MONITORING BUILDING STRUCTURAL HEALTH USING SMARTPHONES AND AMBIENT VIBRATIONS

Tech ID: 34035 / UC Case 2025-134-0

PATENT STATUS

Patent Pending

BRIEF DESCRIPTION

Traditional methods for monitoring a building's structural health, particularly its natural frequencies and damping ratios, typically rely on expensive, permanently installed sensor systems, which are not widely accessible. This innovation, developed by UC Berkeley researchers, provides a highly scalable and cost-effective method for Monitoring Building Structural Health using Smartphones and Ambient Vibrations. The method leverages smartphones equipped with the MyShake earthquake early warning application to measure the ambient vibrations of a building. By analyzing these vibrations, the application can accurately determine key structural health parameters, namely the building's natural frequencies and damping ratios. This technique transforms readily available personal devices into powerful structural monitoring tools, offering a vastly more accessible and lower-cost solution than existing dedicated sensor networks.

SUGGESTED USES

- Mass-scale, low-cost structural health monitoring for residential and commercial buildings.
- Rapid post-disaster assessment (e.g., after an earthquake) of a building's structural integrity.
- Long-term trend monitoring of structural properties to detect gradual degradation.
- Providing building owners and city officials with real-time or near-real-time structural data.

Advantages

ADVANTAGES

- Leverages existing, ubiquitous technology (smartphones and the MyShake application) for monitoring.
- Significantly reduces cost and deployment complexity compared to dedicated sensor systems.
- Utilizes ambient vibrations, requiring no active excitation, making it non-invasive.
- Provides critical structural health parameters: natural frequencies and damping ratios.

CONTACT

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INVENTORS

- Allen, Richard M.

OTHER INFORMATION

CATEGORIZED AS

- **Communications**
  - Other
  - Wireless
- **Computer**
  - Software
- **Engineering**
  - Engineering
- **Sensors & Instrumentation**
  - Environmental Sensors
  - Physical Measurement
  - Scientific/Research
- **Transportation**
  - Other

RELATED CASES

2025-134-0

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Enables a scalable, distributed network of building sensors.

RELATED MATERIALS

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Assessing the Structural Health of Buildings Using Smartphones and Ambient Vibration
- MyShake: Earth Quake Early Warning System Based on Smartphones

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