

# **Validation of the Rolling Straightedge Simulation Performed on Data Collected by an Inertial Profiler**

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# Use of Rolling Straightedge in Ohio





# Instrumenting a Rolling Straightedge

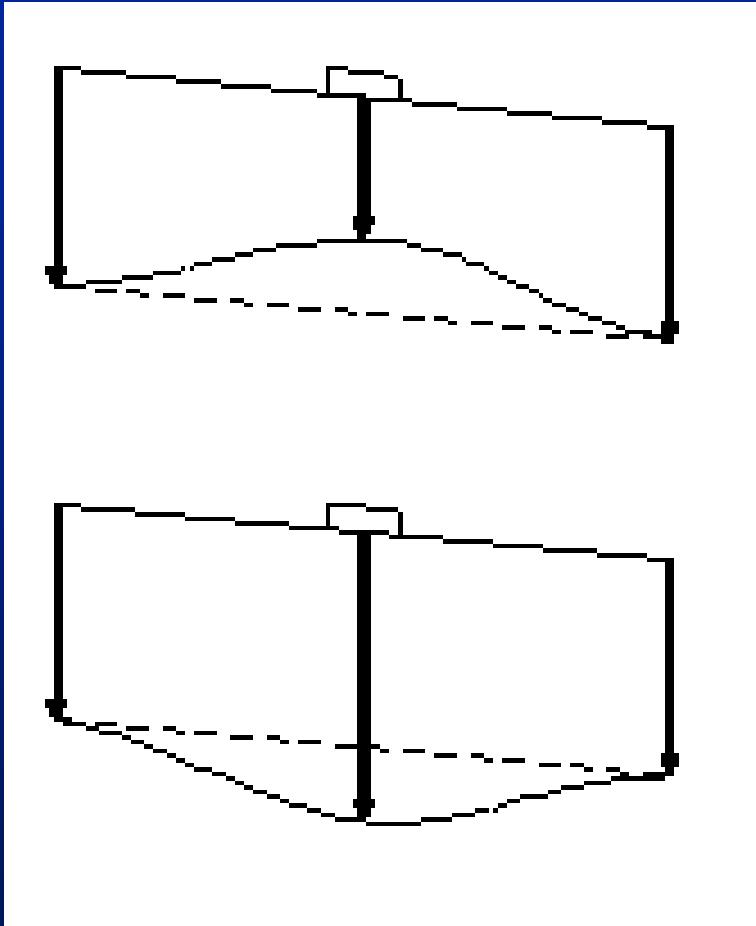




# *Ohio DOT 10-ft Rolling Straightedge*



# ||||| Measuring Principle



# Instrumented Rolling Straightedge



10-ft Rolling Straightedge

# *Instrumented Rolling Straightedge*



**Data Recording  
Interval = 0.166 inches**

# Validating Data Collected by the Instrumented Rolling Straightedge



## *Validation of Data Collected by the IRS*

- Collect data on the concrete section at the OH DOT profiler certification site with the IRS and SurPRO.
- Perform a Rolling Straightedge Simulation on the SurPRO data using ProVAL and compare output with the IRS data.

