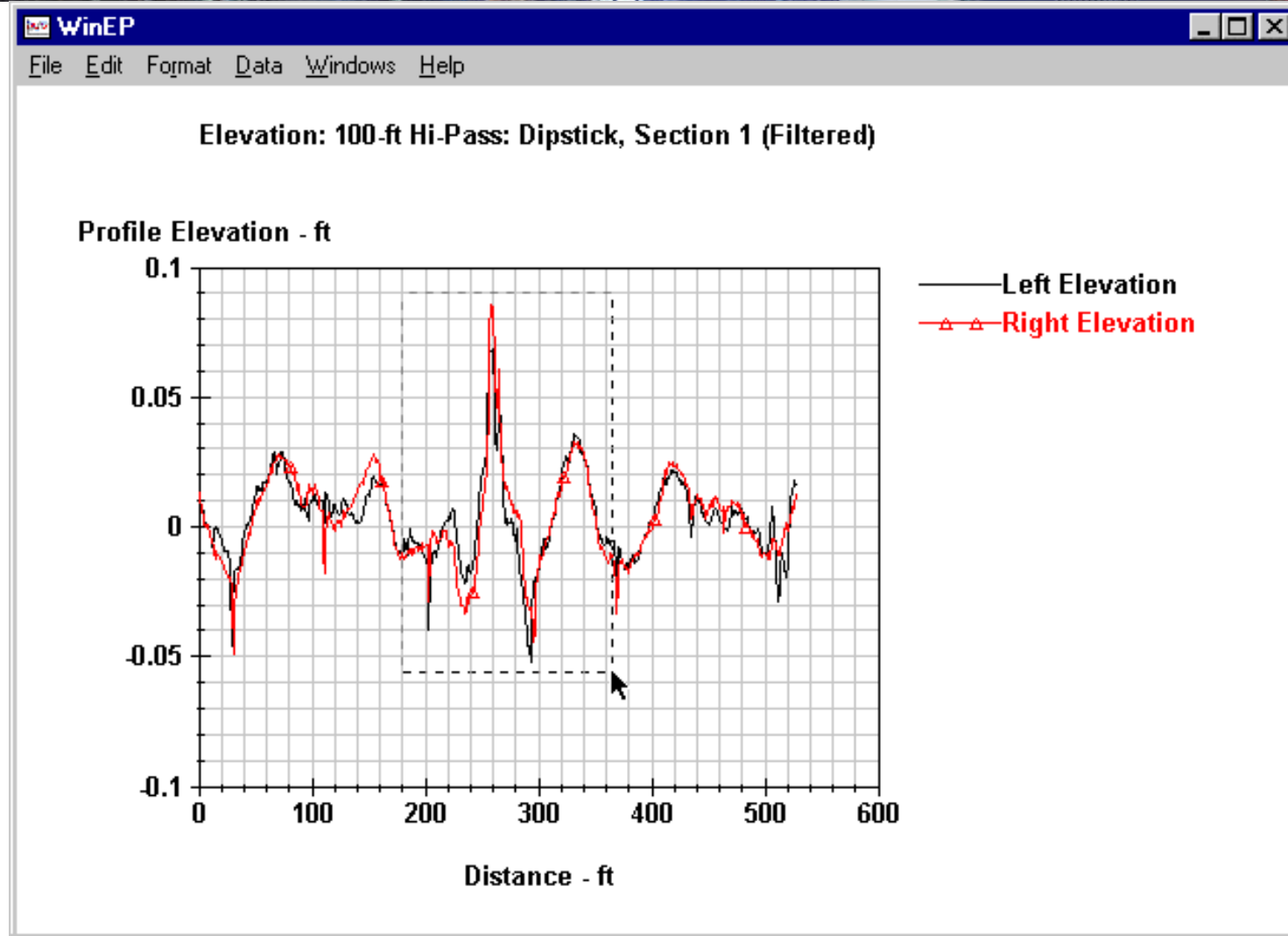
Click the **Run** button above to process the files in the list. Click the **View Table** button to see results.

For more help, go to the startup screen and click **More Info**.

9-17-96

Remove: removes the highlighted file names from the list. The actual files are unaffected. Shift-click to remove all.

# RoadRuf



# RoadRuf

```

Super Pad - 198.LPF
File Edit Search Format Help
* IRI and Ride Number Calculation
* Last modified at UMTRI September 14, 1996
* Copyright (c) 1996 The Regents of the University of Michigan. All Rights Reserved

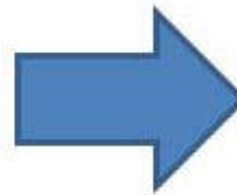
Input files from directory "C:\ROADRUF\PROFILES\TUTORIAL"

Filename          Start:          End: IRI:      (m/km)  RN: 0-5
                   ft            ft  LElev.   RElev.  LElev.  RElev.
-----
C:\ROADRUF\PROFILES\TUTORIAL\DIPSTKS1.ERD
      .00      528.00      2.62      2.25      2.67      2.71
      50.00     150.00      1.90      1.57      3.33      3.16
     150.00     250.00      2.28      2.07      2.71      2.92
     250.00     350.00      4.37      4.40      2.06      1.92
     350.00     450.00      1.71      1.87      3.34      3.27
     450.00     528.00      2.90      1.23      2.84      3.41
-----
C:\ROADRUF\PROFILES\TUTORIAL\ICCS1.ERD
      .00      526.99      2.92      2.72      2.56      2.73
      50.00     150.00      1.81      2.10      3.37      2.98
     150.00     250.00      2.39      2.30      3.20      3.39
     250.00     350.00      4.96      5.33      1.87      1.91
     350.00     450.00      2.12      2.43      2.64      2.70
     450.00     526.99      3.27      1.47      2.79      3.70
-----
C:\ROADRUF\ANALYSES\198.LPF
    
```

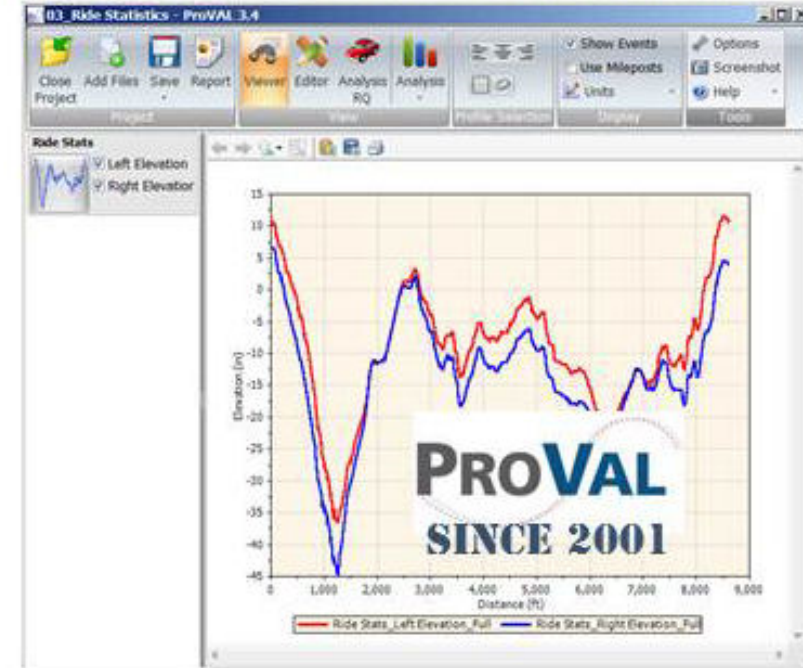


# Profile Viewing and Analysis - ProVAL

## Many Different Profilers...



## One Standard Software



## Who Sponsors ProVAL ?

- US Department of Transportation, Federal Highway Administration (FHWA)
- Long Term Pavement Performance Program (LTPP)
- Profile Pooled Fund Study

