

REVIEW PAPER ON PROLIFERATION OF GROUND VIBRATIONS INDUCED BY MOVING TRAIN

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Abstract:- The vibrations in railway transport are still an ongoing important issue. As there is increase in speed, size, as well as weight of rail vehicles, the effects of vibrations generated when a train moves also grows. The results of the review whose aim is to identify the vibration effect on the environment of the railway infrastructure. In order to analyze, the research on a test track equipped with typical devices of the railway infrastructure, such as crossing signaling devices, point machines was conducted. This review aims at analyzing the forms and distributions of vibrations in the actual environment in which they occurs. Buildings located close to transportation experience structure-borne sound and vibration due to passing train which can be disruptive to the operations of sensitive equipment's in manufacturing, and medical facilities, also can be annoying to human occupants in residential, office, and commercial buildings. The paper focuses on testing of a full-scale building study of ground-borne vibrations and a prediction of avoiding the effects.

Keywords: Vibrations, Moving Train, FTA (Fire Traffic Area), FFT (Fast Fourier Transformation),

1. INTRODUCTION

One of the most important issues in railway transport is safety. Train movements on the railway infrastructure are observed through a signaling system and a well-defined set of rules. The European Railway Traffic Management System (ERTMS) aims at replacing the many different national train control and command systems in Europe and make a standardized system [1]. The innovative approaches in railway safety system is described by the US patent i.e. Railway using acoustic monitoring [3]. It is based on method of monitoring of a railway system which includes a track and train, with application of acoustic functionalities using track circuits. A very important and ongoing issue is the consequences that are being faced due to ground borne vibrations. This review presents the results of experiment on the passage of a Thalys HST at a speed of 314 km/h.

Shopping malls, apartments, hotels, office buildings and other public facilities are close to the track as well as there are buildings which are connected to metro station directly. The characteristic of the high-density multi-purpose land used is that it not only reduces environmental pollution and energy consumption, but also improves the quality of people leaving around that area. But the trains that are frequently passing many times creates an effect on the nearby locality.(3) It radiates the noise and transmits the vibrations to area around which causes many bad effects on the structures as well as the people living in it. Thus it is essential to study the influence of the vibrations and find an efficient method to reduce the effect.(5) The train usually runs on one side of the building while the subways are running underground i.e. beneath the building which is nearby and hence the vibration from the source is transfer to the foundation of the building.

2. MAIN SOURCE OF VIBRATION

The main buildings of a metro area are composed of a maintenance building, a parking where the staff works and the local buildings where people live. The rail can be divided into three types in accordance with the characteristics of rails. The throat area, where trains run into individual parking berths, it has a lot of small-radius curved rails, rail joints and turns i.e. the minimum radius of curve is about 150 m. The storage tracks in the parking garage and in the maintenance building have relatively slower speed of trains. The testing line is where the train has the highest speed in the metro area which is used to test performance of trains and ensure safe operations before the trains are put into practice. The vibration and noise appear in all directions as the train passes.(5) The vibration characteristics are associated with many factors, such as speed, rail types, sleepers, ballast, subgrade, building foundation and structure. The vibration of the train power system and rail structure, the dynamic interaction of wheel/rail and wheel/rail irregularity are the main vibration sources for rail structure. The trains running on the testing line at a higher speed and small radius curved rails in the throat area are main vibration sources while the vibrations of the storage tracks are relatively smaller due to the slow speed.(2) In general, noise increases with speed and