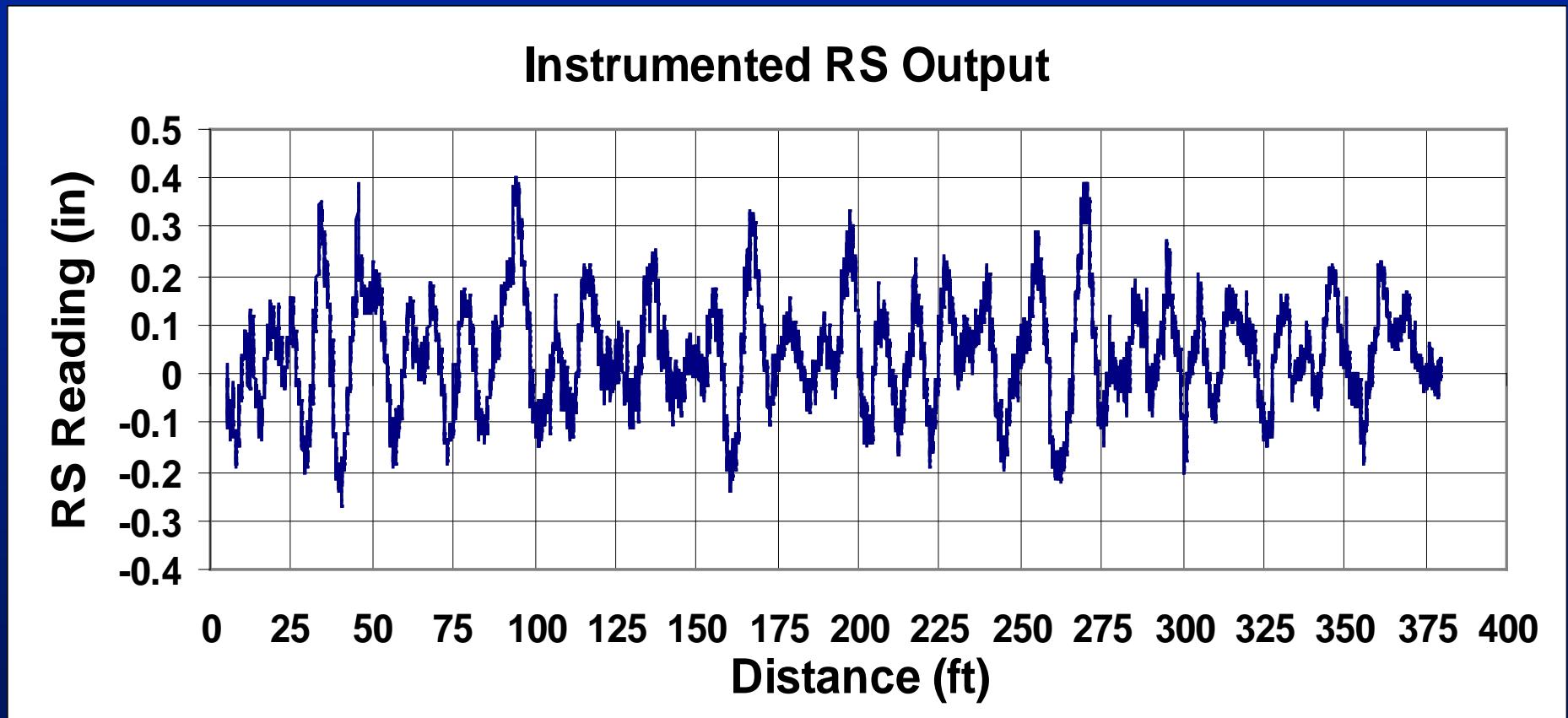
# |||| OH DOT Certification Site



# *SurPRO Rolling Profiler*

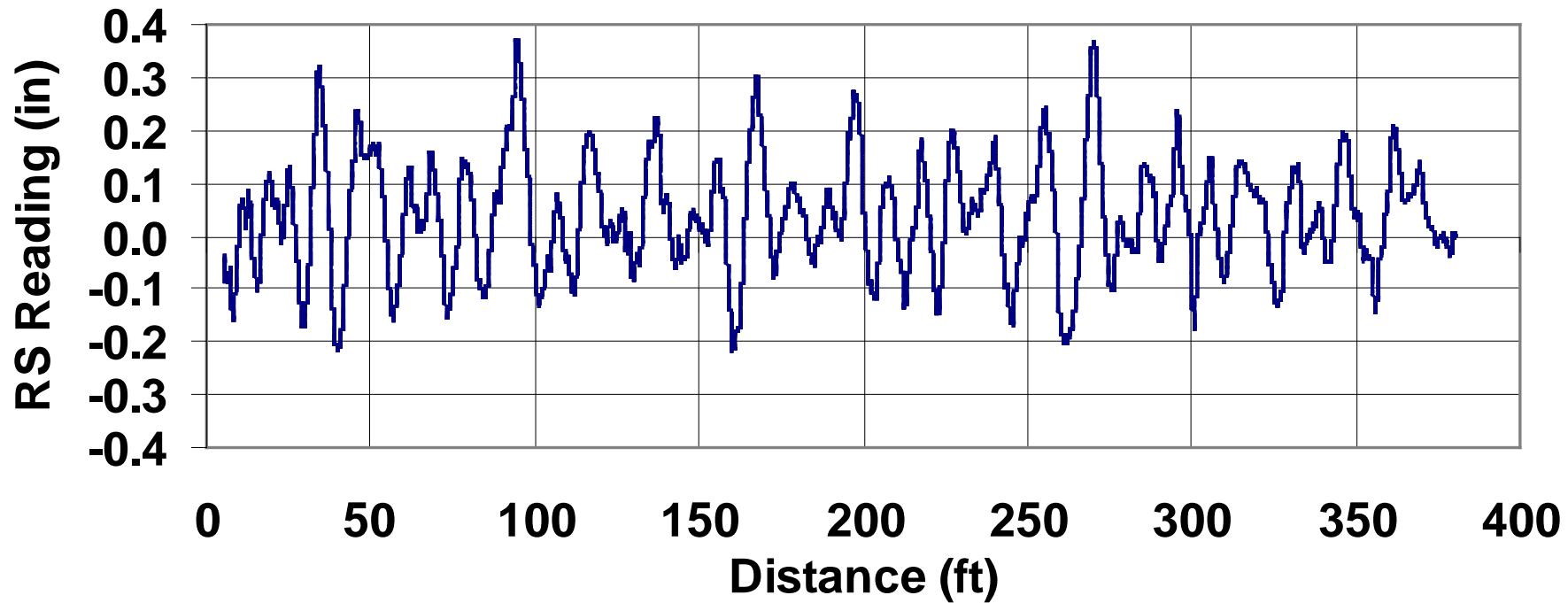


