

PRESS-STAMPING EQUIPMENT

Progressive technology of forging and stamping production is based on receiving parts or workpieces in a result of rational metal redistribution and not by removing it in shaving as it provides cut processing. Metal forming methods produce the most complex and responsible parts of aircraft engines, ships, space rockets because plastic working allows receiving products with high mechanical properties.

Technological processes of plastic working are characterized with considerable specific efforts of deformation resistance, significant energy costs, which have brief, also called peak character. That is why most of press-stamping equipment is «power amplifiers»; thus, it is supported with accumulators that provide opportunity of using energy accumulated before. Varied combinations of construction of accumulators and mechanisms, that transmit energy, define diversity of press-stamping equipment. During scientific-technological revolution, new types of machines were created where the latest discoveries and achievements of science were used. Machines for deformation by using explosion energy, pulsed electromagnetic field, and hydrostatic machines were introduced in production. This leads to continuous improvement and enrichment of classification, which should comprise all types of machines and serve as a basis for studying and improvement of equipment and its implementation in industry. On the base of this principle, 5 main types of press-stamping equipment are divided: presses, hammers, rotary machines, impulse machines and states, which differ mainly by changing speed in time of working stroke and specific efforts that explicate the machines.

Creating servo-drives, motors for automatic control of machines and apparatus, is one of the latest achievements of science in machine tool production. It works because of variable duration impulses. Pulse duration is about 1.5 milliseconds. Electromechanical servo-drives have been used in machine tools during the past decades. The servo-drives of the first generation were built by using high speed motors. To generate the relatively high forces that are needed in metal forming, seat belt connected to screw for converting rotary motion of the slider into translational were used in these designs. Recently, several press designers, mainly in Japan and Germany, have used servo-drives in machine-tools for sheet-metal treatment. It made possible to increase precision, accuracy and reliability of a mechanical press. This technology allows optimizing stamping operations, namely:

- to increase productivity;
- to control the velocity of parts deformation which reduces friction, improves product quality and reduces the percentage of finished parts defects;
- to reduce impact of speed and noise;
- to increase tool life;
- to allow the running of secondary operations on the same press by slowing down or stopping the press slide in its working position to provide additional tool motions.

Thus, the development of equipment for metal forming is not static, existing methods are improved and new methods of treatment are created, that is the prospect for the development of mechanical engineering in general.