Abstract

Investigate of wear of coated and uncoated carbide end mill cutters (K20) was done. This study was done on austenitic stainless steel (SS316L) with the use of combination of different speeds and feeds. 4 μm thick coating of AlCrN which is done by PVD method on carbide tools proved to better when machining is done on SS316L, as compared to uncoated tools. Wear as well as surface roughness is found to be increased with the help of coated tools. For surface roughness feed is found to be the most dominant factor at constant depth of cut. Al based coatings provide chemical inertness, hardness and good wear resistance due to the formation of Al2O3 layer on the tool surface at high temperatures. ISO criterion (0.3 mm flank wear) was used to measure the tool life of end mill cutters. Almost double tool life is achieved for coated
tools as compare to uncoated one, may be due to fact that coatings provide better wear resistance even at high temperature at cutting zones which is due to high speed cutting. The combination of high speed and high speed was found to be the worst combination as far as flank wear is considered, as at high speeds higher stresses are developed on tool and tool edge. Good surface finish is observed for coated tools, specifically when combination of high speed and low feed is used. SEM analysis is done so as to investigate tool wear of end mill cutters. Finally it was found that uncoated carbide inserts can not be used to machine SS316L at high speeds and feeds, and coating of AlCrN is proved to be suitable for the same

References

- Machinability, Module 3, Version 2, ME IIT, Kharagpur, Lesson 14