# ||||| IRS Data

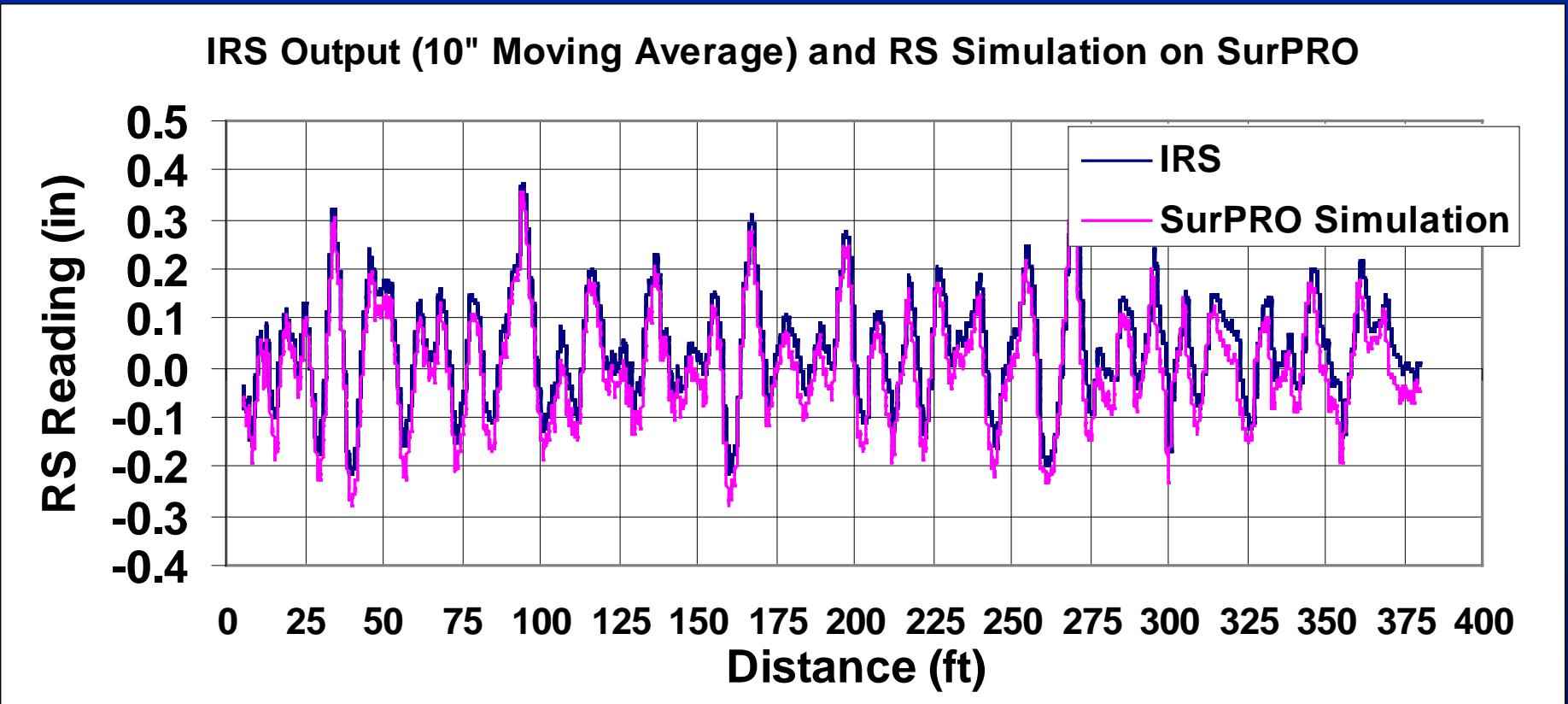


# *Smoothened IRS Data*

Instrumented RS Output (10" Moving Average)



