

MITIGATION OF GROUND VIBRATIONS CAUSED BY TRAIN-GENERATED SURFACE WAVES USING WAVE BARRIERS

Abstract

Train-induced ground vibrations can cause major problems in the structures that accommodate sensitive apparatus or located in densely populated districts. One of the most common types of mitigation measures that has been used by different authors and engineers, is using wave barriers. There are several parameters which have profound effects on mitigation capacity of a wave barrier. Thus, considering the effect of all of these parameters, requires an innovative and thorough approach. This thesis, presents a new methodology for considering the effects of different parameters on mitigation capacity of trenches and jet-grouted columns. In this methodology, all of the important geometrical and mechanical parameters are considered to enhance the mitigation capacity of the barriers. These parameters include its cross section shape, dimensions, location, number and also mechanical properties of the materials which have been used for the barrier. The results of this study show that deep rectangular open-trenches are the most effective type of barriers. But, in some conditions (where the water table is close to the ground surface or when the soil has stability problems), these trenches cannot be used. In these conditions, it is better to use jet-grouted columns instead of in-filled trenches as wave barriers.