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**„Redukcja amplitudy drgań podłoża gruntowego  
przy pogrążaniu grodzic za pomocą ciśnieniowego  
podplukiwania wodą”**

PRACA DOKTORSKA

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**ABSTRACT OF DISSERTATION**  
**„THE INFLUENCE OF WATER-JET MODIFICATION OF SOIL CONDITIONS ON**  
**REDUCTION OF VIBRATIONS DURING SHEET PILE DRIVING IN THE**  
**SUBSOIL”**

PhD thesis raises issues related to the topic of protection of deep excavation technology using sheet piling. In particular, the author focused on the vibratory driving sheet pile installation. Dissertation touches issues related to the impact of the dynamic sheet pile driving on the environment, in particular subsoil. The core work is field measurements of amplitudes of vibration velocity during the installation of sheet piles. In contrast, the new issue is to determine the author's possibility of reducing the above mentioned amplitudes of vibration velocity through water-jet modification. The effort's been focused just on this aspect. An additional element, which appeared in the course of work on the dissertation is the issue of numerical analysis.

The dissertation consists of seven chapters.

The first chapter provides a brief introduction to the issues associated with the technology of driving sheet piles in the subsoil, and the consequences of such activities. These considerations are the basis of the wording of this section scientific objectives of the dissertation. Subsequently, it provides information about the scheme work.

Information on steel sheet piles, as one of the building materials, are included in the second chapter. It described herein both the current production process sheet piles, as well as the historical background of their creation. Then the examples of already completed construction presents various applications of this material, to note the advantages and disadvantages of each solution. Content supplemented widely information on the processes and methods of driving the sheet piles in the subsoil, as well as methods of their support by changing soil conditions by water jet-assisted sheet piling or execution in the ground prior to drilling.

The third chapter is devoted to issues of dynamic influences in the subsoil, in general concerning the wave propagation in the considered medium, and more specifically, taking into account the sheet piling. The topics complemented by applicable laws by standards in the field of acceptable vibration values for buildings and on ways to limit the negative effects of driving sheet piling.

The next chapter, fourth, describes the experimental plots in three different locations: in Krakow, Warsaw and New Bojszowy, on which the author has done its own research. On their example we discuss the principles of monitoring, adopted in which the distance is measured, ways of recording results and used a tool to modify the conditions of the ground. In addition, it shows the characteristics used vibrohammers.

Chapter five analyzes own research carried out by the author in the course of driving piles, which have different degrees of wear, and the number, diameter and arrangement of the outlet openings of the nozzle feed water under pressure. As part of the dissertation, it was also a discussion about the importance of the conditions - soil water on the propagation of vibrations in the substrate and the influence of the established order driving sheet piles on the size of the amplitudes (mean values, maximum aggregate) excited vibration.

The sixth chapter is devoted to numerical analysis initiative aimed at verifying depending obtained in reality. Conditions on the experimental plot in Bojszowy Nowe modeled in the student version Z\_Soil v2014, and then confronted with the values measured

The seventh chapter contains the conclusions of the studies and the author's vision of further steps in this topic.

The work ends additives in the form of annexes documenting studies and bibliography includes 110 items. Due to the volume of the collected measurement data most of the results in the form of graphical interpretation moved to the annex No. 2