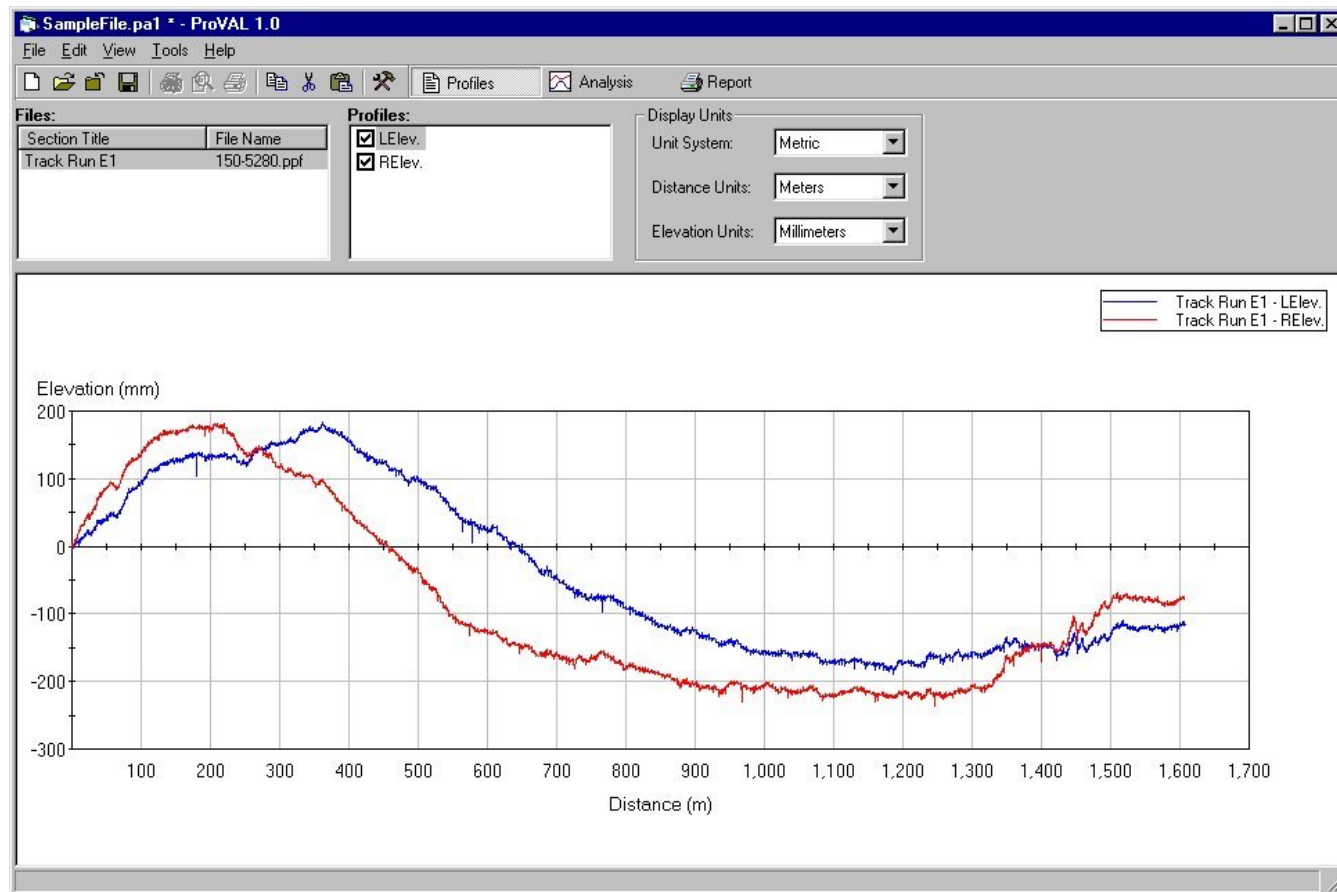




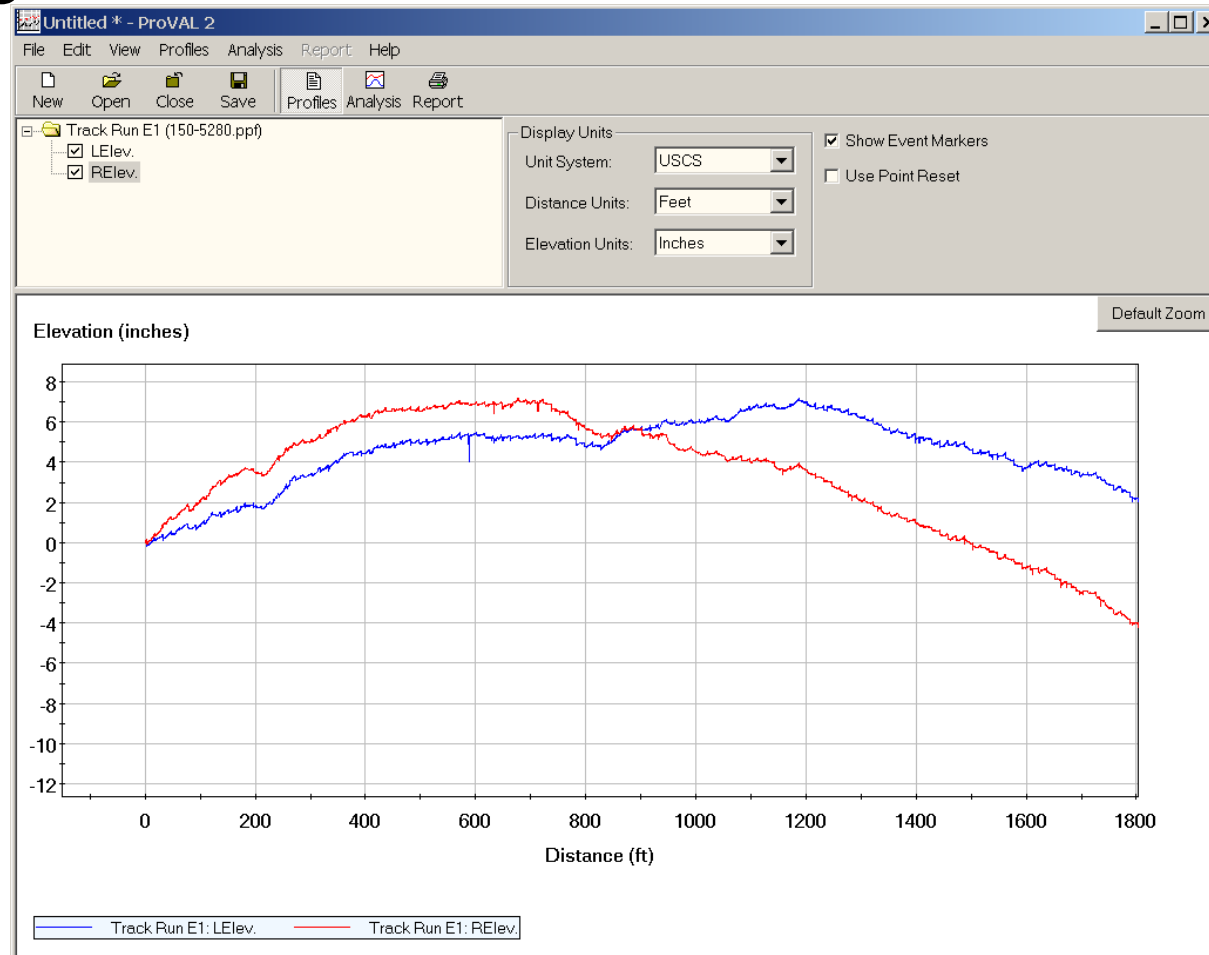
# ProVAL Media – since 2001



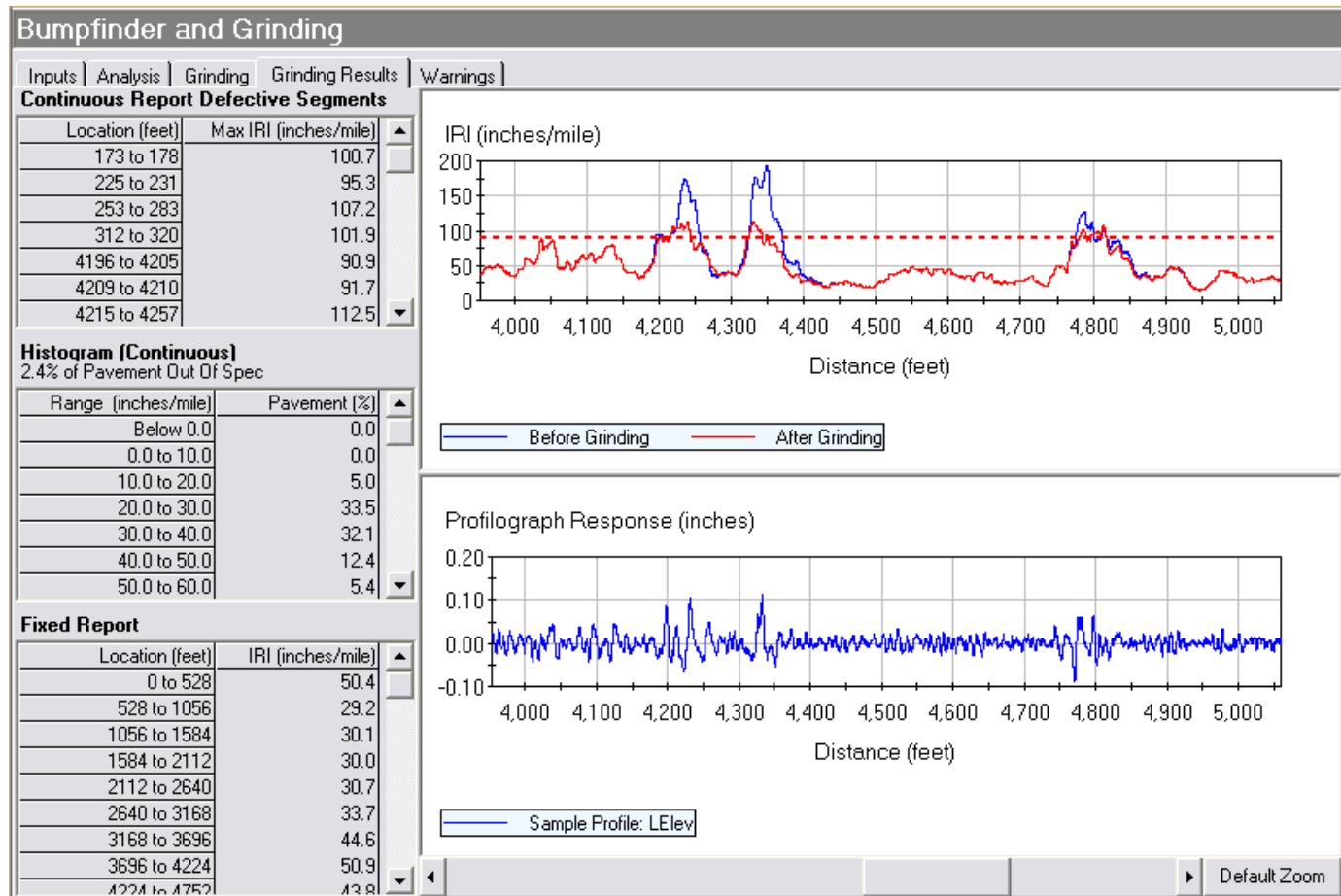
# ProVAL 1.0



# ProVAL 2.0

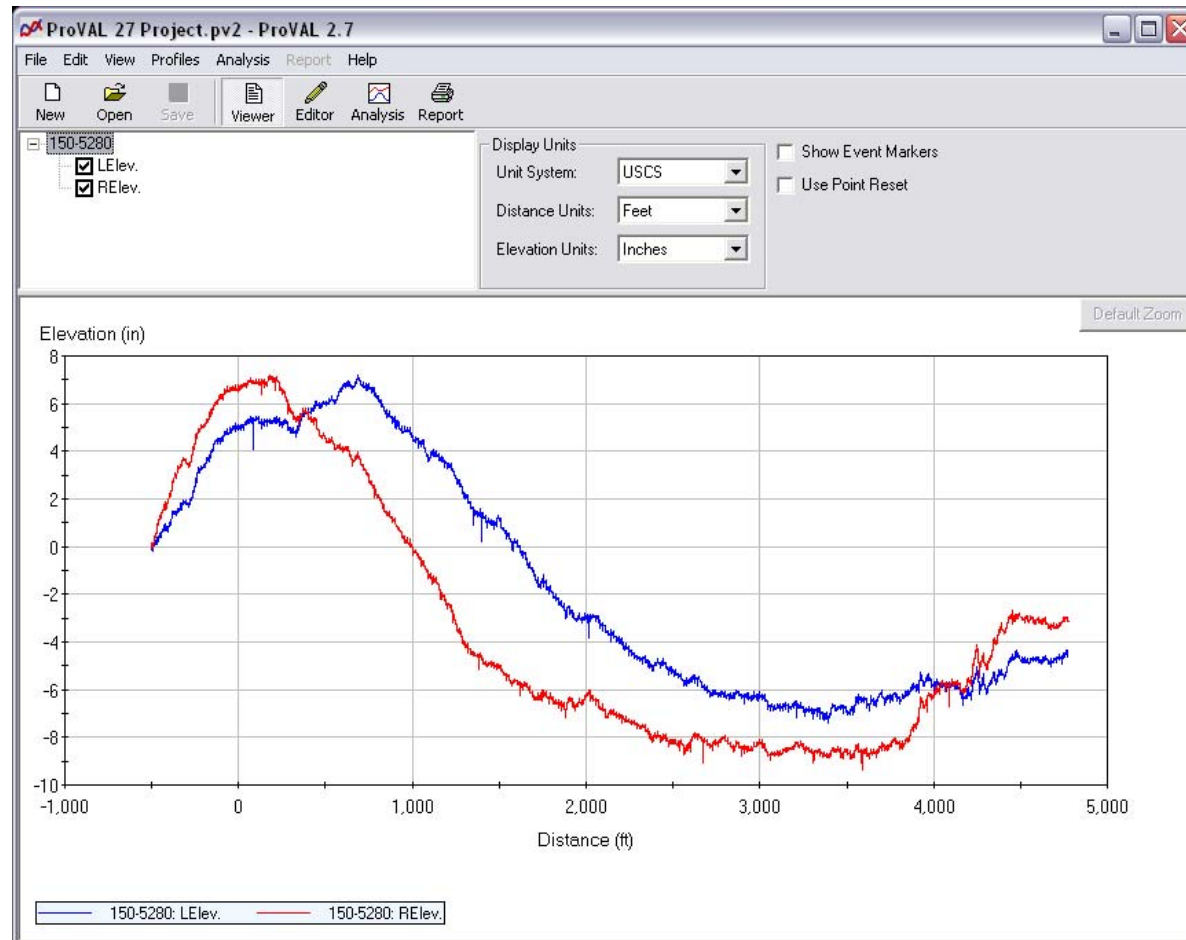


# ProVAL 2.5

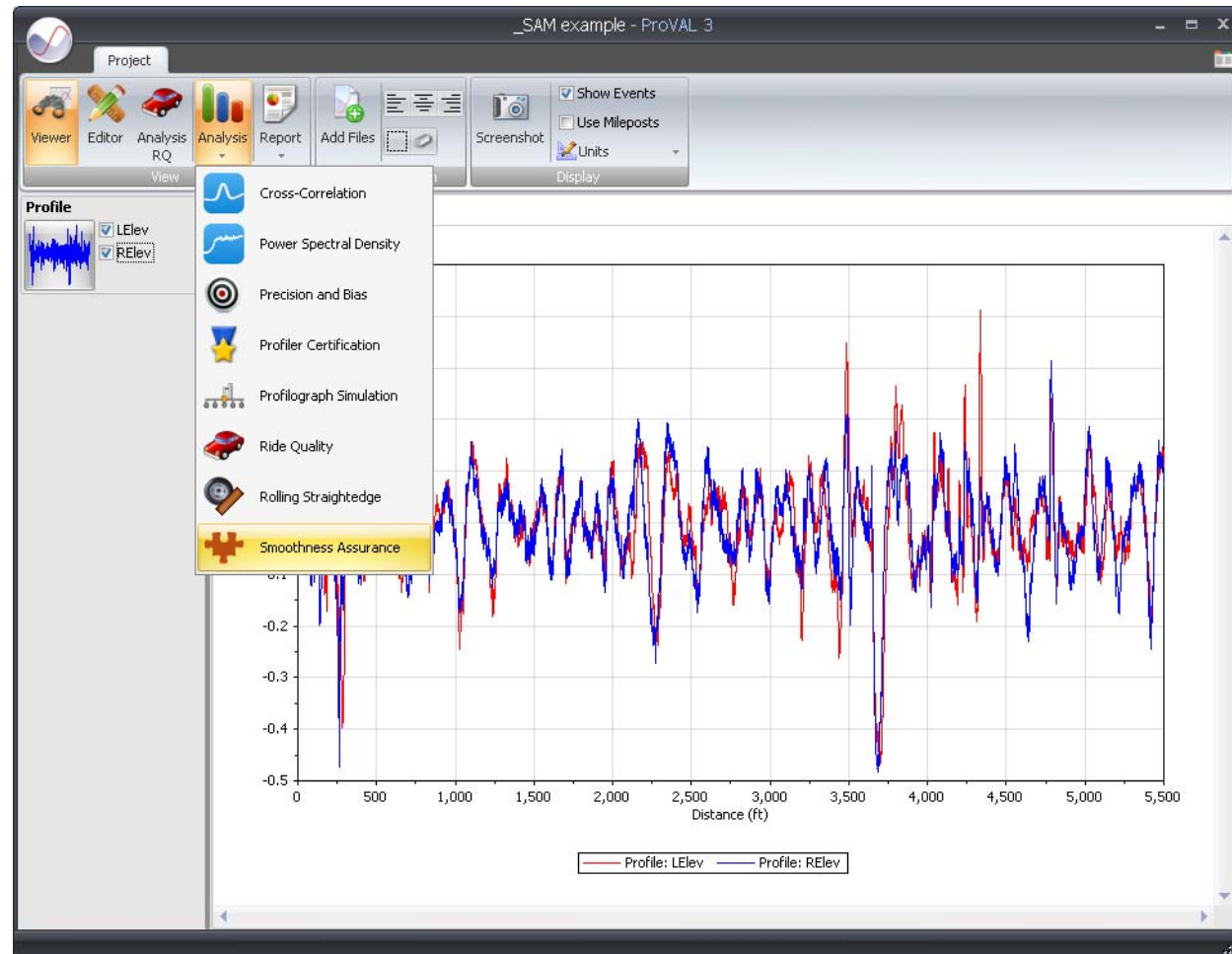




