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## PRODUCTION TOOLING OF PART PROCESSING

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The fundamental requirement for modern production facilities is to provide as many products of the best quality as possible at the lowest cost and in less time. In modern manufacturing, the use of production tooling to increase the efficiency and technical capabilities of the enterprises is relevant. The implementation of standard tooling at machine builder enterprises ensures high economic efficiency, a 2–2.5-fold reduction of preproduction costs, and an increase of labor efficiency by 30–35 %. For example, TGM Ltd. invested approximately \$1.43 million in the introduction of CNC technology for aerospace defense firms. The introduction of new technologies will double the sales volume in just two years, according to the specialists' calculations. We need to consider which production tooling the most favourable in modern production environment.

Production tooling is a set of widgets for fixing future blank parts, component parts and tools. Production tooling is subdivided into gaging, control, manipulating, processing, transport and fixation. The main group of technological equipment is made up of mechanical assembly production widgets.

Widgets are assisting devices for processing equipment used for processing, bonding and gaging. Intended use, up to 80 % of widgets are referred to the group of machine accessories. The main condition for reducing the production time of a part is the automation of a manufacturing process. Since widgets and machine tools exist inseparably from each other, widgets of a higher level of automation and CNC working machines are used.

Modern adaptable tooling should be used to ensure a high level of automation. The main requirements are related to the high accuracy of manufacturing the component part in comparison with conventional working machines. Special quick-clamping production tooling must be used, since on CNC machines all movements are programmed in the specified final data.

They are often pneumatically and hydraulically operated vertical or horizontal clamps. Clamps are used that work on the bell crank principle. Incidentally you need to make a little effort to create a significant effort.

Significant support in the processing of the part is provided not only by the specially programmed tools but also made an enormous contribution by the working machine jigs. This device is used for fixing future blank parts and has ways for the cutting tool.

According to their mechanical functionality, drilling jigs are divided into template jig, rotary jig, universal, sliding and fixate.

The templated jig is placed on the blank part surface impress and cramped with special clamps. The sliding jig does not have to be cramped to the surface where it is applied. Its unhandiness lies in the constant holding by the hand of the worker. These two types of jigs are not used in mass production, since they increase the processing time and have a sufficient amount of disadvantages in use.

Retune jig or rotary jig are applied for simplicity and convenience. They allow drilling simultaneously in two or more planes.

Universal jigs are used mostly for industrial and serial production, especially for processing small parts. Their advantage is the quick justification of processing parameters for

existing conditions. The velocity of the pneumatic and manual clamps allows to process of more products in a short time.

Special jigs are also used in large-scale production. They are designed to fix one specific blank part when performing a specific operation. In this way, changing the type of blank part will lead to the fact that this device will no longer be used. But the main advantage of special jig is that such jig is assembled with standard elements and represent a system of universal assembly devices. Therefore, if necessary, they are disassembled and reassembled for processing other types of blank parts.

In conclusion, we have discussed the technic facilities of modern devices and have analysed the way to reduce time for tooling processing. It can be mentioned that the correct choice of production tooling makes it possible to obtain a great economic gain and reduce production time. Automated and mobile tooling is the best suited for the task in hand. You can achieve high accuracy and speed of production using CNC in cooperation with multifunctional jigs. Because of the favourable terms, it becomes clear why large companies are investing money in the use of production tooling [1–3].

### **References**

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