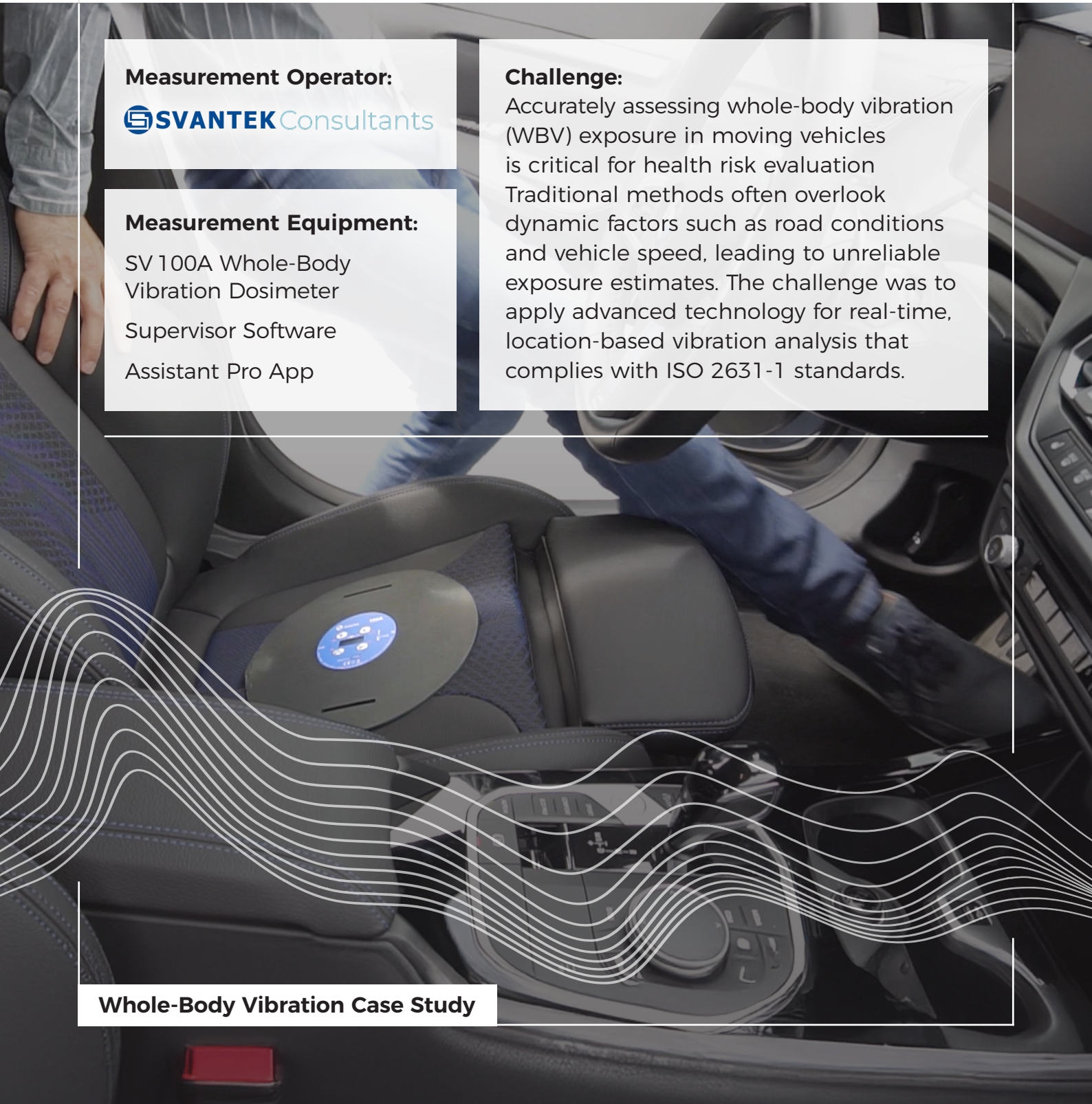
SVANTEK

Assessment of Whole-Body Vibration Risk in Moving Vehicles

CASE STUDY: Whole-Body Vibration Measurement using SV 100A



Measurement Operator:

SVANTEK Consultants

Measurement Equipment:

SV 100A Whole-Body Vibration Dosimeter

Supervisor Software

Assistant Pro App

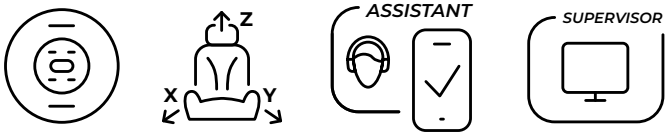
Challenge:

Accurately assessing whole-body vibration (WBV) exposure in moving vehicles is critical for health risk evaluation Traditional methods often overlook dynamic factors such as road conditions and vehicle speed, leading to unreliable exposure estimates. The challenge was to apply advanced technology for real-time, location-based vibration analysis that complies with ISO 2631-1 standards.

Whole-Body Vibration Case Study

Whole-body vibration (WBV) is a known risk factor for various health issues among vehicle operators. According to ISO 2631-1, accurate WBV assessment should reflect both frequency content and dynamic conditions over time. However, conventional methods tend to rely on static measurements taken under assumed reference conditions—disregarding the variability caused by factors like road quality or driving speed. This practice may result in significant underestimation or overestimation of exposure risks.