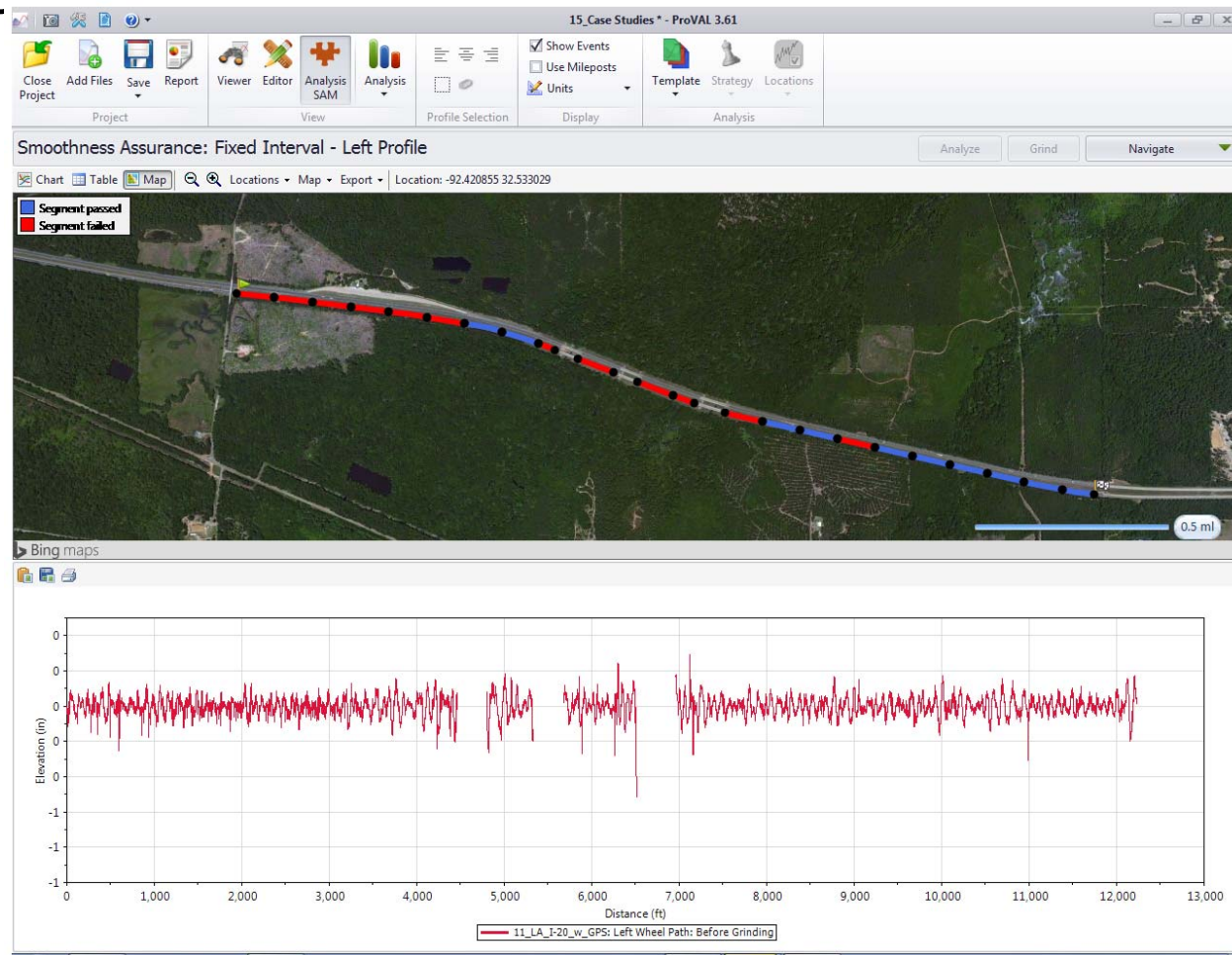
# ProVAL 2.7



# ProVAL 3.0



# ProVAL 3.6



## With ProVAL You Can...

- Import
- View
- Edit/Filter
- Analyze
- Report

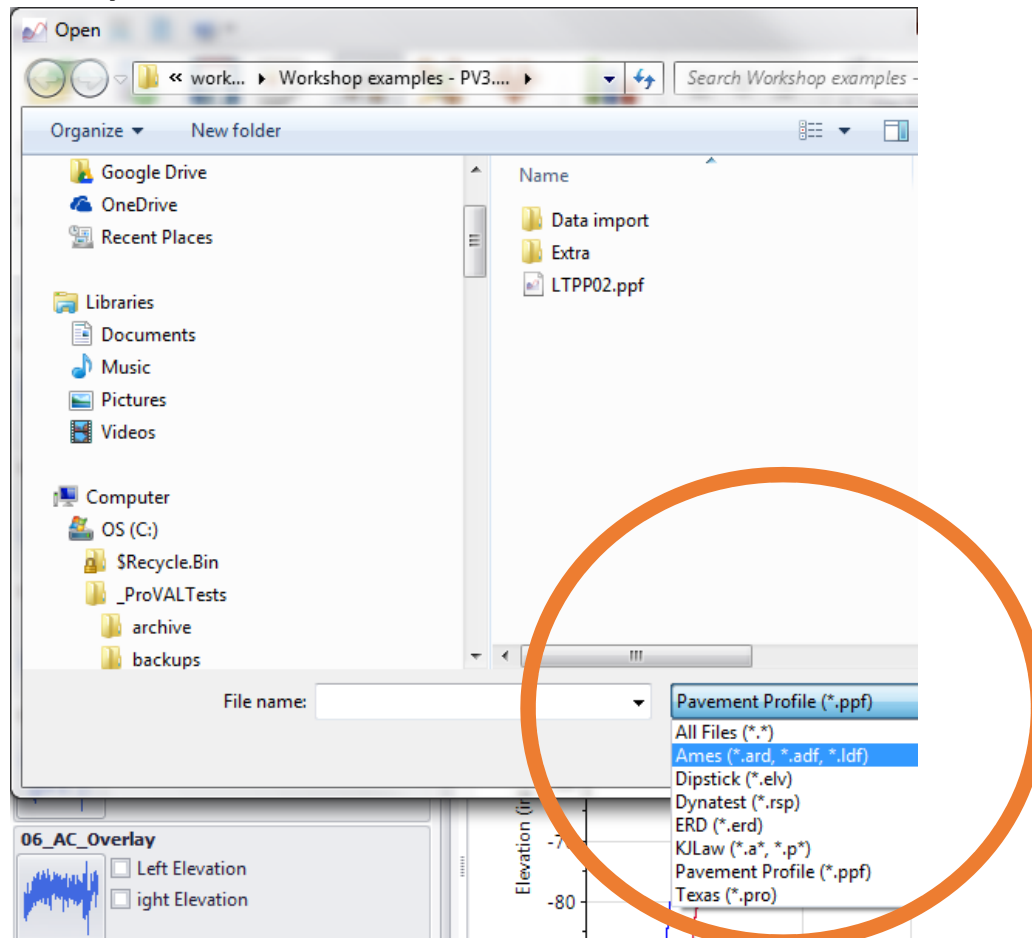


**PROVAL**

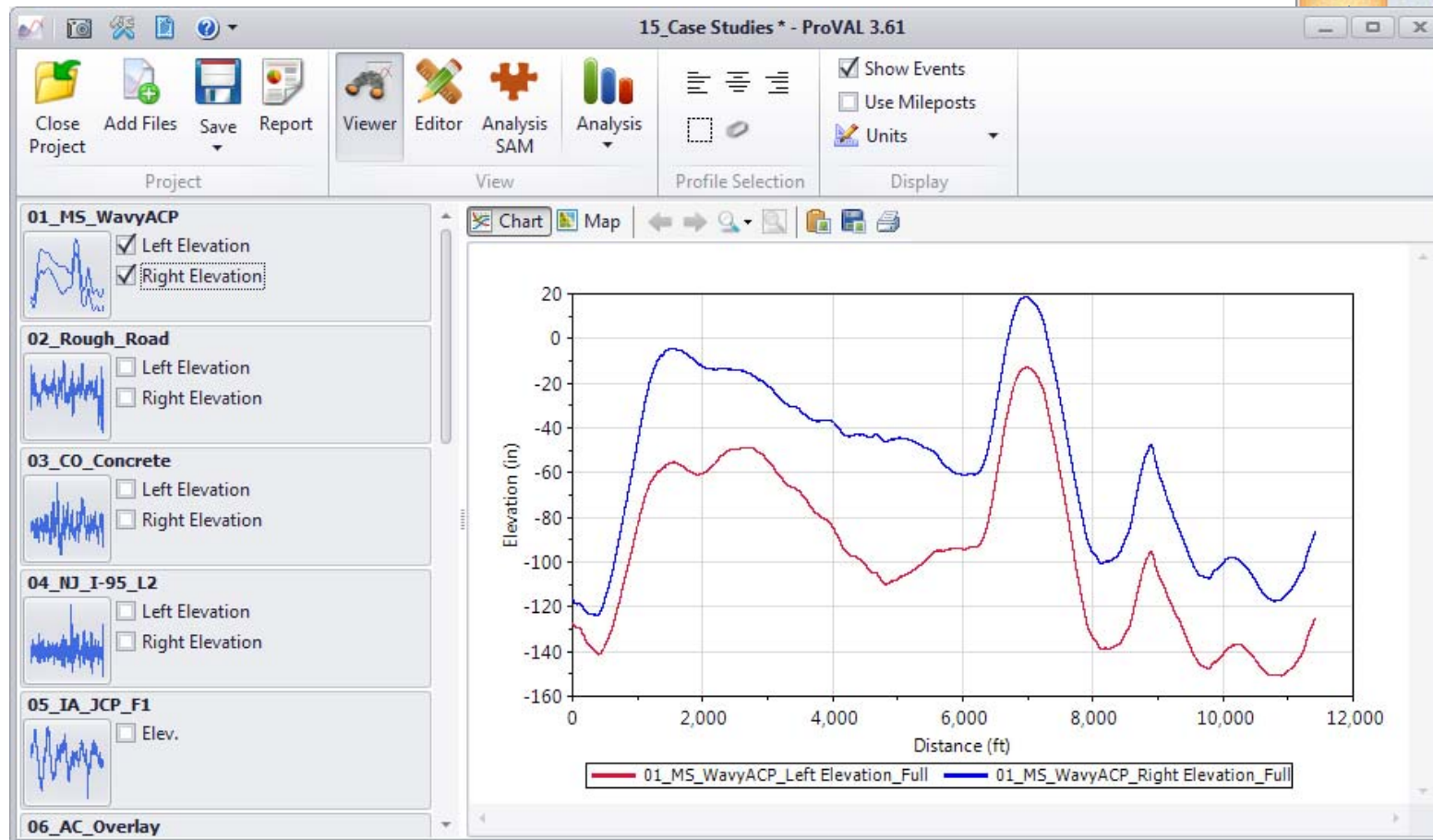
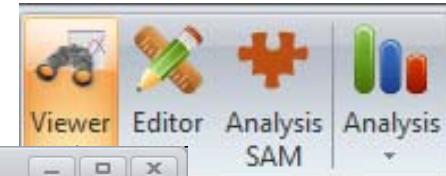




