

## The Effect of the Shape of Chip Cross Section on Cutting Force and Roughness when Increasing Feed in Face Milling

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**In this paper, the results of an investigation done with face milling are presented. The changes in cutting force and surface roughness were studied through changing the values of depth of cut and the feed per tooth. Meanwhile the permanent value of the undeformed chip cross section, which was determined ( $f_z$  and  $a_p$ ), remained permanent. Increasing  $f_z$  and keeping the same value of  $A_c$  chip cross section, the ratio  $a_p/f_z$  changed in five grades from 0.5 to 8. It is shown, that if the feed is increased in the examined range so that the chip cross section is constant, then the value of the cutting force decreases, which decrease can be observed in all three force components. Accordingly, the mechanical power required for cutting is reduced. The results of the surface roughness investigations showed that initially a significant increase can be observed in the roughness with the gradual increase of the feed (up to  $a_p/f_z = 2.5$ ), followed by a moderate increase afterwards.**

**Keywords:** Equation face milling, permanent chip cross section, cutting force, surface roughness

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