# Compare IRS and RS Simulation on SurPRO Data by ProVAL





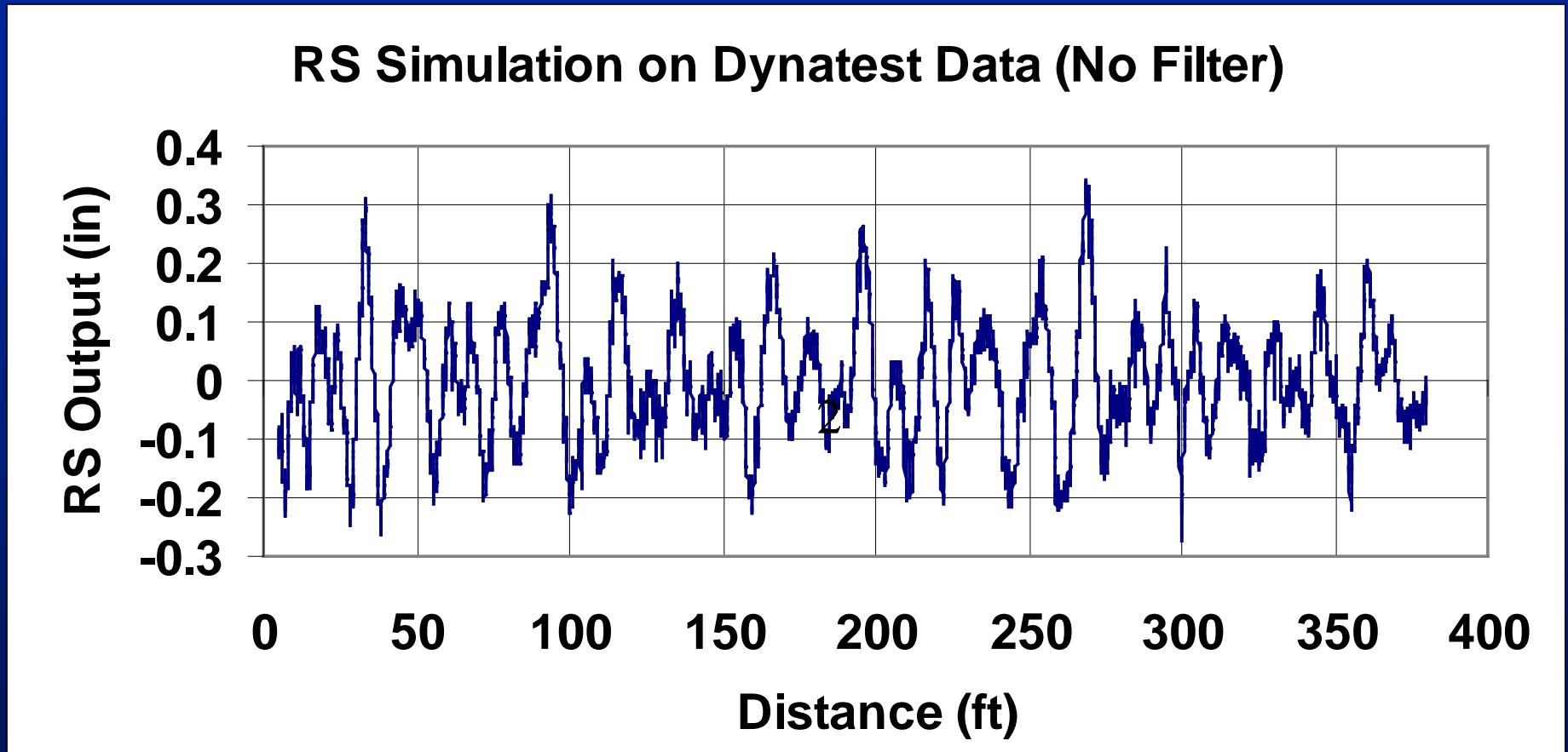
## Cross-Correlation Values

Profiles being Compared	CC (%)
RS Simulation Surpro vs. IRS (Non-smoothened)	94.7
RS Simulation Surpro vs. IRS (Smoothened)	93.7