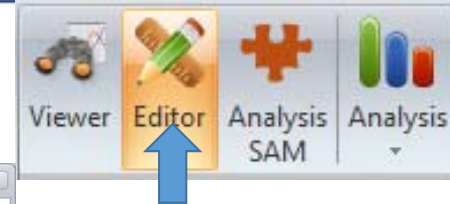
# Import Many Profile Formats



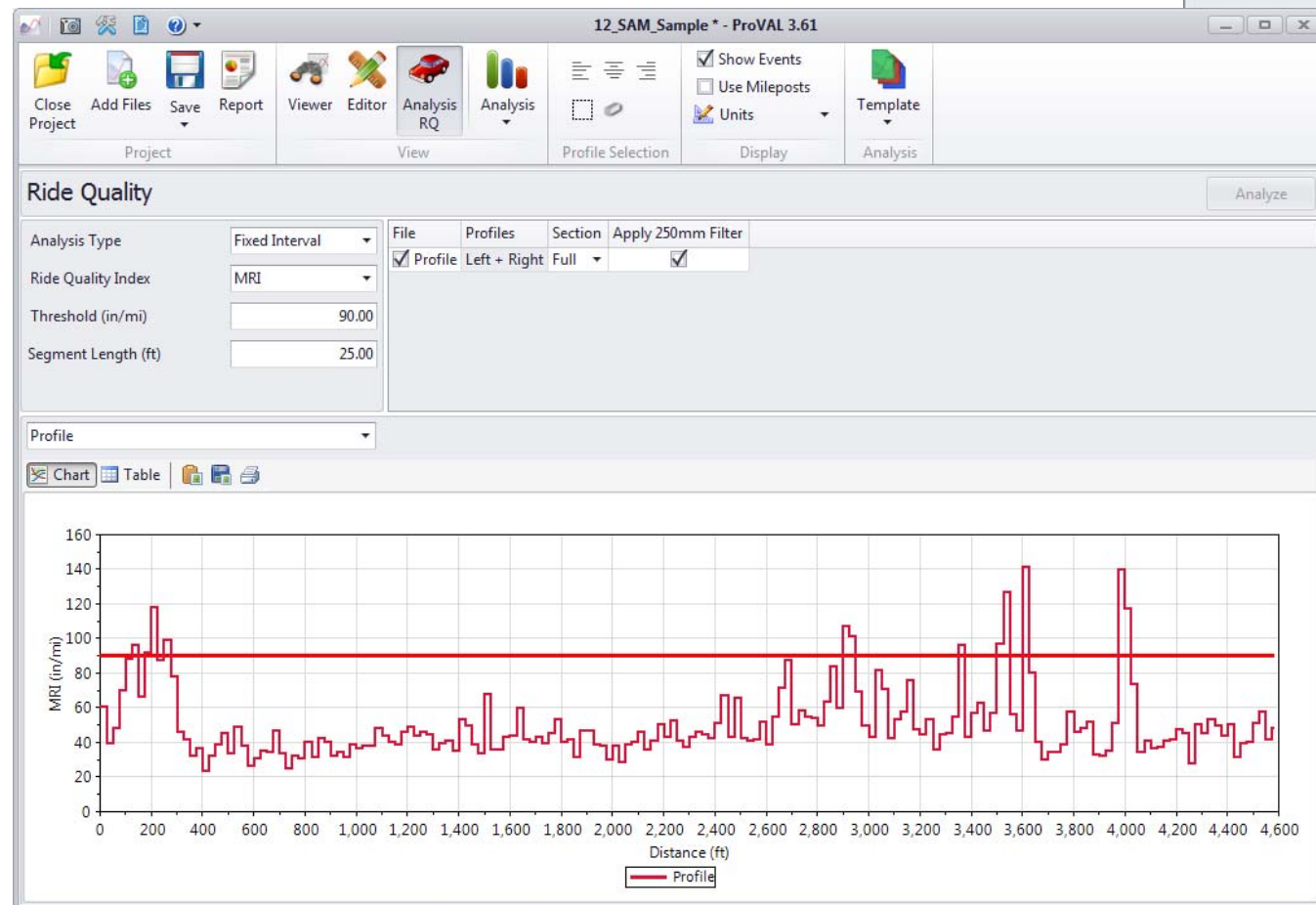
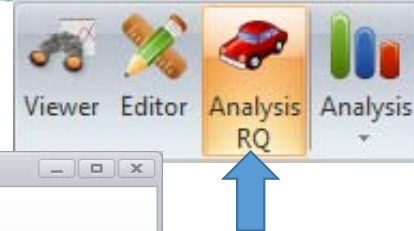
# Profile Viewing



# Profile Filtering

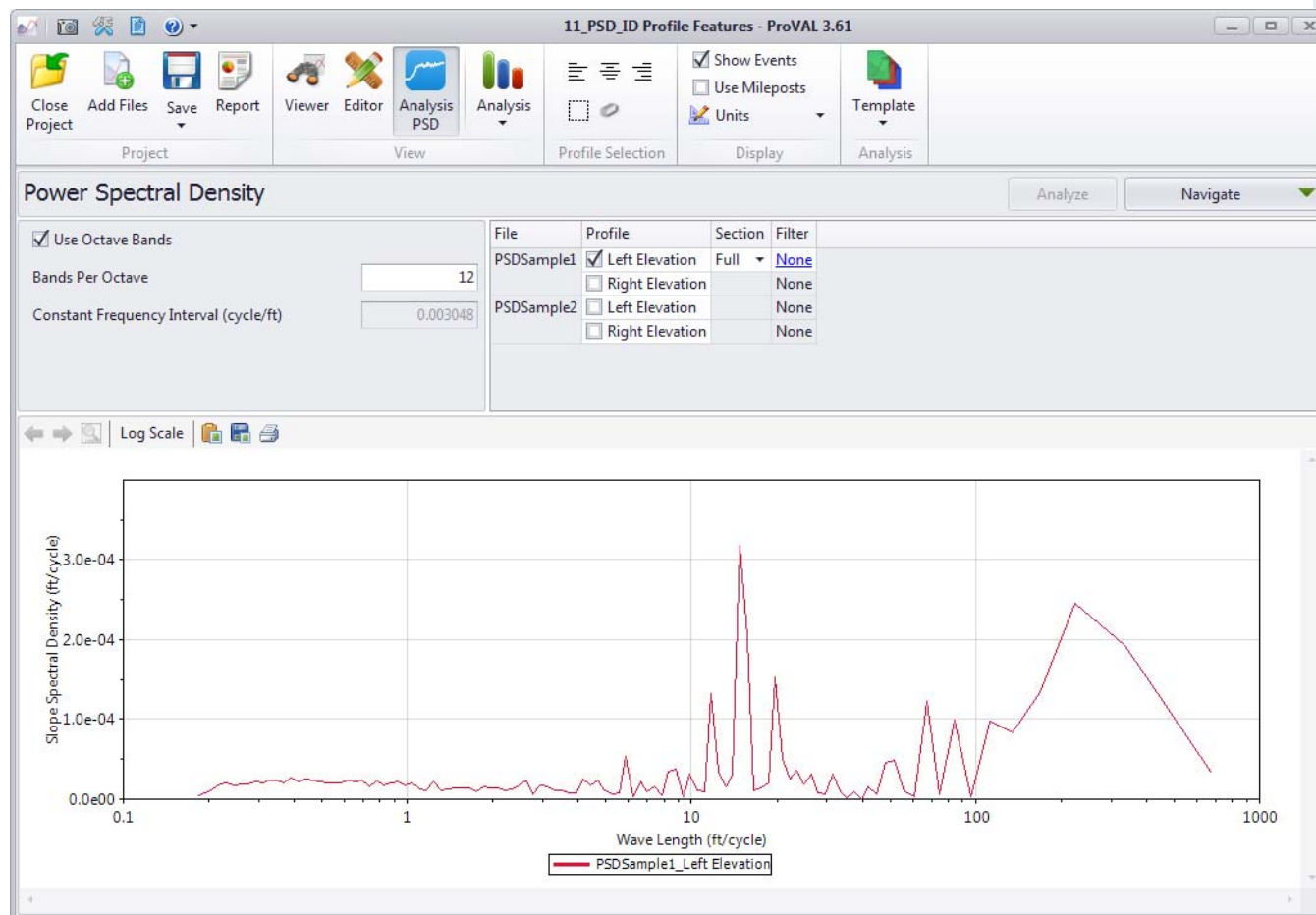
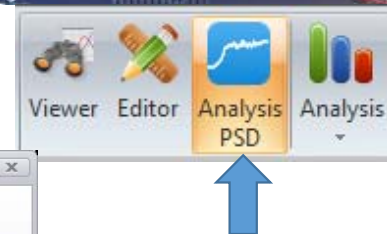


