How to Detect Heavy Truck and Train Vibrations with Your Phone

Heavy trucks and trains produce distinctive ground vibrations detectable by smartphone. This tutorial shows you how to set up Pocket Seismograph to log vehicle and train vibrations effectively.

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Detecting Heavy Vehicle Vibrations with Your Smartphone

Heavy trucks, freight trains, and other large vehicles produce ground vibrations that travel significant distances through the earth. These vibrations are strong enough to rattle windows, disturb sleep, cause structural fatigue over time, and register clearly on a **smartphone seismograph app** like Pocket Seismograph.

Whether you are documenting noise and vibration complaints, conducting a home investigation, or simply curious about what your phone can detect, this tutorial walks you through the complete setup for logging heavy vehicle and train vibrations.

Why Vehicle Vibrations Register on Phones

A heavy truck or loaded freight train can weigh 40,000 to 80,000 kg or more. When this mass moves along a road or rail, the repeated impact of wheels on pavement or track creates vibration pulses that radiate outward through the ground. Near a highway or railway, these pulses arrive at nearby buildings as low-frequency vibrations, typically in the range of 1-20 Hz.

The MEMS accelerometer in your iPhone is sensitive enough to detect vibrations in this

frequency range when the phone is properly positioned. The key variables are distance from the vibration source, ground coupling quality, and surface type.

Optimal Setup for Vehicle Vibration Detection

Choose the Right Location

The closer to the vibration source, the stronger the signal. However, you need a stable monitoring position. The best locations are:

- **Concrete floor in a basement or ground floor** — direct coupling to the ground gives the strongest signal
- **Floor near an exterior wall facing the road or railway** — structural elements conduct vibrations efficiently
- **Hard floor surface away from thick rugs or furniture** — soft materials dampen vibration significantly

Phone Positioning

Lay your iPhone flat on the surface. Do not prop it up or lean it against a wall. Flat placement ensures all three accelerometer axes can register ground motion. If you want the strongest signal, use a small piece of tape to keep the phone from sliding during the measurement session.

Eliminate Sources of Noise

Before your measurement session, minimize background vibrations from other sources. Turn off HVAC systems if possible, ensure no one is walking in the room during the session, and note the time of each measurement so you can cross-reference it with vehicle schedules or traffic counts.

Reading Vehicle Vibration Waveforms

When a heavy truck passes, you will see a characteristic pattern in Pocket Seismograph:

- **Arrival:** The waveform amplitude increases as the vehicle approaches
- **Peak:** Maximum amplitude occurs when the vehicle is closest to the phone's position
- **Fade:** Amplitude decreases as the vehicle moves away
- **Duration:** Typically 5-30 seconds for a passing truck, depending on speed and distance

Train vibrations have a similar pattern but typically last longer (15-120 seconds depending on train length) and may show a more complex waveform due to the rhythmic impact of multiple axles on rail joints.

Real-Time vs Logged Data

Pocket Seismograph provides both real-time waveform display and timestamped session logging. For vehicle vibration studies, the combination is powerful:

- Use the real-time display to confirm your setup is working and you are detecting vehicles
- Use the session log to build a historical record of vibration events over hours or days
- The timestamp on each recorded session lets you correlate vibration events with specific vehicles or time periods

Practical Applications

Noise and Vibration Complaints

If you live near a busy road or freight railway and are experiencing vibration-related problems, Pocket Seismograph gives you a way to document what is happening. A timestamped log of elevated vibration events, cross-referenced against known truck or train schedules, provides evidence for complaints to local authorities or transportation agencies.

Research and Education

Vehicle vibration patterns are an excellent subject for citizen science projects and educational demonstrations. Students can measure vibrations from different vehicle types, compare results from different distances, and develop a quantitative understanding of how mechanical energy propagates through the ground.

Building Assessment

If you suspect that road or rail traffic vibrations are contributing to cracks or structural issues in your building, Pocket Seismograph provides a starting point for assessment. Document the vibration levels and patterns, then consult a structural engineer if levels seem elevated or damage is evident.

Get Started with Pocket Seismograph

Detecting heavy truck and train vibrations with your phone is easier than you think, and the results can be genuinely informative. Download Pocket Seismograph free from the App Store and start monitoring the ground vibrations around you today.

The app is completely free, works offline, and requires no account. Just place your iPhone on a hard floor near the road or railway you want to monitor and let it run. Get Pocket Seismograph on iOS now and discover what is vibrating in your world. Download it free today.

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