

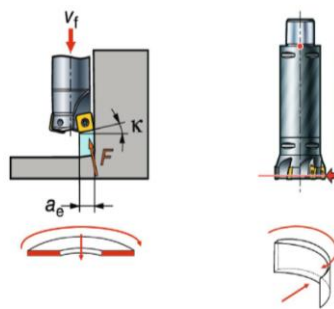
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ANALYSIS OF METHODS FOR PROCESSING FLAT SURFACES BY WIDELY VERSATILE CUTTERS

There are different surfaces in engineering that are processed by mills. Among them are ledges, flat surfaces, pockets, etc. In this regard, there is a problem of high-speed and high-performance machining parts with a large area of metal layer removed.

There are several methods for processing flat surfaces, ledges and surfaces similar in configuration. Treatment of surfaces is mostly performed by face or end mills. For example, case parts, which are flat and the ledge, you need to handle the cutter face (flat surface) and final (ledge). But this method has several drawbacks, namely artificial time increases due to changes in the tool and small processing performance of end mills. Also there are vibrations, noise, high stress in the cutting zone. When processing a number of mills centrifugal force is nearly always present that the processing of complex surfaces do not allow to process the surface without losing performance efficiently and accurately. An important disadvantage is also the fact that in the non-rigid system or in the processing of heavily processed materials (titanium), it is almost impossible to perform processing by end mills with a standard layout.

Therefore the method of processing a number plunger surfaces was developed. When plunger milling processing is carried out not peripheral but the face part of the instrument, the direction of the radial cutting efforts in axial is radically redistributed (see. Figure 1).



Advantages of plunger milling is to use it in the following terms:

- departing tool more than 4 x D mills;
- in non-rigid system;
- while limiting the power and torque of the machine;
- with stringent requirements on the form and relative position of the corners.

So the company Sandvik Coromant has created a number of plunger cutters:

- CoroMill 210 is designed for rough milling with a large offset, size plate is 9mm, tooth loading is 0,1 mm / tooth, the maximum overlap is $b = 8\text{mm}$, diameter cutters is $D_c = 25\text{-}66\text{mm}$;

- Coromant F215 is solid processing and has a large diameter and radius, plate size is 25mm, tooth loading is 0,15 mm / tooth, the maximum overlap is $b = 22\text{mm}$, diameter cutters is $D_c = 80\text{-}160\text{mm}$

- But plunger milling method is not the first choice for stable processing methods, as it has lower performance. This method is not fully explored and has a great perspective in the future.