# Ride Quality (AASHTO R54)

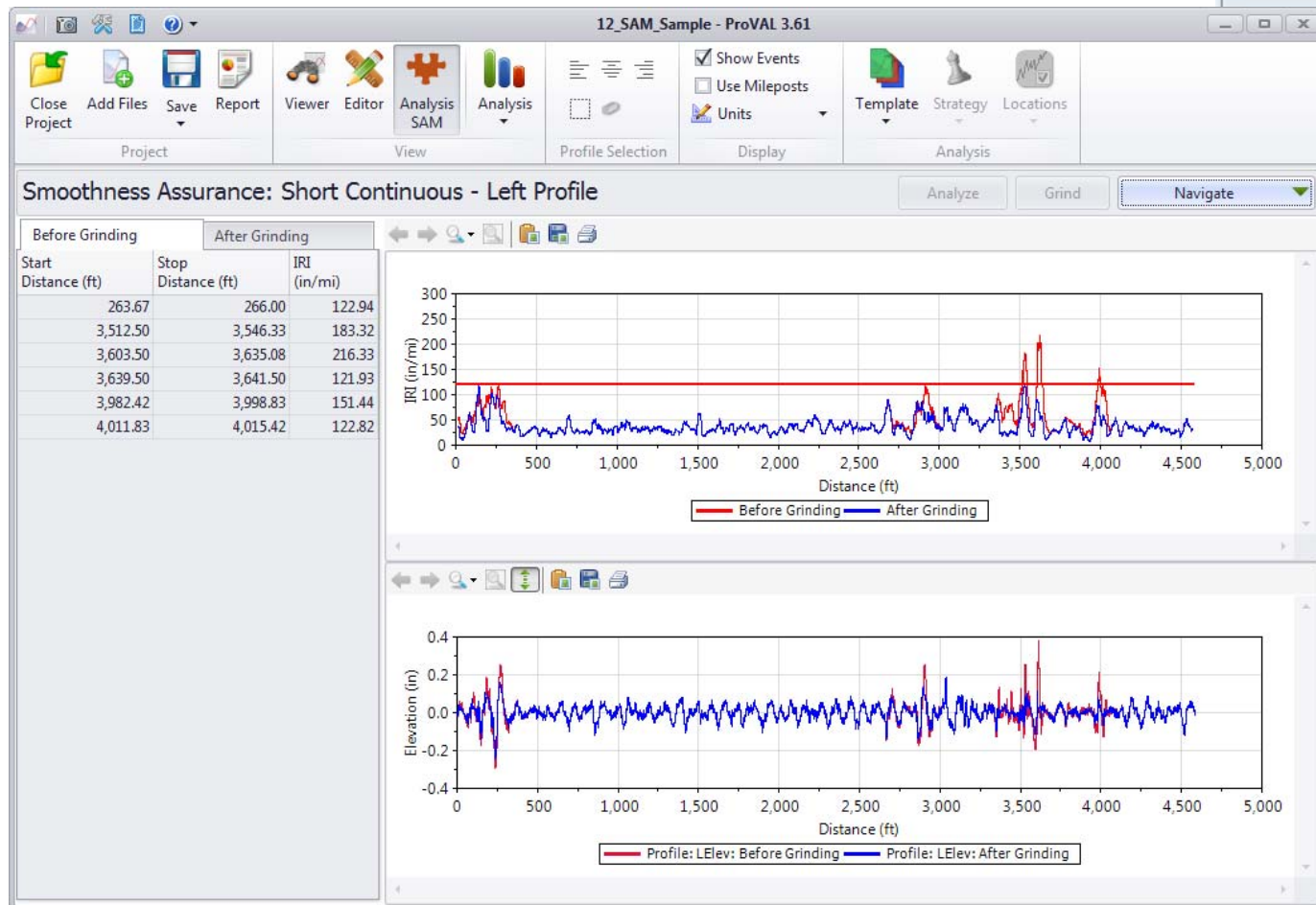




# Power Spectral Density (PSD)



# Smoothness Assurance

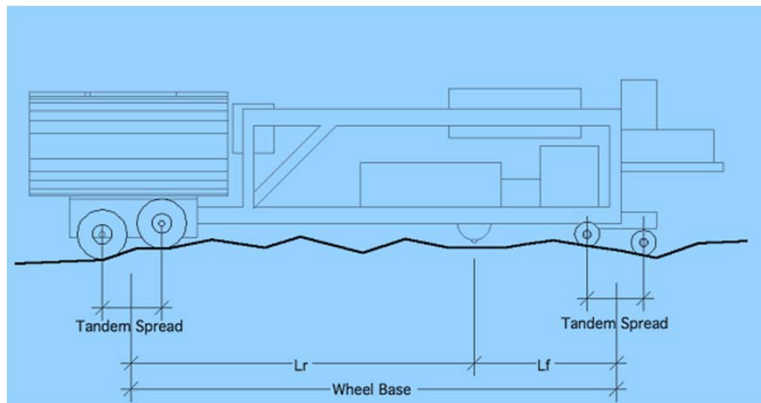
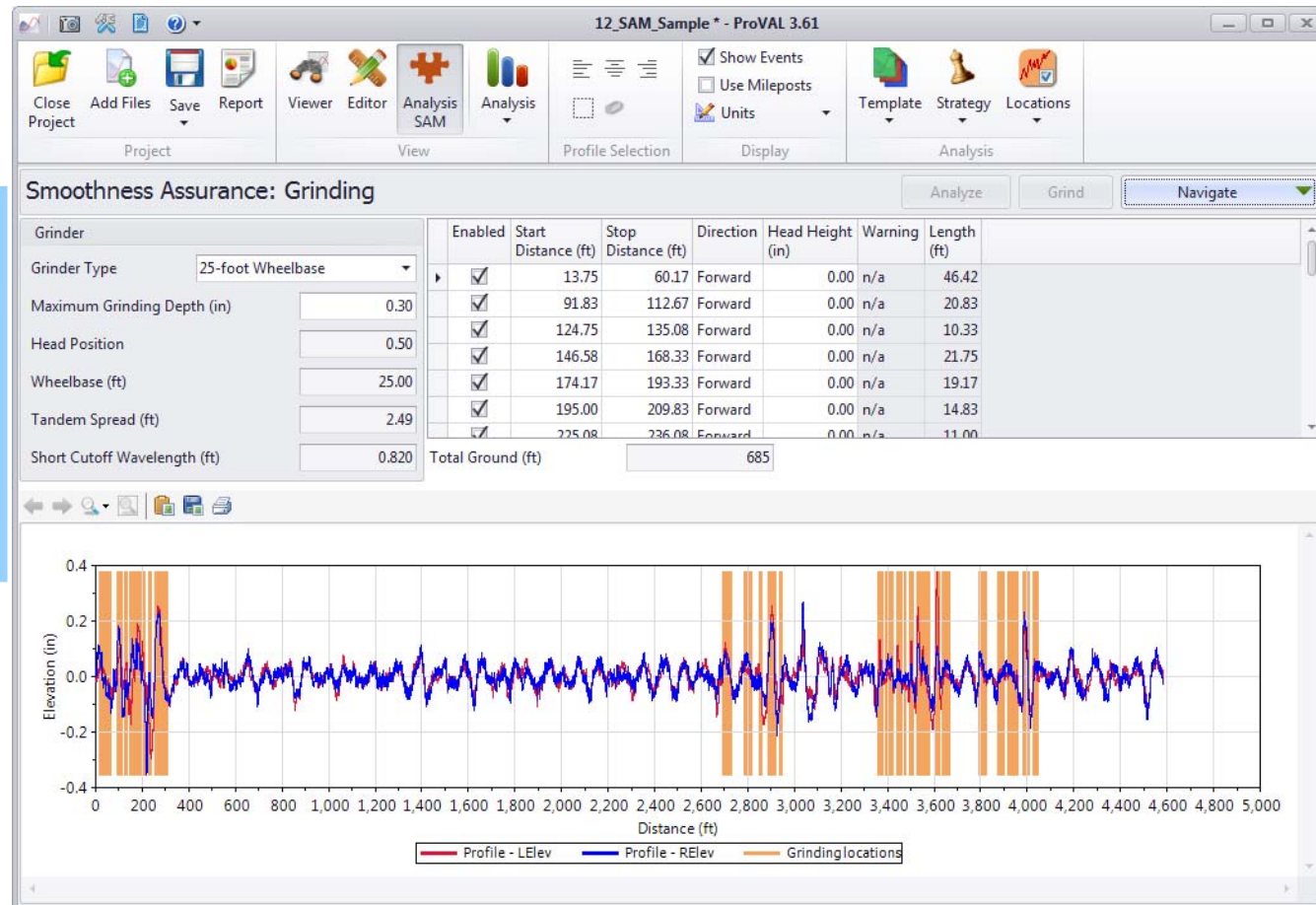


TRB 2006

S.A.M.

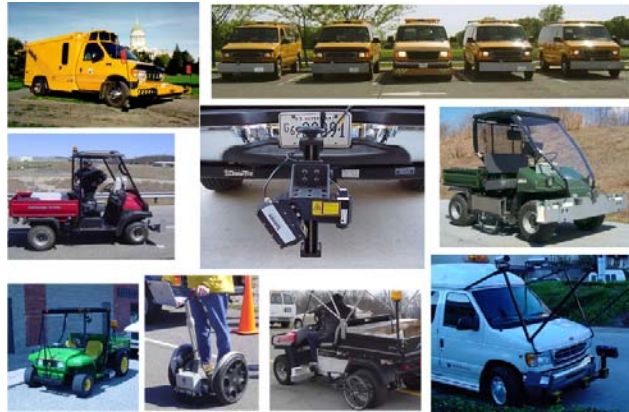
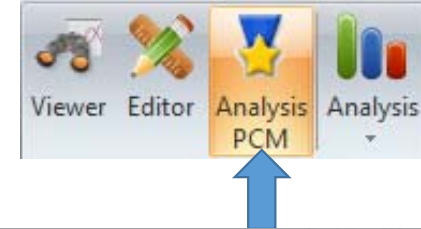


# SAM - Grinding Simulation





# Profiler Certification (AASHTO R56)



05\_PCM\_Aspphalt test - ProVAL 3.61

Close Project Add Files Save Report Viewer Editor Analysis PCM Analysis

Show Events Use Mileposts Units Template

Project View Profile Selection Display Analysis

### Profiler Certification: Summary Results

Analyze Navigate

#### Statistics

Statistic	Repeatability - Left	Repeatability - Right
Comparison Count	10	10
% Passing	100.00	100.00
Mean	98.37	98.95
Minimum	97.84	98.46
Maximum	99.33	99.36
Standard Deviation	0.5	0.3
Grade	Passed	Passed

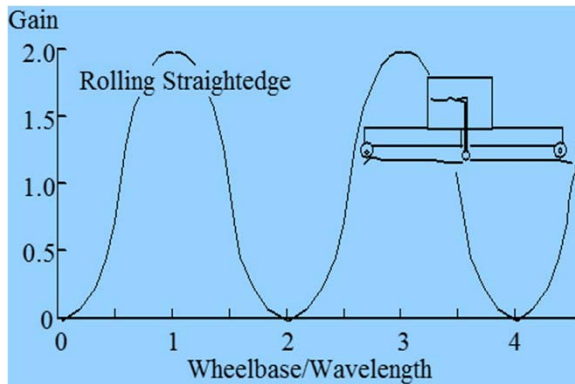
Repeatability - Left Correlations (%)					
Run	2	3	4	5	
1	97.84	99.00	98.09	98.02	
2		98.38	98.20	97.96	
3			98.46	98.42	
4				99.33	

Repeatability - Left Offsets (ft)					
Run	2	3	4	5	
1	0.0	0.1	0.0	0.1	
2		0.1	0.0	0.1	
3			-0.1	0.0	
4				0.1	

Repeatability - Right Correlations (%)					
Run	2	3	4	5	
1	98.80	98.86	98.46	98.84	
2		98.90	98.88	99.14	
3			98.93	99.30	
4				99.36	

Repeatability - Right Offsets (ft)					
Run	2	3	4	5	
1	0.0	0.1	0.0	0.1	
2		0.1	0.0	0.1	
3			-0.1	0.0	
4				0.2	

# Rolling Straight Edge Simulation



12\_SAM\_Sample - ProVAL 3.61

Close Project Add Files Save Report Viewer Editor Analysis RSE Analysis Profile Selection Display Analysis

Rolling Straightedge Analyze

Straightedge Length (ft) 10.00  
Deviation Threshold (in) 0.100

File Profile Section Filter  
Profile  LElev Full  RElev  None

Results  
Profile\_LElev

Start Distance (ft)	Stop Distance (ft)	Deviation (in)
151.58	152.33	-0.111
3,036.08	3,036.17	0.112
3,037.17	3,038.08	0.112
3,500.67	3,503.83	0.142
3,519.92	3,524.50	-0.123
3,528.17	3,533.17	0.174
3,609.42	3,616.00	0.173
3,977.25	3,980.00	-0.138
3,983.75	3,987.58	0.110

Surface Deviation (in) vs Distance (ft)

# Profilograph Simulation



15\_Case Studies \* - ProVAL 3.61

Close Project Add Files Save Report Viewer Editor Analysis PG Analysis Profile Selection Display Analysis

Profilograph Simulation Analyze Navigate

Inputs

Blanking Band (in) 0.20

Minimum Scallop Width (ft) 2.000

Minimum Scallop Height (in) 0.030

Scallop Rounding Increment (in) 0.05

Segment Length (ft) 528.00

Raw Profile Index

Rounded Profile Index

Wheel Offsets...

