ENVIRONMENTAL VIBRATION MONITORING & ASSESSMENT AT SENCITIVE RECEPTORS DURING METRO CONSTRUCTION IN URBAN CENTRE OF THESSALONIKI, GREECE

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Abstract: - The construction of the Thessaloniki Metro integrates state-of-the-art technology and the most demanding standards concerning both quality and operation, rendering it, thus, the most modern Metro System in the whole of Europe and ensuring the protection of the urban environment. The network consists of 2 Depots, 13 modern center platform stations, 9.5 km of Line (with two independent single track tunnels), 18 ultra-automatic and state-of-the-art trains. The elaboration of an extensive Environmental Monitoring Programme as part of the *"Required Pertinent Monitoring Designs-Programmes"* of the project specifications for the "DESIGN, CONSTRUCTION AND COMMISSIONING OF THESSALONIKI METRO" was enforced in order to ensure the protection and minimization of annoyance from worksite operation in the network. For each construction site and in the location of the closest receptors, Vibration Acceleration in time domain (m/sec^2), Vibration velocity (mm/sec) were recorded and then ppv for all recordings was calculated as well as rms weighted acceleration (m/sec2) and VDV values , following Fourier analysis for the vibration velocity recordings according to DIN 4150 (Part 3). Included in this article are the relevant assessment and evaluation results of this state of the art monitoring program with emphasis on sensitive receptors such as archaeological areas and sensitive land uses (e.g. schools and hospitals..)

Key-Words: Environmental Vibration, Metro, Environmental monitoring, Vibration dose, Transportation vibration

1 Introduction

In September 2003 the decision was made for this specific Project to be constructed by means of National and European Union funds. The construction of the Thessaloniki Metro (fig. 1) integrates state-of-the-art technology and the most demanding standards concerning both quality and operation, rendering it, thus, the most modern Metro System in the whole Europe ensuring protection of the urban environment.

Fig. 1

The basic characteristics of the THESSALONIKI METRO network are the following:

- a Depot in the Pylea Region (Votsi) covering a surface of 50,000 square meters.
- 13 modern center platform stations
- 9.5 km of Line (with two independent single track tunnels) constructed mostly (7.7 km) by means of two Tunnel Boring Machines. The remaining section of the Line will be constructed by the Cut and Cover method
- 18 ultra-automatic and state-of-the-art trains, fully air-conditioned, which will be run without a train driver, with an attendant aboard the train.
- platform screen doors, which guarantee greater safety level
- a Depot in the Pylea Region (Votsi) covering a surface of 50,000 square meters.

As regards the problems, the Project was faced with the task of protecting the city's twenty three centuries of history which made the execution of extensive archaeological excavations imperative and the selection of a design-construction method required a longer time for the projects maturing process to ensure the minimization of environmental effects.