The introduction of modern vibration dosimeters, such as the **SV 100A**, enables precise correlation of vibration data with GPS location and vehicle speed. This breakthrough approach allows vibration magnitudes to be visualized on a map, providing a practical tool for evaluating exposure in real operational contexts.



Measurement Methodology

The measurement was conducted using the **SV 100A** Whole-Body Vibration Dosimeter in accordance with ISO 8041:2005. The test a passenger vehicle — followed a route featuring both good and poor-quality road sections.

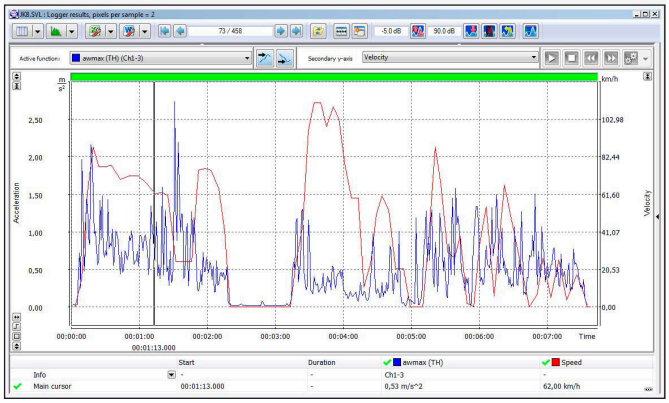
The **SV 100A** recorded the time history of weighted RMS acceleration (aw) and Vibration Dose Value (VDV), along with unweighted 1/3 octave band spectra. A smartphone running the **Assistant Pro App** provided continuous GPS data, which the dosimeter used to synchronize vibration measurements with vehicle location and speed.

Post-processing was carried out using **Supervisor** Software, which enabled detailed analysis of vibration exposure patterns over time and space.

Mode:	A(8)							
Standard:	ISO 2631-1							
Show exposure:	levels							
User								Time to reach EAV
Skoda	Exposure duration	a_{wx}	a_{wy}	a_{wz}	Partial exposure (X)	Partial exposure (Y)	Partial exposure (Z)	0.50 m/s^2 A(8)
Task	hh:mm	m/s^2	m/s^2	m/s^2	m/s^2 A(8)	m/s^2 A(8)	m/s^2 A(8)	hh:mm
[+] Fast	08:00	0.371	0.284	0.485	0.519	0.398	0.485	07:24
[+] Slow	08:00	0.167	0.199	0.319	0.234	0.279	0.319	19:37
Total duration:	16:00				Total exposure (X)	Total exposure (Y)	Total exposure (Z)	
					m/s^2 A(8)	m/s^2 A(8)	m/s^2 A(8)	
					0.570	0.486	0.581	
						Daily exposure		
					User	m/s^2		
					Skoda	0.581		

Vibration exposure values calculated in Supervisor software

Time history of **awx** with different speeds



Key Findings:

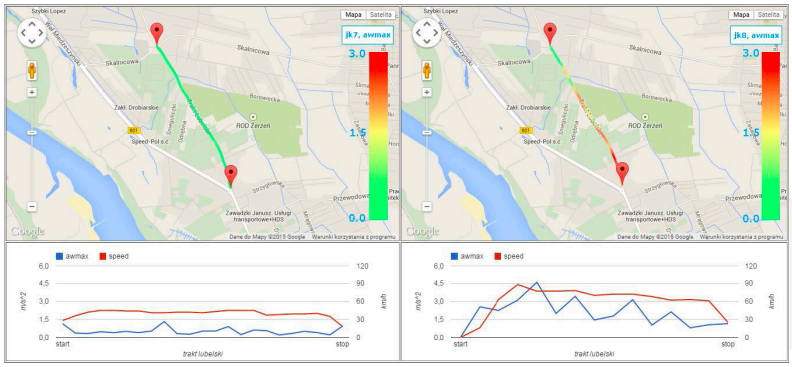
On **good-quality roads**, changes in vehicle speed did not significantly affect vibration amplitudes.

On **poor-quality roads**, an increase in vehicle speed caused a substantial rise in vibration magnitudes.

Spectral analysis revealed a notable increase in low-frequency components when traveling on rough surfaces.

These findings highlight the importance of dynamic WBV assessment and demonstrate how combining GPS and vibration data delivers actionable insights.

awmax values plotted on a map on a **good-quality road**



awmax values plotted on a map on a **poor-quality road**

"By combining vibration measurements with GPS and speed data, we uncover the true picture of whole-body vibration exposure. This integrated approach pinpoints hazardous road sections, quantifies risk levels, and supports the development of more effective prevention strategies."

Jacek Kuczyński,
Vibration Expert

Conclusion:

The **SV 100A** Whole-Body Vibration Dosimeter, integrated with GPS data and analyzed via Supervisor Software, provides a complete solution for ISO 2631-1 compliant vibration risk assessment in moving vehicles. This approach allows:

Analysis of how vehicle speed impacts exposure risk

Enhanced understanding of vibration sources through spectral analysis

Real-time identification of hazardous road sections

By leveraging this technology, users gain a powerful tool for preventing health risks related to whole-body vibration in transport environments.

Scan for more information about SVANTEK Whole-Body Vibration Measurement Solutions!

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