File	Profile	Basis	Section	Filter
01_MS_WavyACP	<input checked="" type="checkbox"/> Left Elevation <input type="checkbox"/> Right Elevation	<input checked="" type="checkbox"/>	Full	Butterworth Low-pass (1.97 ft)
02_Rough_Road	<input type="checkbox"/> Left Elevation <input type="checkbox"/> Right Elevation	<input type="checkbox"/>		None
03_CO_Concrete	<input type="checkbox"/> Left Elevation <input type="checkbox"/> Right Elevation	<input type="checkbox"/>		None
04_NJ_I-95_L2	<input type="checkbox"/> Left Elevation <input type="checkbox"/> Right Elevation	<input type="checkbox"/>		None
05_IA_JCP_F1	<input type="checkbox"/> Elev.	<input type="checkbox"/>		None
06_AC_Overlay	<input type="checkbox"/> Left Elevation <input type="checkbox"/> Right Elevation	<input type="checkbox"/>		None
07_MysteriousSpikes	<input type="checkbox"/> LElev.	<input type="checkbox"/>		None

Results

Profile 01\_MS\_WavyACP\_Left Elevation

Scallops All

Scallop	Start Distance (ft)	Stop Distance (ft)	Height (in)
Down	62.24	68.69	0.05
Up	123.59	135.60	0.05
Up	167.85	173.59	0.05
Down	383.37	402.90	0.05
Up	496.02	502.97	0.05
Up	654.23	664.15	0.05
Down	716.40	727.99	0.05

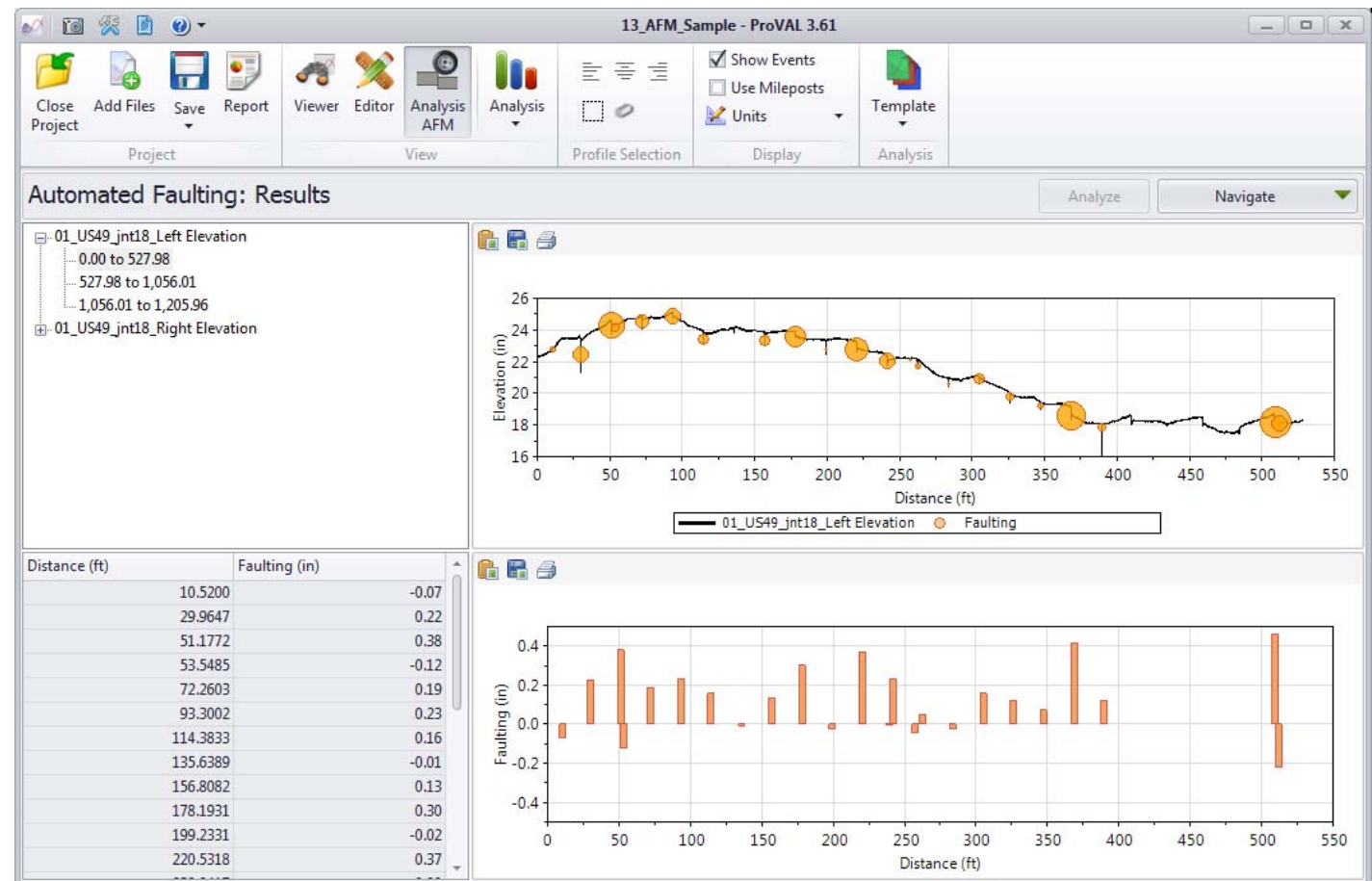
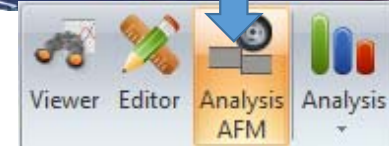
Profilograph Response (in)

Distance (ft)

01\_MS\_WavyACP\_Left Elevation

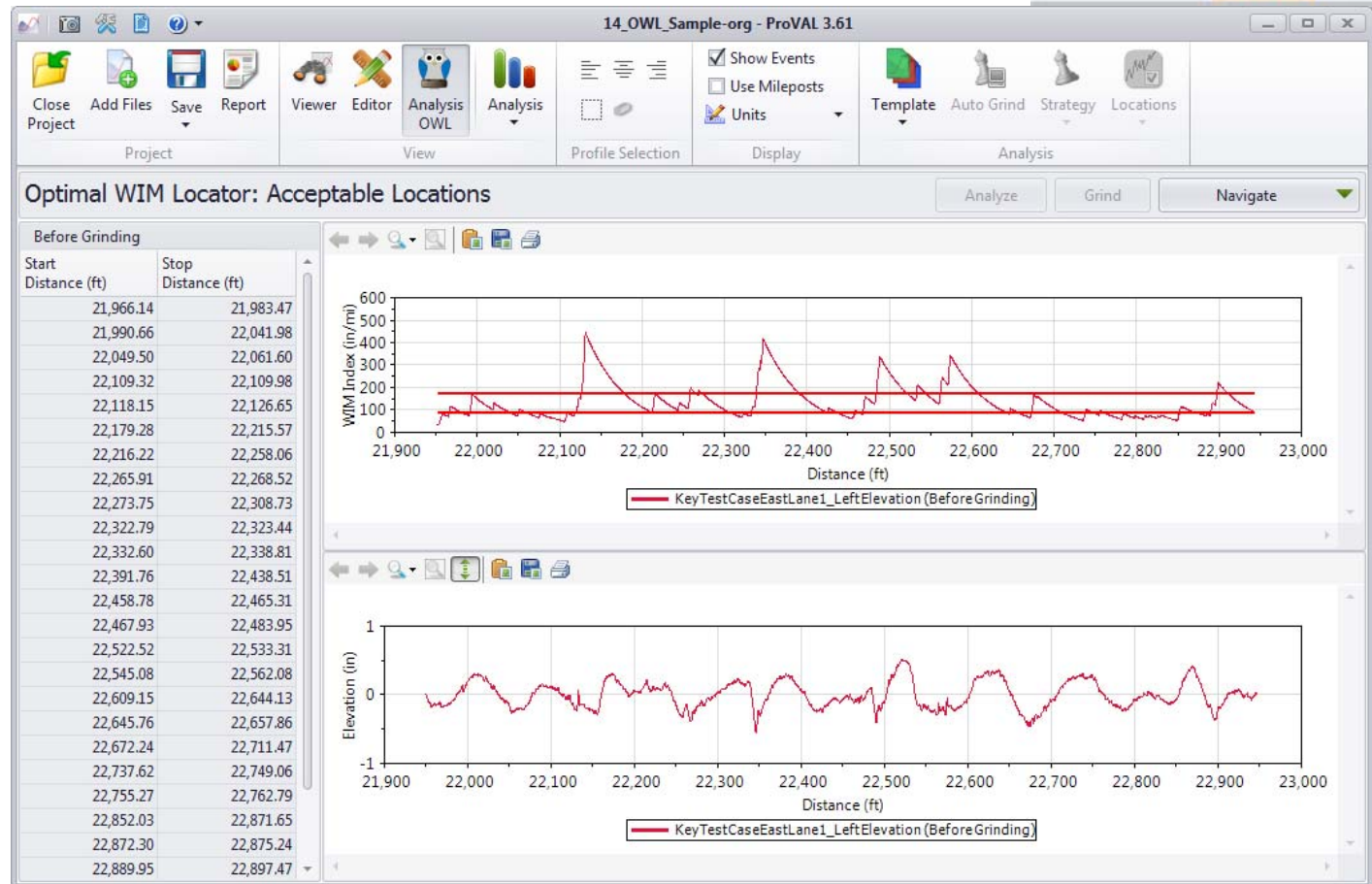
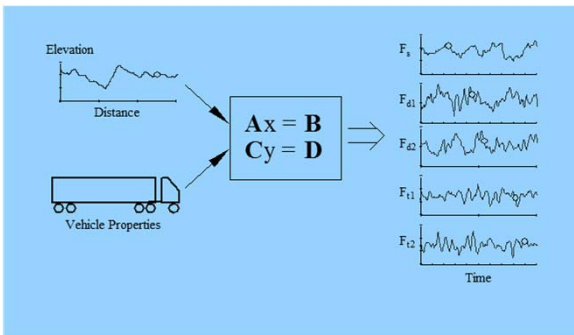


