LTPP PROFILE DATA – 20 YEARS OF DATA COLLECTION

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Overview

- Profile data collection at LTPP sections started in 1989. Data collection is still being performed.
- Four inertial profilers used to collect data.
- Profilers operated by regional contractors.
- Three types of profilers have been used so far in the LTPP program: K.J. Law DNC690, K.J. Law T-6600, and ICC.

K.J. Law DNC690: 1989 to 1996

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- Equipped with two incandescent sensors, with a sensor footprint of 6” x 1”.
- Data collected at 1 inch intervals, then a 12 inch moving average applied, and data saved at 6 inch intervals.
- Upper wavelength cut-off of 300 feet.

K.J. Law T-6600: 1996 - 2002

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- Three infrared height sensors. Elliptical footprint of 1.5” x 0.25”.
- Data collected at 25 mm intervals.
- Upper wavelength cut-off of 100 m (328 ft).

ICC: 2002 to Present

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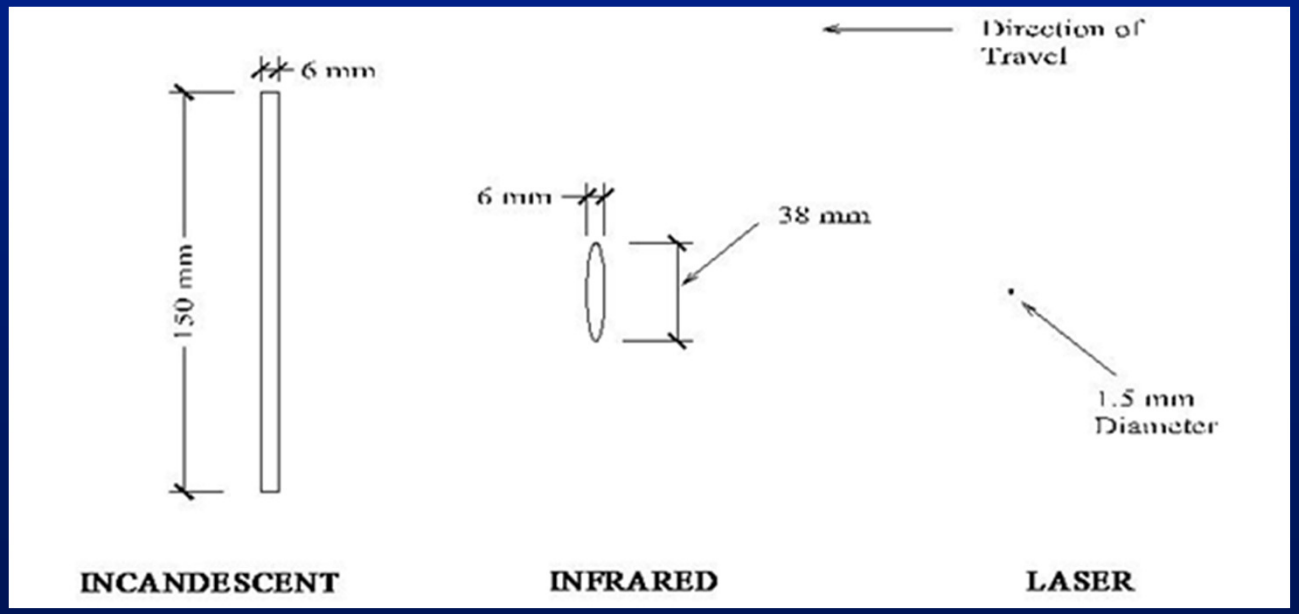
- Three Selcom laser sensors. Circular footprint 1.5 mm diameter.
- Profile data at 25 mm intervals can be obtained.
- Upper wavelength cut-off of 100 m (328 ft).

LTPP DATABASE

- Left and right wheelpath IRI.
- DNC 690: Profile data at 6 inch (152.4 mm) intervals.
- T-6600 and ICC: 25 mm data subjected to a 300 mm moving average, and data obtained at 150 mm intervals are stored.
- T-6600 and ICC: The 25 mm interval data can be requested from the FHWA.

Differences Between Profilers

- Height sensor type and footprint.
- Two profilers are K.J. Law and other ICC.
- Filtering procedures.



