Conclusions

1. To develop technical systems with dynamic effects on processing media, a new approach and methodology is proposed, taking into account the influence of energy fields of physical and mechanical effects, the transformation and inversion of types of energy exposure.

2. A model of considering the structural nature as dispersed media in a wide range of all components of the process of destruction, grinding and compaction is substantiated. The revealed changes in the parameters of the subsystems taking into account their stress-strain state.

3. The parameters of dispersed media as a system of soil destruction, the grinding process, the process of compaction of the processing media in the vibration field are investigated, quantitative and qualitative changes of all significant characteristics of the systems are found.

4. The obtained laws of changing the state of dispersed media under the influence of power loads by technical systems during the implementation of various technological processes have allowed to propose new load processes, including multi-mode implementation with minimized energy costs and increased efficiency of work processes.

5. On the basis of preliminary calculations and modeling of frame bearing elements by beam finite elements, elastically deformed under the action of longitudinal force, bending moments in two planes and torque, an experimental model of vibration unit with active forming surfaces is developed. In the investigation of the system, principles are applied that ensured the model adequacy, as well as the possibility of further research — solving other types of problems.

6. The main oscillation frequencies are determined, which are realized at 12.50 Hz, 18.60 Hz and 24.30 Hz. At the same time, oscillation forms with complex movement of forming surfaces are realized.

7. The presence of wave phenomena in the forming surface is experimentally proved when implementing modes of operation at the main frequencies of oscillations. The amplitudes of oscillations of the unit in the range of 0.0006...0.0003 m are determined at excitation frequencies of 18.60 Hz and 24.30 Hz.