

## **Effect of Press-Type Scrap Tire Isolation Wall on Ground Vibration Reduction**

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### **ABSTRACT**

It is a very important issue to reduce the ground vibration generated by the running of vehicles in traffic systems as railways and highways, and also the operation of construction machines or factory machines. The authors have proposed a countermeasure applying the ground vibration isolation wall using scrap tire.

In this paper, the effect of two types of press-type scrap tire isolation walls on ground vibration reduction was discussed through full-scale field tests, including two kinds of tests on the isolation wall without and with anchoring. The latter test was carried out in about a year after the former test. As the results, the effectiveness of press-type scrap tire isolation walls was confirmed by the vibration reduction of 5 dB ~ 12 dB, together with confirming its durability, although the effect of anchoring was not observed.

**KEY WORDS:** anchoring, field test, isolation wall, scrap tire, vibration reduction.

### **INTRODUCTION**

Ground vibration caused by construction works, machineries in factories and various sources of transportation including road and railway are propagated through the ground. Such ground vibration often brings physiologically as well as psychologically adverse effects on the inhabitants. And the vibration also causes material damage to nearby buildings and precision machinery. So, this problem is recognized an important environmental problems in the world. However, its propagation mechanism through the ground is not fully elucidated because of the complexity of interaction between vibration waves and ground conditions. Many countermeasures for reducing such ground

vibration are available so far at the vibration source, through wave propagation pass and at the receiving point. However, it is seemed that an effective and economical vibration countermeasure has not been developed. Recently, the authors have proposed a countermeasure applying the ground vibration isolation wall using scrap tire (Hayakawa et al, 2005).

In this paper, in order to discuss the effect of the isolation walls on ground vibration reduction, full-scale field tests are carried out, using two types of press-type scrap tire isolation walls, which are composed by a series of scrap tire columns with centered steel pipe pile or PHC pipe pile, as shown in Figure 1. Another full-scale field tests are also carried out in about a year, anchoring the isolation walls, in order to discuss the effect of anchored isolation walls on ground vibration reduction and also its durability.



Figure 1. Press-type scrap tire columns with centered steel pipe pile and PHC pile