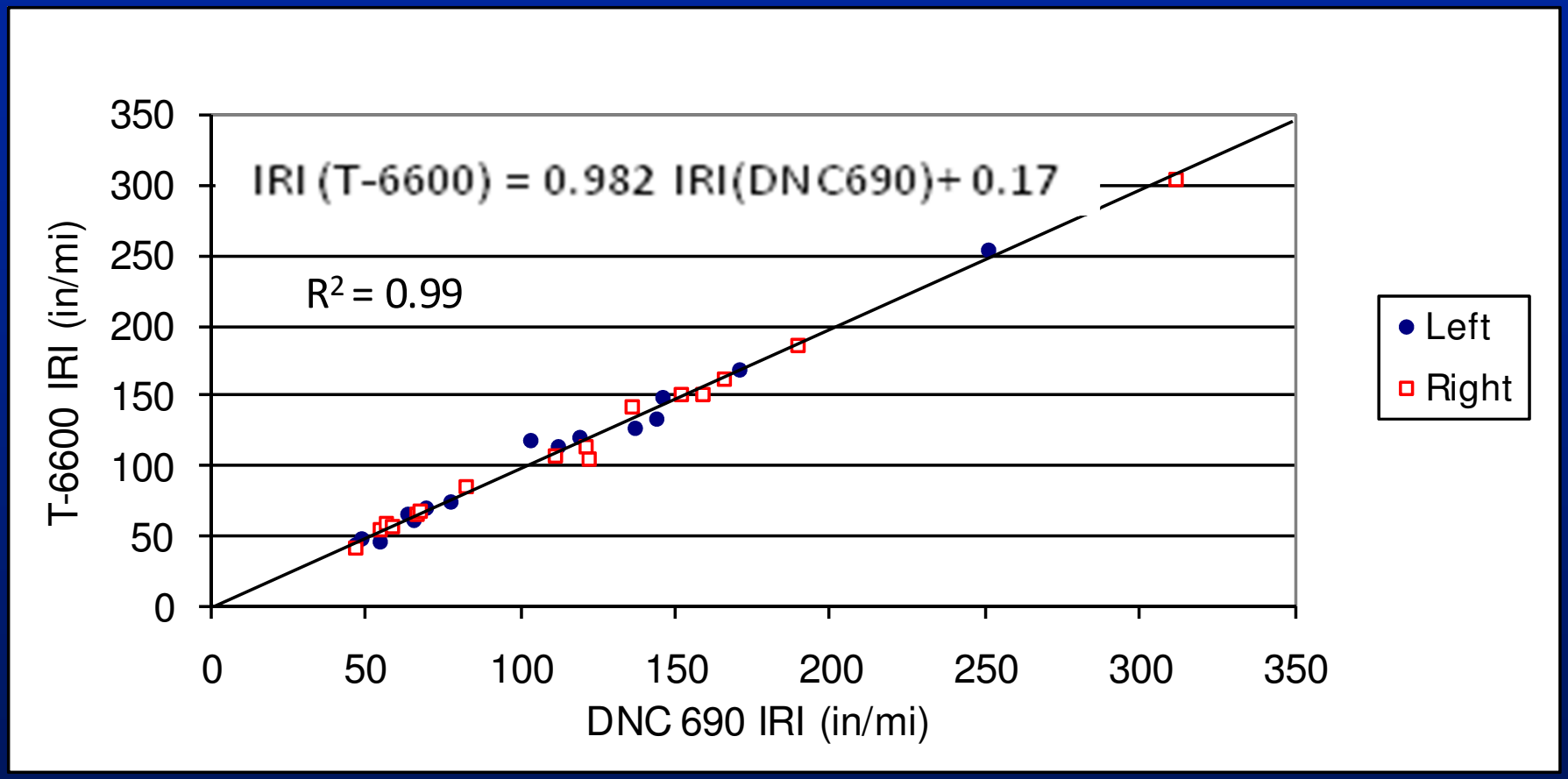
Questions by Data Users

- Are the IRI values similar for different profilers?
- Are there differences in the profile data collected by the different profilers?