# JCP Fault Measurement (AASHTO R36)

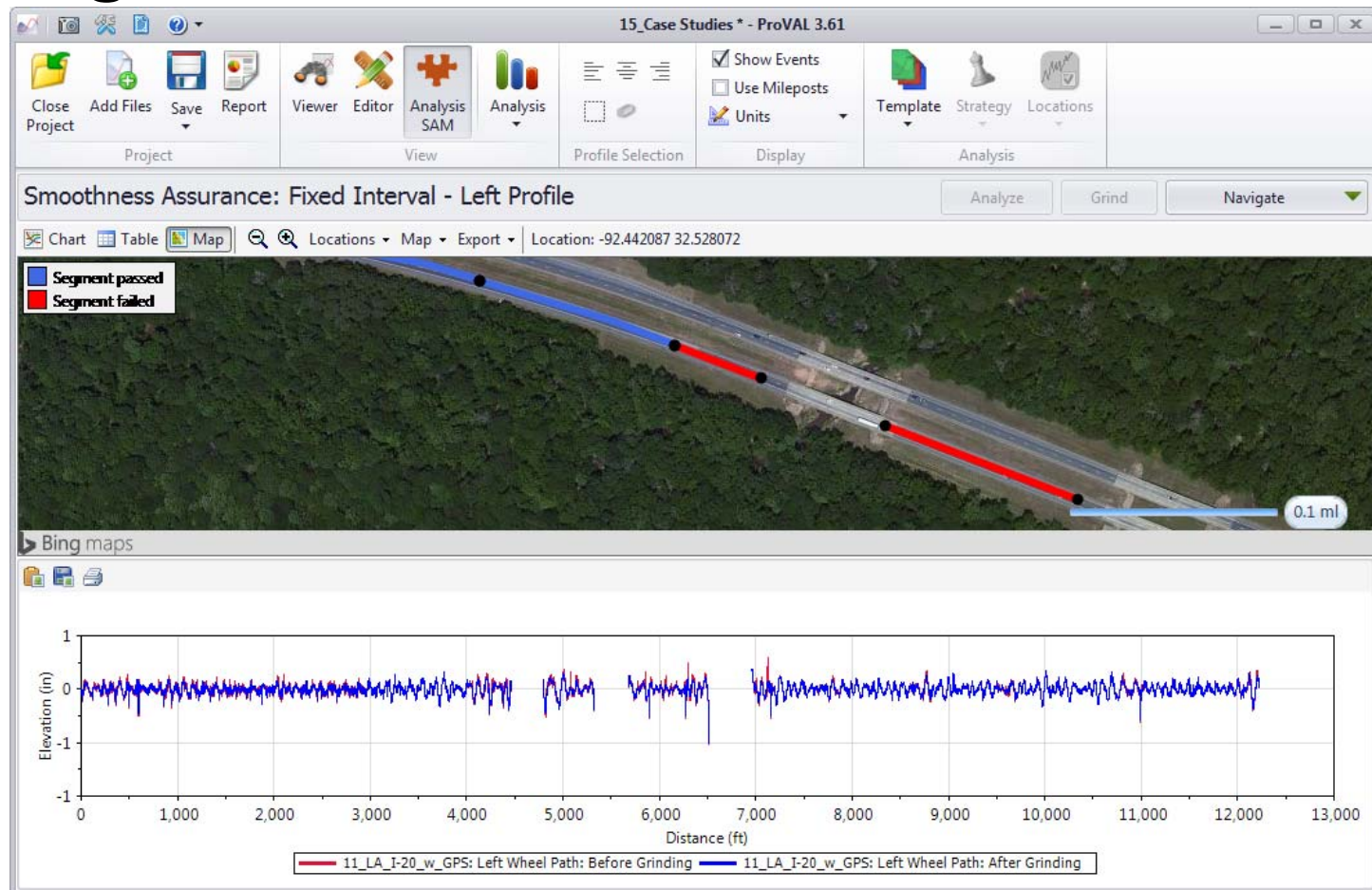


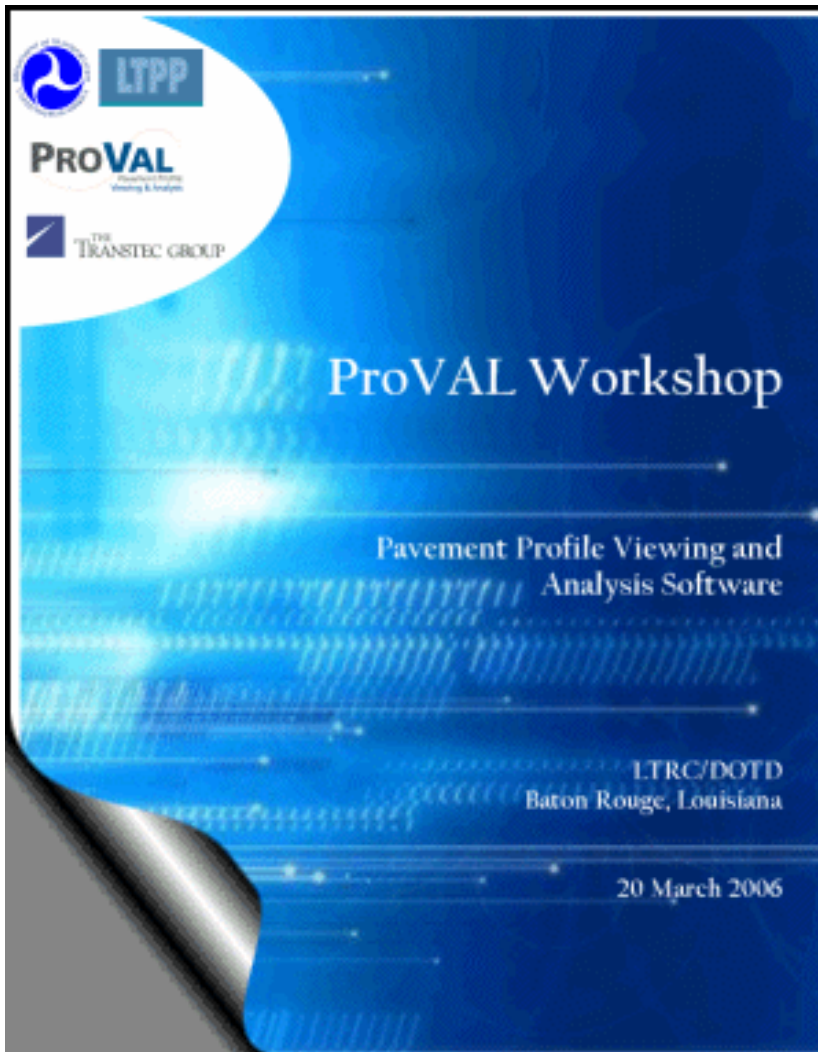


# Optimal WIM Locator (AASHTO M331)



# Map Integration





# 2005 Pilot Workshop FLDOT

## PAVEMENT PROFILE VIEWER AND ANALYZER (ProVAL version 2.5) SOFTWARE WORKSHOP

### Tentative Agenda

#### OBJECTIVES

- ✦ To familiarize attendees with the current version of the *Profile Viewer and Analyzer* software (*ProVAL* [www.roadprofile.com](http://www.roadprofile.com)).
- ✦ To refresh some of the key fundamentals of pavement profiling and analysis methods.
- ✦ To inform attendees of the advantages, limitations, and pitfalls related to analyzing and interpreting pavement profiles.
- ✦ To provide an interactive and hands-on approach throughout the workshop.

#### AGENDA

- 12:30pm Welcome and Self-Introductions
- 12:45pm Overview and Outline of Workshop
- 12:55pm Preview of Pavement Profile Viewer and Analyzer Software
- 01:10pm Refresher on the Fundamentals of Pavement Profiling
- 01:45pm Profile Analysis – Part I
- 03:00pm *Break*
- 03:30pm Profile Analysis – Part II
- 04:30pm *Adjourn for the day*

#### Next Session

- 08:00am Bumpfinder and Grinder Simulation – Part I
- 09:30am *Break*
- 09:45am Bumpfinder and Grinder Simulation – Part II
- 11:30am General Discussion including the Future of Pavement Profiling
- 11:45am Conclusion and Workshop Evaluations
- 12:00noon *Adjourn*

#### WORKSHOP MATERIALS

- ✦ CD-ROM containing latest version of the FHWA ProVAL Software
- ✦ Printed packet including Workshop Slides

#### SPECIAL NOTES

- ✦ Attendees will need to bring their laptop computers for the hands-on sessions.

#### INSTRUCTORS

Steven M. Karamihas Senior Research Associate UMTRI 2901 Baxter Road Ann Arbor, MI 48109-2150 (734) 936-1057	George K. Chang, P.E., Ph.D. The Transtec Group, Inc. 1012 East 38 1/2 Street, Austin TX 78751 (512) 451-6233	Michael J. Swan, P.E. Project Manager Dick Corporation 10320 Brecksville Road Brecksville, Ohio 44141
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## ProVAL Trainers



