

Evaluation of Methods in order to attenuation of seismic amplification: cells full of lead and empty

M. Maleki*, I. Farjamifar

1. Master of science of civil-earthquake engineering, mohsen.maleki@semnan.ac.ir
2. MS student of civil-structural engineering, issa.farjami.civil@gmail.com

Abstract

On the base of different researches about site effects, considerable and destructive seismic amplifications due to different irregularities have been observed. The main purpose of this article is to investigate using some empty cells and ones full of lead materials around a triangular hill subjected to vertically propagated incident SV waves. The soil medium is considered elastic, homogeneous and isotropic. The results indicate that seismic responses have been reduced up to 3% and 19% on cases with Empty Cells (EC) and Lead Cells (LC); according to the results, the LC method has been better than the EC one, because of its robust attenuation power on seismic amplifications. The set of lead cells could make a cloak zone so that some waves propagated at this zone, have been dispersed or disappeared. Thus, these materials have been considerably caused reduction of seismic responses. However, cost of implementing LC is more than EC. Generally, it can be mush appropriate using these methods on regions subjected to seismic or even explosion hazards to protect them well.

Key words: Irregularity, seismic amplification, reduction, SV waves

1. Introduction

Strong ground motion amplifications have been intrested by different researchers from past till now. In fact, considerable seismic amplification has been observed on regions with topographic features that can make some severe damages and destructions on structures which is constructed on such regions. In literature about site effects, there are some important and effective factors such as factors related to wave (type, angle and frequency of the wave), geometry and type of the topographic feature and soil type [1-8]. Also, methods to solve such problems including analytical methods [9-12] and numerical ones (Finite Element Method (FEM) [13, 14], Boundry EM (BEM) [15] and hybrid method [16-18]).

On the base of reports of different researchers, value of the seismic amplification has been attained even up to 10 [19]; thus, the question is that are there methods in order to