

## CHANGES IN THE LEVEL OF DECREMENT OF LOW-FREQUENCY OSCILLATIONS AFTER EXPOSURE TO PULSES OF A WEAK MAGNETIC FIELD

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*It was detected, compared and generalized the patterns of changes in the level of decrement of oscillations (DO) of dislocation low-frequency external and internal friction generated after exposing samples of materials with differing original structural conditions to pulses of a weak magnetic field (PWMF), each time in a new mode, which was changed 52 times.*

### Introduction

Our previous papers [1-4] show that the DO in samples of materials after exposure to PWMF changes. Almost immediately in the beginning (during PWMF exposure and upon exposure termination), then during 180 minutes slowly and durably (during subsequent structural relaxation of a material). Changes in the DO level are set through exposure to PWMF, while their patterns depend on the PWMF mode, structural condition of the samples' material, and selected material. Researches into the patterns of changes in the DO level after exposing to PWMF, each time in a new mode, samples of materials with differing structural conditions were continued. The total number of various PWMF exposure modes was increased from 10 to 52 units. The conditions and findings of these researches are collected, presented, considered and generalized in the present paper.

### Results an their discussion

Researches were performed on 40 samples of a fine-dispersed mixture of powders (silica sand – 79.4%, silicon – 17%, aluminum – 3%, Fe<sub>2</sub>O<sub>3</sub> – 0.6%) and 12 samples of heat-treated steel (chromansil). The mixture powders had a size of 0.5 mm at most, while the volume of test samples was of 5cm<sup>3</sup>. The sizes of the steel samples constituted 40x3x3 mm<sup>3</sup>.

We detected, compared, generalized and classified patterns of changes in the decrement of oscillations (DO) of dislocation low-frequency external and internal friction occurring after exposing samples of materials with differing structural conditions to pulses of a weak magnetic field, each time in a new mode.

There were used 52 various PWMF exposure modes; samples of fine-dispersed mixture of powders and heat-treated steel; and samples of materials had different structural conditions. Measurements of the DO level were made before, during, after PWMF exposure termination, and for 180 min during subsequent structural relaxation of the material. Changes in the DO and DO level kinetics were evaluated against the original position (prior to PWMF exposure).

It is found that the DO level at the beginning, during and upon PWMF exposure termination shows virtually instantaneous changes, an increase and a decrease respectively. Then, during structural relaxation lasting 180 min, the level changes slowly displaying kinetics of different patterns. These patterns are generalized and classified in the following way.

By 3 types of the common background behavior: a decrease in the exponent type (40 kinetics), an increase in the exponent type (2 kinetics), and preservation of the straight horizontal line type (10 kinetics). By 8 types of combination of the common background type and local change pattern on in the form of a bend, one – two – three oscillations, and a step.

It is assumed that further increase in the number of new modes of PWMF exposure will lead to repetition of the identified 8 types of kinetics and their subtypes and to emergence of new types of kinetics and their subtypes. For example, an increase in the exponent type DO level with local changes on it in the form of a bend, one step, and oscillations.

Examples of 4 types of changes (№1,3,5,7) in the DO level after PWMF exposure in various modes in samples of fine-dispersed mixture and steel are shown in Fig. 1.

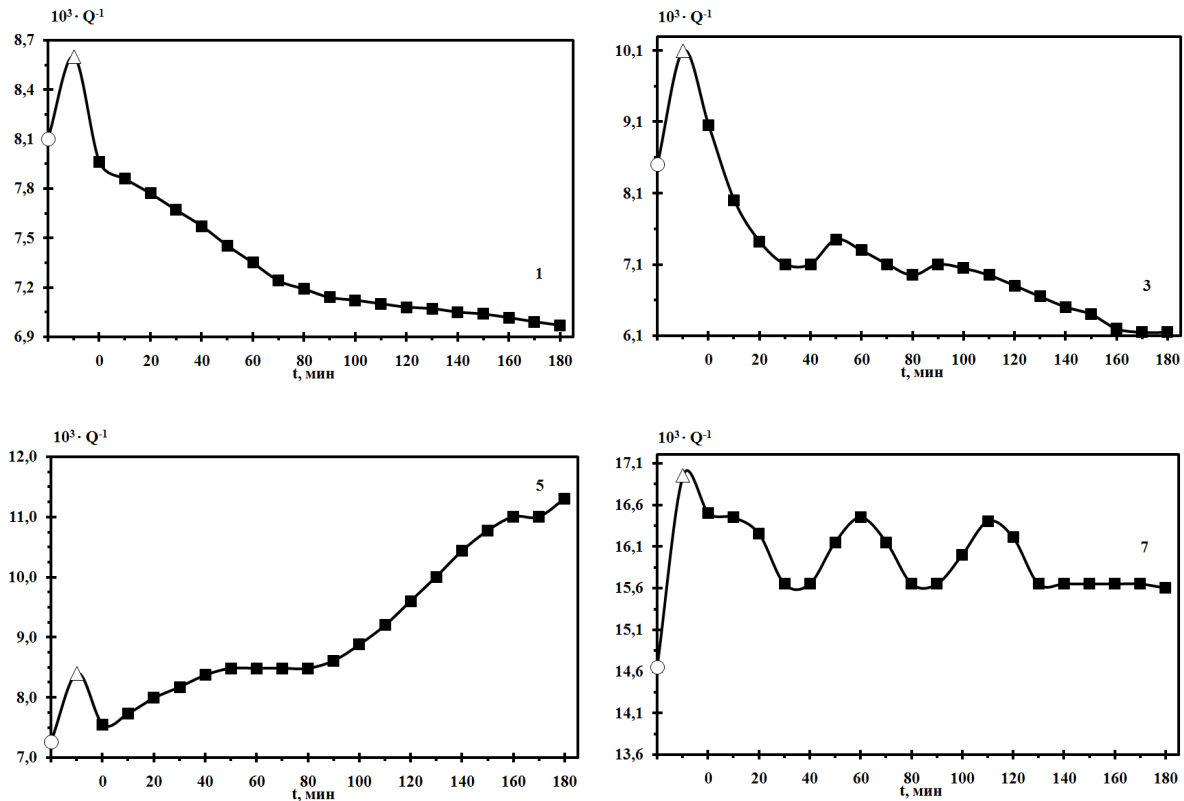


Fig. 1. Examples of 4 types of changes (№1,3,5,7) in the DO level after PWMF exposure in various modes in samples of fine-dispersed mixture and steel: 0 – prior to PWMF exposure,  $\Delta$  – during PWMF exposure,  $\square$  – upon PWMF exposure termination and during subsequent structural relaxation lasting 180 min

#### References

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