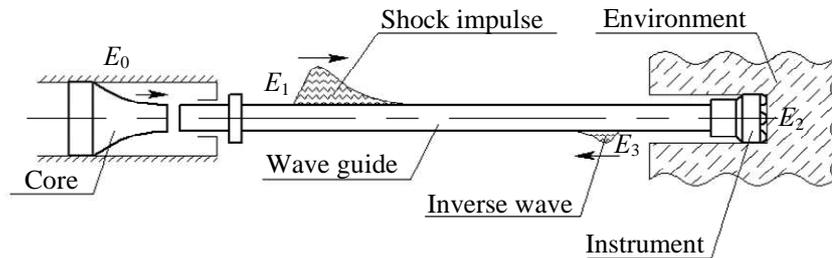


PROBLEM OF HEIGHTENING OF CAPACITY OF IMPACT SYSTEMS OF TECHNOLOGICAL ASSIGNMENT BY SELECTION OF RATIONAL SHAPES OF CORES

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The urgency of working out of the scientific fundamentals and tools of creation and probe of new generations of impact systems is linked with the considerable economic gains consisting in increase of capacity and reduction of power inputs on operations on collapse of fragile environments at the expense of creation of the hi-tech competitive equipment.

The typical impact system of technological assignment can be presented schematically (drawing 1).



Drawing 1 - The circuit of impact system of technological assignment

At impact effect on the fragile environment of efficiency it is defined as a ratio of energy E_0 of the drummer accumulated by it at acceleration, to energy E_2 going immediately on collapse of environment:

$$\eta^* = \frac{E_0}{E_2}. \quad (1)$$

Energy E_0 is that other as a kinetic energy

$$E_0 = \frac{mV_0^2}{2}, \quad (2)$$

m, V_0 - mass and pretonic rate of core accordingly.

But to define a value of energy E_2 somehow it is not obviously possible. In this connection for an estimation of efficiency of process of collapse use concept of a transmission factor of energy (TFE) of impact impulse which is defined from a ratio of energy E_1 of a dropping impact impulse and energy E_3 of a reflected wave:

$$\eta = \frac{E_1 - E_3}{E_1}. \quad (3)$$

Process of transmission of energy from core to a wave guide, advancements of a impact impulse on a wave guide, transformations of its energy into useful energy of collapse of environment and fractional reflecting of a impact wave is specific feature of process of the impact collapse to which probe many scientific operations are devoted. It is fixed [1] that one of the most effective design techniques leading to increase of value TFE, selection of the expedient shape of the drummer since energy of a dropping impulse is defined by materials, shapes and the sizes impacting bodies is.

To solve a problem about shaping and spreading of elastic waves of a strain at impact core with a rod it is possible two various paths. The first path consists in selection of any shape core for the constructive or ideological reasons grounded on practical experience of probes and maintenance of machines of impact operation. Then the selected shape core is examined theoretically with

application of the one-dimensional wave Sen-Venan's theory, the mathematical apparatus, the corresponding computer programs and experimentally. Ground the assaying and comparison received theoretical and experimental data the conclusion about rationality of the offered shape core and about suitability of its application in modern practice of mining and machine industry becomes. By means of such operations various shapes cores [2] are developed and examined some.

The second path consists in synthesising of geometry of the striking body which application in machines of impact operation will promote generation in a rod of an elastic wave of the strain which are optimum for collapse of any concrete environment. According to this path it is necessary to define initially for a concrete plant of collapse the dependence linking force of resistance of rock and magnitude of introduction in it of the instrument, i.e. performance «force - introduction». Then on the given performance regularity of dependence of efforts from time, arising in a rod-wave guide is evaluated at blow which will meet as much as possible to requirements of collapse of the concrete environment. This regularity will reflect the shape of a wave of the dropping impact impulse which optimality consists in minimisation of energy of the reflected impulse.

The knowledge of dependence of efforts from time, explicated by a impact impulse, allows to synthesise necessary geometry core of impact system. The decision of this problem is reached by means of application of a semigraphical method upside-down [3]. The synthesised shape core will represent the multiple-stage barrel, which generatrix of a lateral area - a step-function, is approximated by some smooth curve. Then it is necessary to make the conclusion about suitability of application of the received shape core in the modern industrial engineering.

Introduced paths of searching and justification of rational shapes cores are open a problem of heightening of capacity of impact systems by application cores rational shapes without change of other parametres and allow to receive concrete practical results.

The list of references

1. Opening № 13 USSR / Aleksandrov E.V. - priority from 10.30.1957, publ. 3/19/1964, bull. №7. - 1 p.
2. Zhukov I.A. Cores of the impact gears, having the analytical decision / I.A. Zhukov, J.T. Dvornikov // Quick reference. The engineering journal. - 2008. - №10 (139). - P. 17-20.
3. Zhukov I.A. Theoretical of the fundamentals of synthesising of shapes cores of impact systems of technological assignment / I.A. Zhukov, E.V. Sarahanova // News of Tomsk polytechnic university. - 2009. - T. 315. - №2. - P. 173-177.