# Compare IRS and RS Simulation on Profiler Data

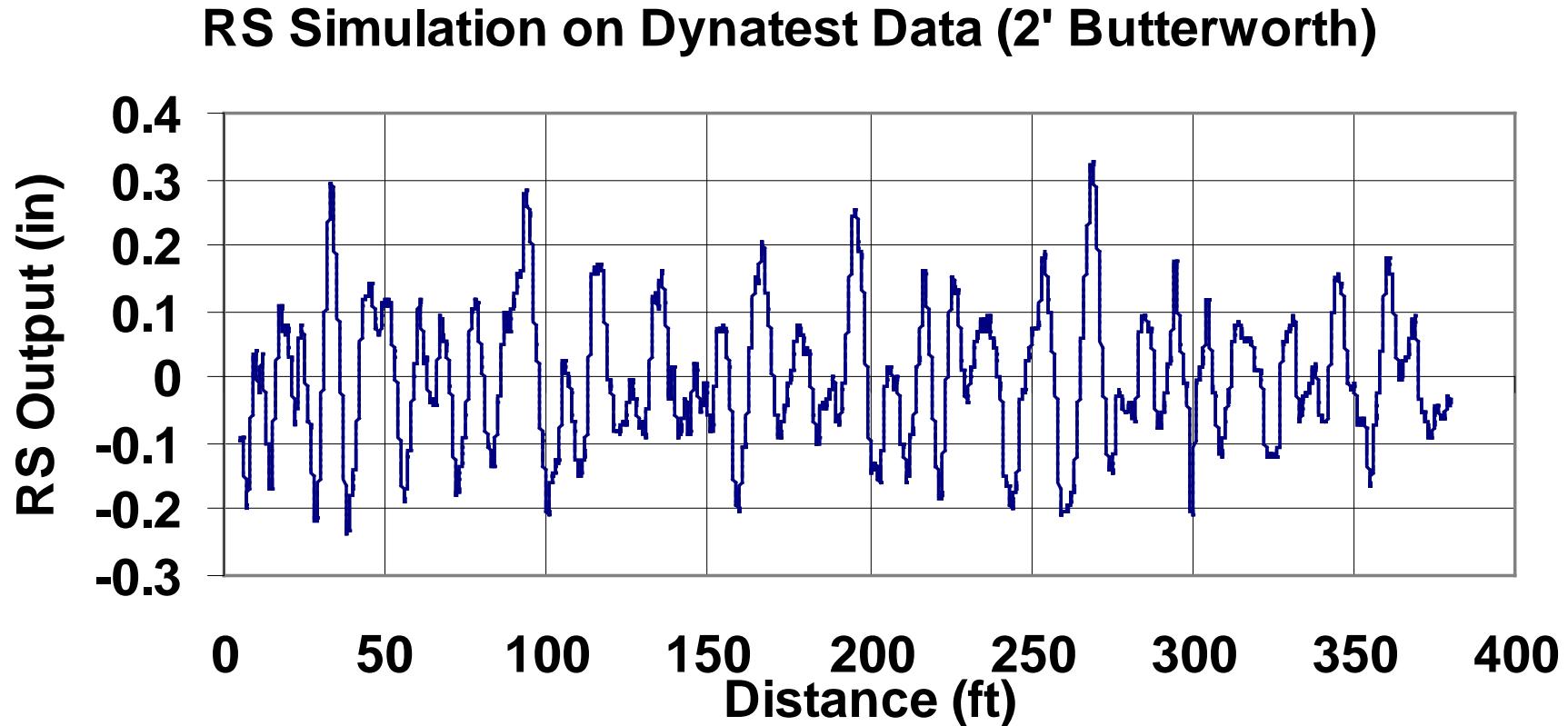
# Profiler – RS Simulation by ProVAL