**Mr. Bob Orthmeyer, P.E.**

*COTR*

*FHWA Resource Center*



**Dr. George Chang, P.E.**

*Team Lead – ProVAL Support  
The Transtec Group, Inc.*



**Mr. Steve Karamihas**

*Trainer – ProVAL Support  
University of Michigan*



**Ms. Jennifer Rutledge**

*Trainer – ProVAL Support  
Transtec Group*



**Mr. Dave Merritt, P.E.**

*Trainer – ProVAL Support  
Transtec Group*



# ProVAL Training

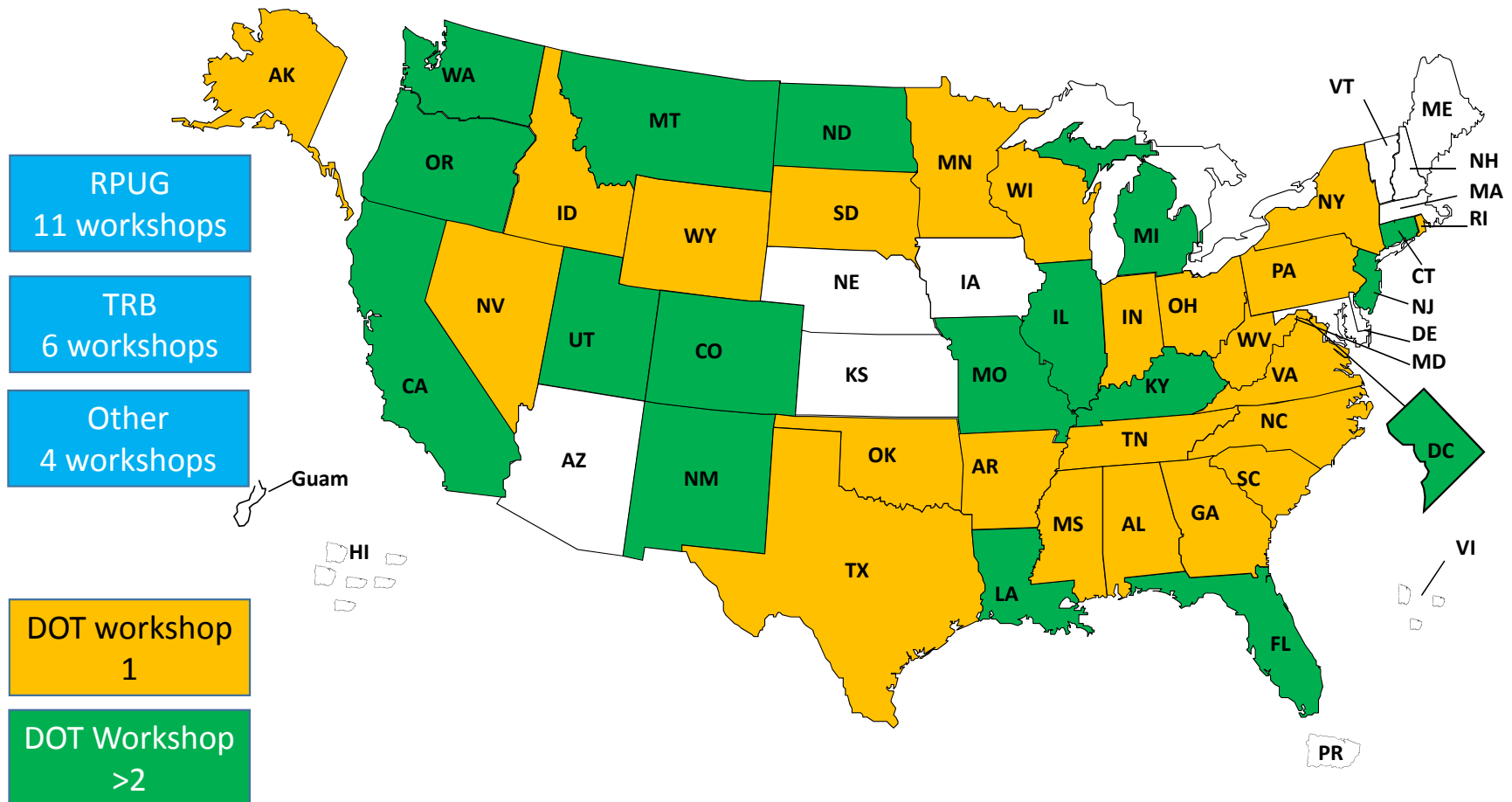
2005  
Pilot  
Workshop  
FLDOT

**Inertial Profiler Data for  
Construction Quality Control  
and Acceptance Testing**

January 24-25, 2005

Michael Swan

# 80 ProVAL workshops since 2005



## ProVAL workshop 2007 Washington State



## ProVAL workshop 2009 LTRC





## ProVAL workshop 2010 SC DOT



## ProVAL workshop 2012 RPUG (MN)





## ProVAL workshop 2014 NM DOT



## ProVAL workshop 2016 ID DOT



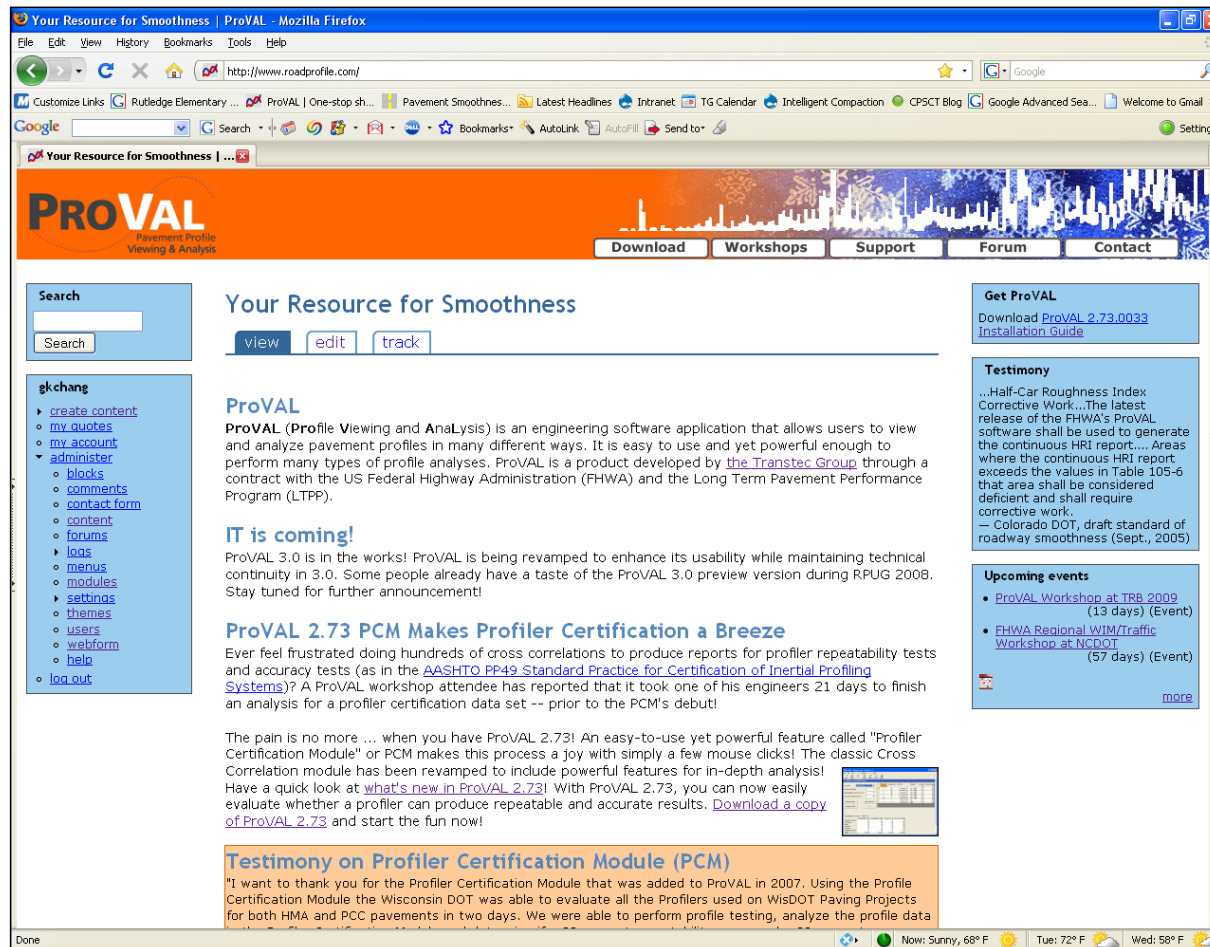
## How to get Technical Support?

- Online Helpdesk [www.roadprofile.com/proval-support](http://www.roadprofile.com/proval-support)
- Email
  - Support@roadprofile.com



**www.RoadProfile.com**

# ProVAL Website 2008



# ProVAL Website 2013

PROVAL
Search

[Downloads](#) | [Workshops](#) | [Support](#) | [Forum](#) | [Contact](#) | [About](#)

Software

- [ProVAL 3.40.0291](#)
- [Release Notes](#)
- [Installation Guide](#)

Welcome to ProVAL

ProVAL is an engineering software application used to view and analyze pavement profiles. It is easy to use, yet powerful enough to perform many types of profile analyses. **Contact us** if you have any questions, comments, feedback, or to find out more about any of our workshops.

Looking for smoothness specifications? Check out our companion website: [SmoothPavements.com](#).

Take a look at a brief introduction to ProVAL in various languages:

English
Español
華語
华语

ProVAL Workshops

**February 2013**

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28		

ProVAL Workshop  
at TN DOT

February 20, 2013 at 8:30 AM

TDOT auditorium

TDOT auditorium - 6601  
Centennial Blvd - Nashville,  
TN 37243

Event Registration Online powered by  
Eventbrite

Documentation

- [ProVAL 3.4](#)
- [ProVAL 3.3](#)
- [General FAQ](#)
- [Library](#)

gkchang

- [My account](#)
- ▼ [Create content](#)
  - [Book page](#)
  - [Forum topic](#)
  - [Image](#)
  - [Page](#)
  - [Story](#)
  - [Webform](#)
- [Administer](#)
- [Log out](#)

ProVAL 3.40 Released

We are pleased to announce the release of ProVAL 3.4!

We have made many changes, and added several new features, all of which are included in the must-read **Release Notes**. Check out the **ProVAL 3.4 intro document**.

If you encounter an issue, please **contact us**. Be aware that due to the holidays, no new version of ProVAL will be available after this for at least a couple of weeks.

**Highlights:**

- Enhanced localized roughness report in Smoothness Assurance
- Advanced report for Profiler Certification
- Locating profiles on a map in a Web browser or Google Earth
- .NET Requirements changed
- Other major changes

[Download ProVAL 3.40.0291](#)

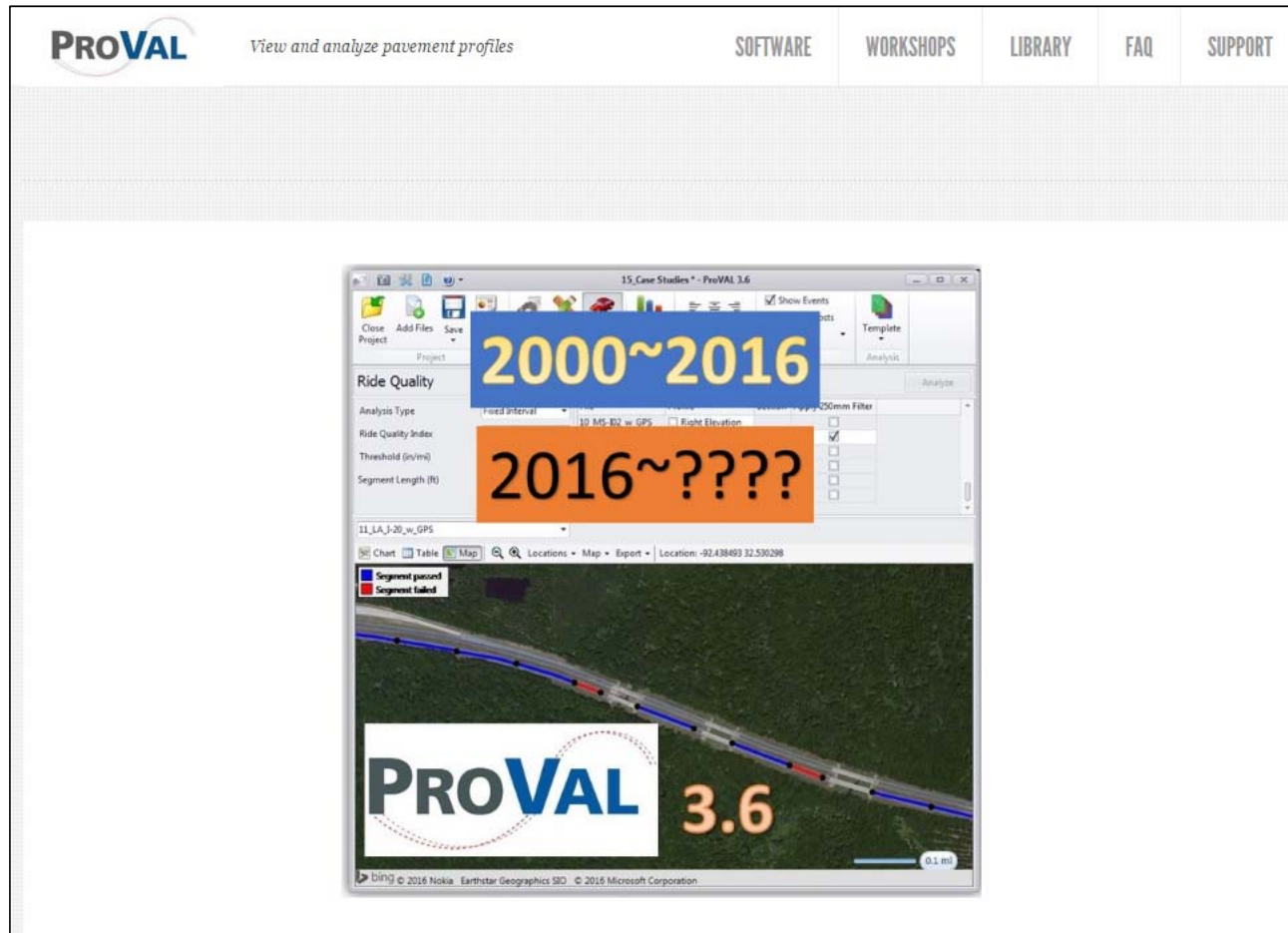


ProVAL 3.4

FASTER - EASIER - FUNNER



# ProVAL Website 2016

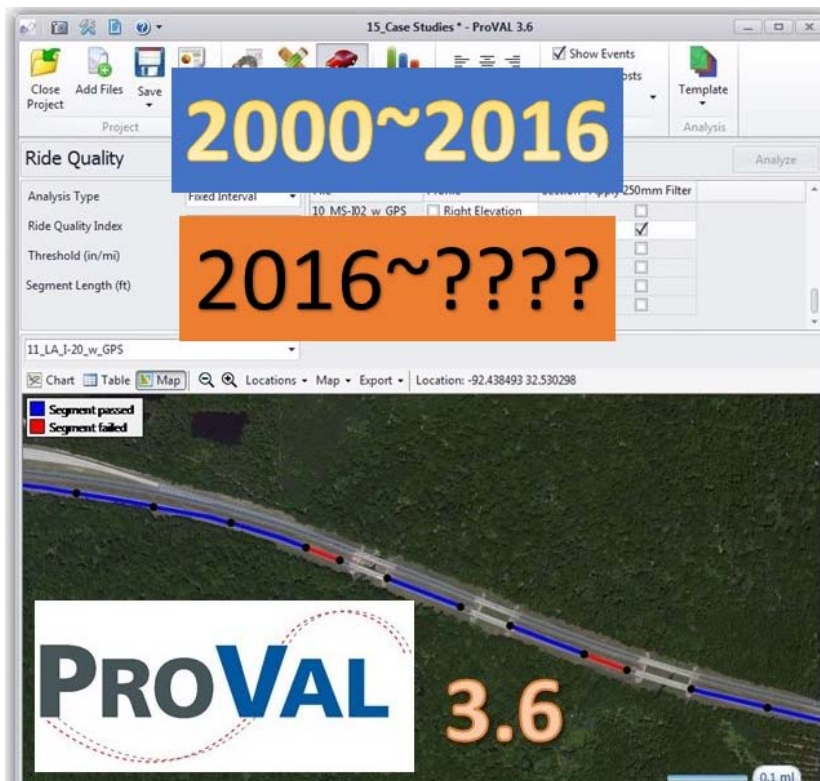


# ProVAL HelpDesk

The screenshot displays the ProVAL HelpDesk dashboard. At the top left is the ProVAL logo and the text 'ProVAL Support'. A navigation menu includes 'Dashboard', 'Tickets', 'Solutions', 'Customers', 'Reports', and 'Admin'. On the right, there are links for '+ New' and 'Search', along with a user profile picture and a help icon. The main section is titled 'Ticket Summary' and features a 'Unresolved Tickets' link. Below this, six statistics are shown in a grid format, each with an icon, a large number, and a label: 18 Unresolved (calendar icon), 5 Overdue (calendar with exclamation mark icon), 0 Due Today (hourglass icon), 5 Open (tag icon), 13 On Hold (stopwatch icon), and 0 Unassigned (question mark icon).

Category	Count
Unresolved	18
Overdue	5
Due Today	0
Open	5
On Hold	13
Unassigned	0

# Future Sponsor of ProVAL



 TRANSPORTATION POOLED FUND PROGRAM
Username:   
Forgot your username?

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Home > Home > Search Solicitations and Studies > Study Detail View Study Detail View

## Study Detail View

### Improving the Quality of Highway Profile Measurement

#### General Information

<b>Study Number:</b> TPF-5(354)	<b>Status:</b> Cleared by FHWA	<b>Contract/Other Number:</b>
<b>Lead Agency:</b> South Dakota Department of Transportation		<b>Last Updated:</b> Aug 24, 2016
<b>Contract Start Date:</b>	<b>Est. Completion Date:</b>	<b>Contract End Date:</b>
<b>Partners:</b> CT , FL , IL , KS , KY , LA , NC , NY , OH , PA , SD , TX , WI		

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#### Contact Information:

**Lead Agency Contact(s):**

David Huft  
dave.huft@state.sd.us  
Phone: 605-773-3358

**FHWA Technical Liaison(s):**

Robert Orthmeyer  
Robert.Orthmeyer@dot.gov  
Phone: 708-283-3533

## Future of ProVAL