Equipment Comparison

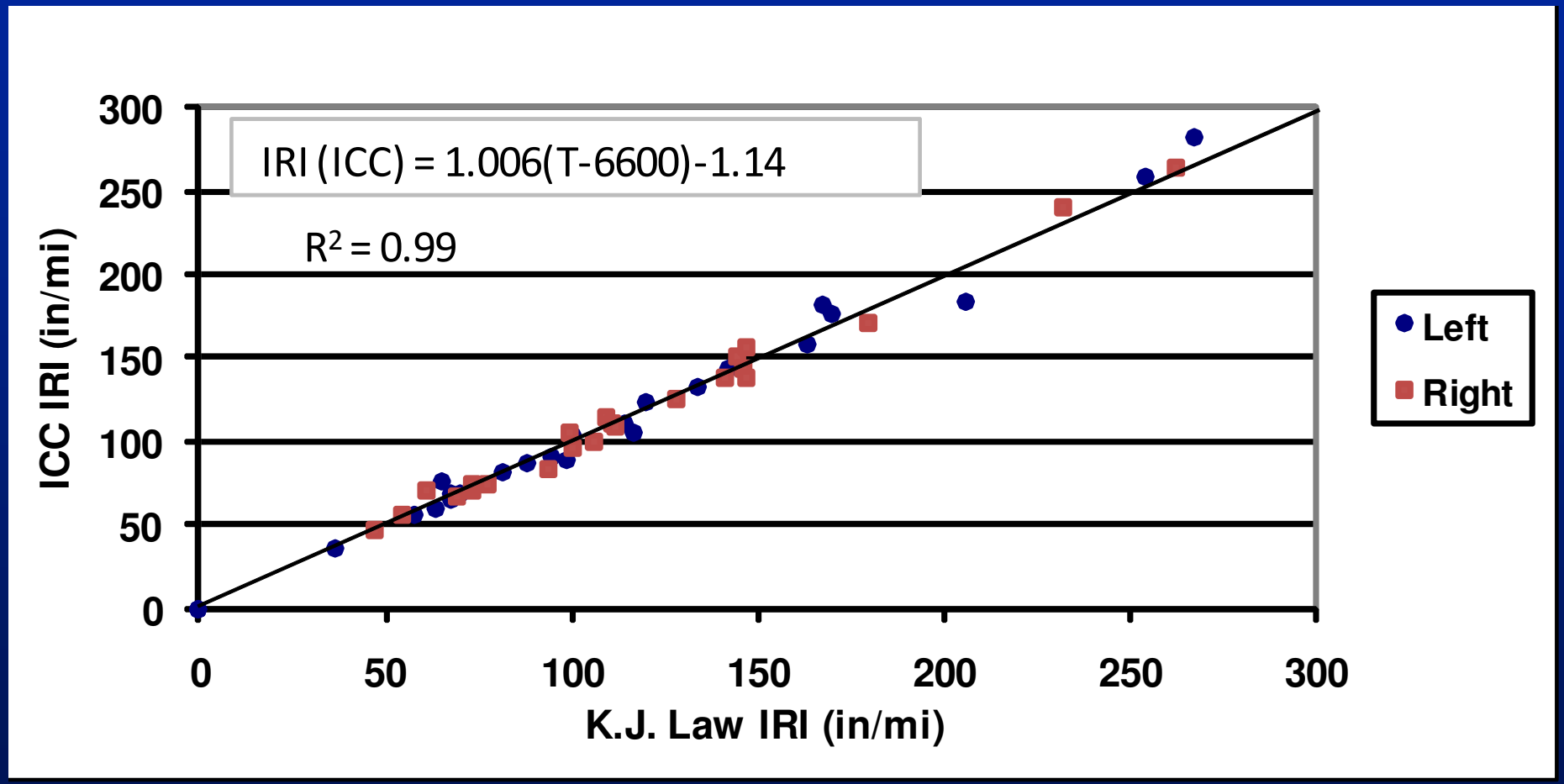
- Whenever an equipment change has occurred in the LTPP program, each regional contractor performed a comparison between the old and the new profiler.
- Data collected for these comparisons were used in this study.

