



Seismic Metamaterials

The invention provides a vibration shield structure which can be installed around an area or building to be protected from ground vibration.

Proposed use

Ground vibration has an impact upon the structural integrity of buildings and structures. Our invention can cloak a building from any small tremors and is particularly effective with low, continuous, droning vibrations such as rail or tram lines and similar. The invention can also be used to protect certain types of buildings that may be affected by tremors and for broader seismic protection up to 30 Hz.

Problem addressed

Presently, the available technologies in the market are based on vibration isolation of structures and are difficult to implement because they involve the modification of the building itself. Our invention provides a solution to this problem: Shielding vulnerable structures using large-scale metamaterials which inhibit the propagation of incoming seismic waves or ground vibration through interference effects can help to protect a much wider area without any direct modification to buildings.

Technology overview

The vibration defence structure consists of a set of columns (no specific pattern required) embedded in regolith and in contact with bedrock, positioned outside of a lateral perimeter of the building. This shield has a stop band for seismic waves of 0Hz to 30Hz, which means that waves or vibration are reflected and partially absorbed by the shield.

Benefits

- Provides protection to buildings/structures over a wider range of frequencies
- Provides protection from low-frequency vibrations, for example from trains, machinery and road traffic
- Can be used to shield critically important buildings such as nuclear power plants, dams, bridges, hospitals, and refineries
- Does not involve any change to the building structure

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Intellectual property information

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