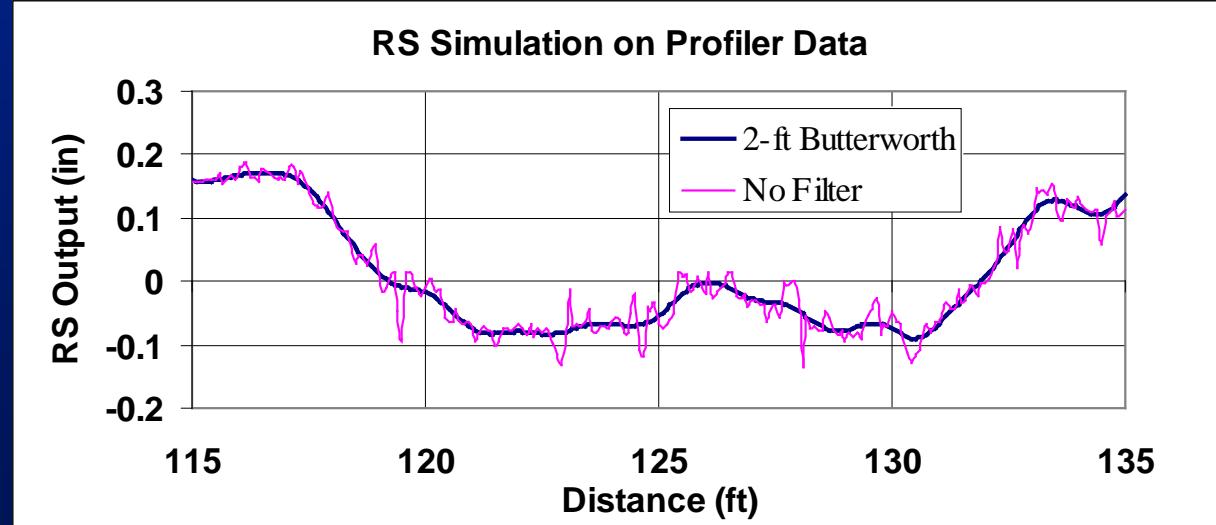
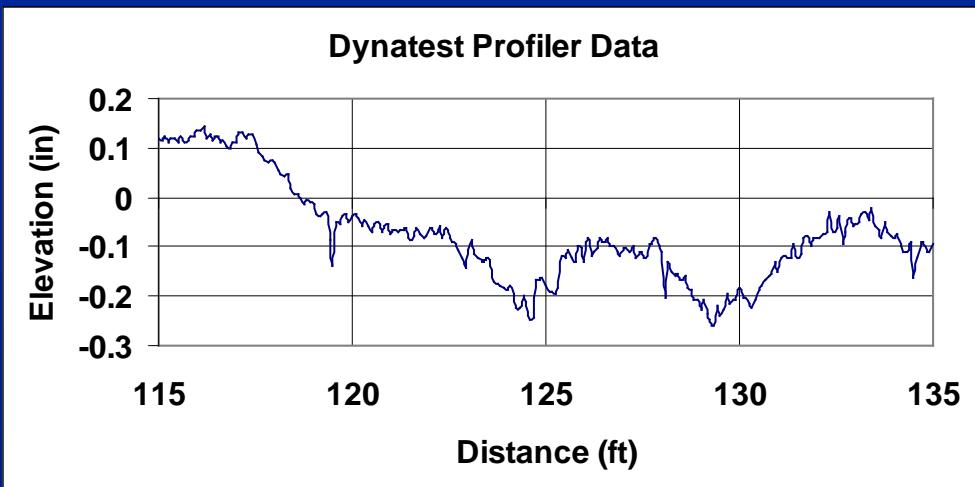
Profiler Data Collection Interval = 1 inch



