

INFLUENCE OF PROPERTIES AND STRESSED STATE OF FOUNDATION  
SOILS ON ABSORPTION AND DIFFUSION OF ENERGY OF SEISMIC  
VIBRATIONS

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S U M M A R Y

The results of the experimental investigation of free and forced oscillations of the full and simplified models of the "foundation-structure" system are stated and the influence of the elasto-plastic properties of the foundation soils on the dynamic characteristics and the systems' response to the seismic disturbances is analyzed.

Testing of free and forced oscillations of the simplified models of the systems having one degree of freedom - the mechanical oscillators made of steel (1), wood (2), pressed sand concrete (3) and claydite concrete (4) as well as of those of the models of 9-storeyed large-panel dwellings (Fig.1) on rocky (rigid) and clayey (elasto-plastic) foundations at different stressed-deformed states brought about by the centrifugal compression and bending inertia loads, has been performed on the centrifugal experimental device AzIS-2. The method of these tests is described in the work [1]. The analysis of the results [2] of the dynamic tests in the field of the centrifugal forces during the stationary vibrations and impulses of the "peak" nature and of their preceding static tests of the strength and deformability of the models on the rigid foundation in the field of the gravitational forces provides the reason for making the following main conclusions:

- depending on the elastic properties of the foundation soils the periods (T) of free oscillations of structures can vary within 1.5-1.6 times. The stressed-deformed state of the system does not have a marked effect on T;

- the damping coefficient of the vibrations ( $\xi$ ) of structures on the elasto-plastic foundation is several times (up to 4-5 times) in the tests) higher than that of structures on the rigid foundation. The value is seriously affected by the stressed deformed state of the system (Fig.2) and the greatest value corresponds to the stressed state characterized by  $G=0.8-0.9 R$ , where R is the ultimate strength;

- the dynamic effect both of the single impulses and the stationary vibrations for structures on the elasto-plastic foundation is 1.5-2 times less than for structures on the rigid foundation and the greatest reduction in the dynamic effect fits the condition:  $G=0.8-0.9 R$  (Fig.3).

1. Алиев Г.А. Доклад на Всесоюзном совещании по сейсмостойкому строительству, Баку-Алма-Ата, 1967.

2. Алиев Г.А. Труды НИИСМ им. Дадашева, № 37, Баку, 1976.

I. Azerbaidjanian Institute for Building Materials named after Dadashev, chief of the laboratory of the seismic resistance.

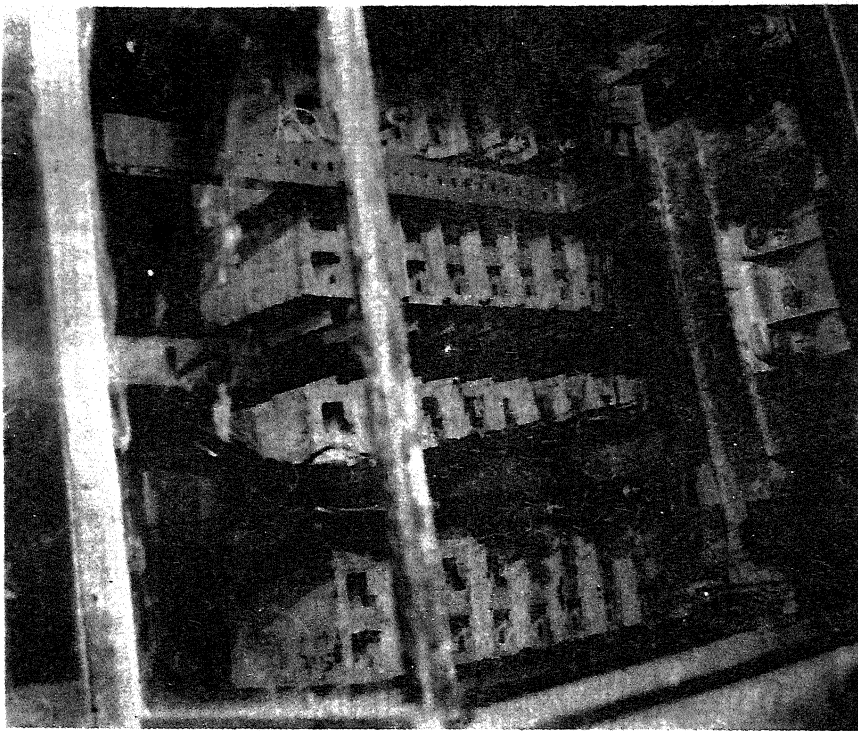


FIG. 1 - General View of the Test Chamber with the Models of 9-storied Large-Panel Dwellings

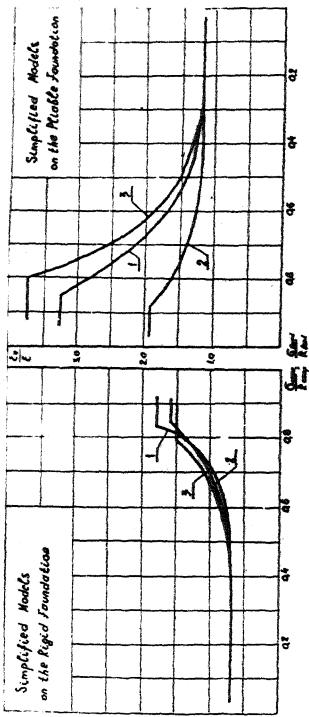


FIG. 2 - Diagram of the Change of Def ( $\frac{q \text{ compr } G \text{ bond}}{R \text{ compr } R \text{ bond}}$ )

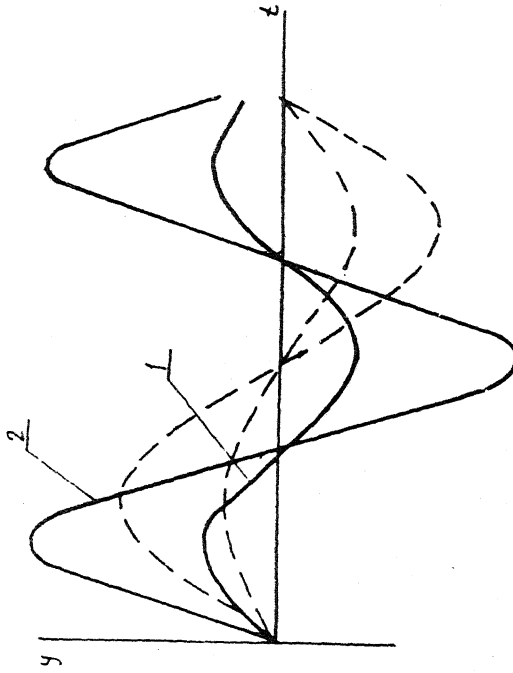


FIG. 3 - Response of the Model on the Rigid (-) and Plastic (-) Foundations at the Elastic (1) and Elastoplastic (2) stages.