

ABSTRACT

of the dissertation thesis on the theme:

«RESEARCH AND DEVELOPMENT CONSTRUCTIONS CENTRIFUGAL ARE GYRATION MILLS FOR TO MILL OF ORE»

proposed for the PhD degree competition

by the specialty: 6D071200 – «Engineering»

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Among a number of operations and technological processes in the processing of minerals, the grinding process is considered one of the least efficient.

Insufficient production volumes and low manufacturing of equipment, slow pace of technical re-equipment of existing enterprises, long periods of implementation of projects for their reconstruction, insufficient level of mechanization and automation remain the main reasons for the low labor productivity at the enterprise.

The dissertation discusses the current problems of ensuring the efficiency of centrifugal gyration mills for the mining industry: design features of mills for grinding ore materials, crushing and grinding processes, as well as the kinetics equation of the grinding process, analyzed factors affecting the performance of a centrifugal gyration mill.

Selection and justification of the parameters of the new design of the centrifugal gyration mill for grinding mineral raw materials, which includes such aspects as the theoretical justification of the design parameters, power calculation of the parameters of the centrifugal gyration mill.

The calculation method of the crank shaft of the drive of a centrifugal gyration mill was completed, which includes: the main defects of the crank shaft and the reasons for their generation, the influence of technological residual stresses on the fatigue resistance of the crankshafts, the stress-strain state of the crank shaft under the influence of loads, the calculation of crankshafts on the fatigue strength.

Experimental substantiation of the operating life of a centrifugal gyration mill under conditions of intense shock loads: a model of fatigue failure of a crank shaft under a volumetric stress state is developed, dynamics modeling of a crank shaft of a centrifugal gyration mill CGM 140/320, analysis of resonant frequencies of a shaft of a CGM -140/320 mill, analysis dynamic strength with multi-cycle shaft fatigue, the shaft endurance limit is determined when loading sections reduced to a symmetrical cycle.

The innovative development of the processes of grinding ore materials and improving the design of a centrifugal gyration mill are the results of a study for introduction into the production of the enterprise JSC “Kardanval” (Kazakhstan) and an application for “Method for grinding ore materials and a device for its implementation”, registration number No.2019 / 0532.1, dated July 29, 2019 at the RSE “National Institute of Intellectual Property” of the Ministry of Justice of the Republic of Kazakhstan for a patent for an invention, confirmed by a positive result of a formal examination.