IRI Comparison: DNC 690 vs. T-6600



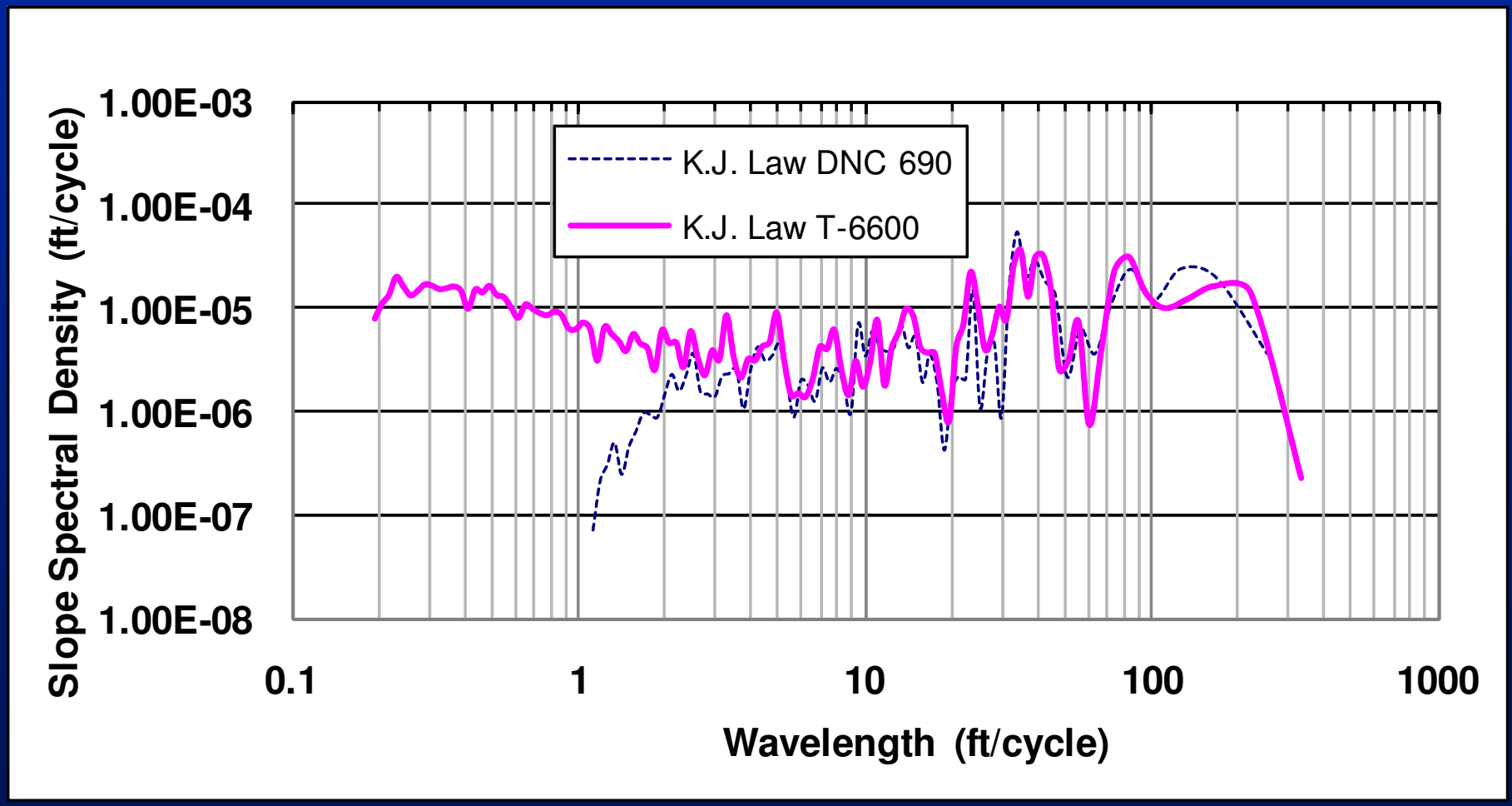
16 Sections, 32 Wheelpaths

IRI Comparison: T-6600 vs. ICC

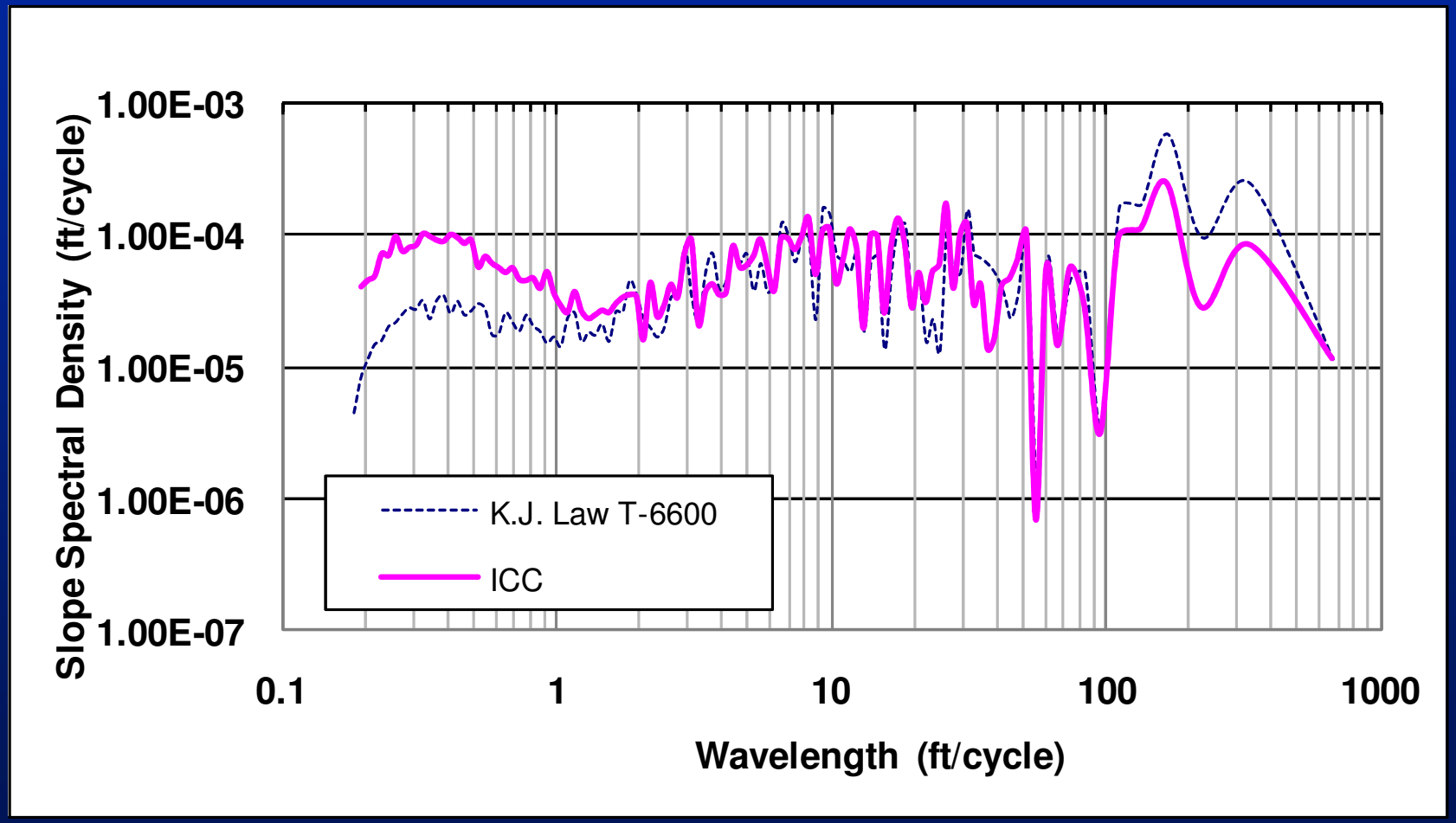


23 Sections, 46 Wheelpaths

PSD Plot: Law DNC 690 vs. Law T-6600



PSD Plot: T-6600 vs. ICC



IRI Filtered Cross-Correlation: DNC 690 vs. T-6600

Region	Site	IRI (in/mi)	Cross Correlation
North Central	1	67	0.91
North Central	2	314	0.94
North Central	3	65	0.95
North Central	4	184	0.96
Western	1	56	0.94
Western	2	166	0.85
Western	3	60	0.82
Western	4	152	0.93

IRI Filtered Cross-Correlation: T-6600 vs. ICC (North Central Profilers)

Site	IRI (in/mi)	Cross Correlation
1 - Asphalt	76	0.94
2 - Asphalt	177	0.91
3 - Concrete	75	0.80
4 - Concrete	264	0.93
5 - Chip Seal	249	0.85

Conclusions – LTPP Data in the Database

- Similar IRI values obtained from the three different inertial profilers used in the LTPP program.
- Similar IRI values and distribution of IRI.
- Some differences in the short wavelengths (< 2 ft) among the three profilers.
- DNC 690: Upper wavelength cut-off 300 ft, T-6600 and ICC – 328 ft.
- These differences in wavelengths are outside wavelength range influencing IRI.

Conclusions

- Similar analysis techniques can be used by State Highway Agencies to compare data among profilers or to compare old and new profiler data when purchasing new equipment.