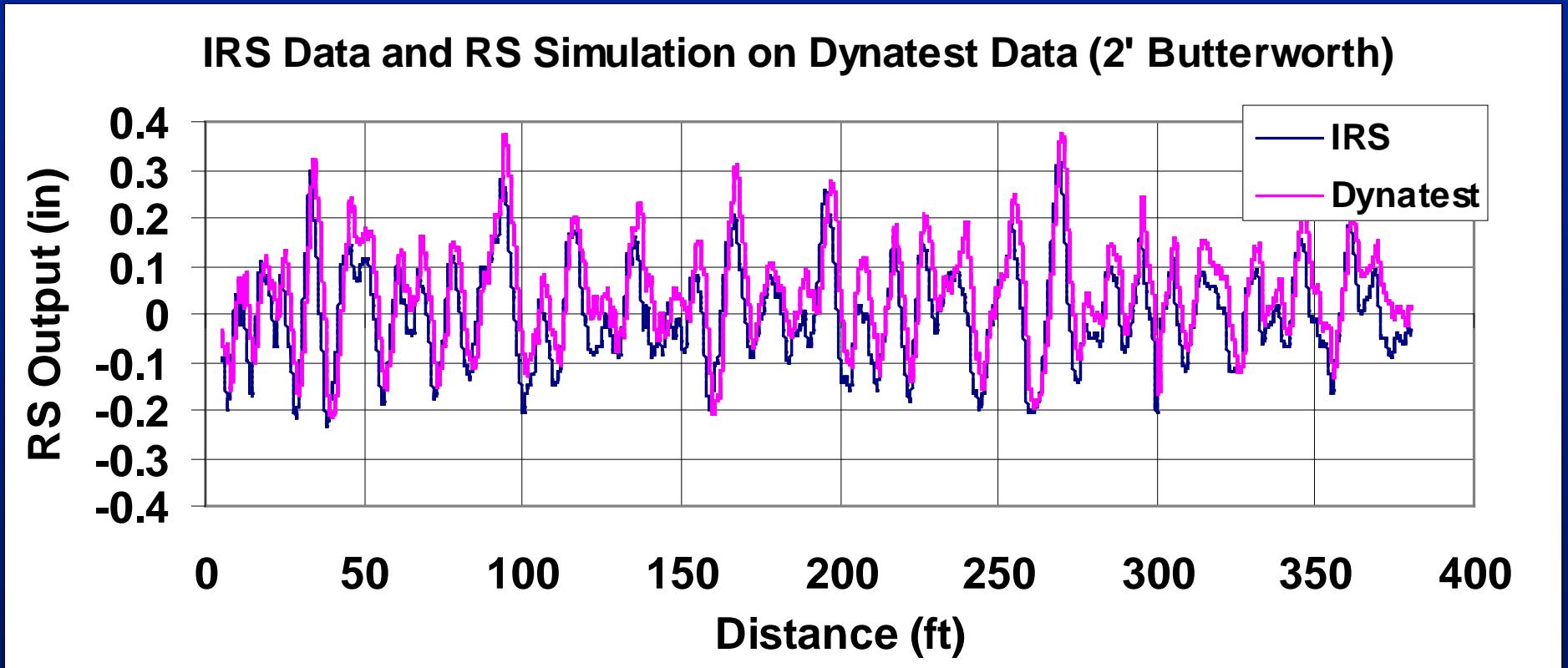
# Profiler – RS Simulation by ProVAL



# Affect of a 2-ft Low-Pass Filter



# Comparison between IRS and RS Simulation on Profiler Data



## *Cross-Correlation Values*

<b>RS Profiles being Compared</b>	<b>CC (%)</b>
<b>RS Simulation on Profiler Data (No Filter) vs. IRS</b>	<b>92.6</b>
<b>RS Simulation on Profiler Data (Butterworth 2 ft) vs. IRS</b>	<b>92.3</b>



## **Conclusions**

- A rolling straightedge simulation performed on inertial profiler data provides data comparable to that obtained by a rolling straightedge.
- Using a 2-ft Butterworth filter during the RS simulation is recommended.