Chapter 7

Conclusions

For today's increasing tendency of utilizing automated turning machines, the study of optimum cutting conditions is necessary to reduce the machining cost. The cutting conditions, i.e., cutting speeds and feed rates, have directly affected on the tool life and the machine interruption for changing cutting tool or workpiece. In this research, the optimum method for rough turning using the Optimum Gradient method was proposed. The cutting speed and feed rate were considered to minimize the machining cost per workpiece.

The experimental results using the carbide cutting tools showed that the optimum cutting conditions were 172 m/min cutting speed and 0.5146 mm/rev feed rate and the machining cost was 9.39 baht/workpiece. For coated cutting tools, the machining cost was 8.83 baht/workpiece and the optimum cutting conditions were 185 m/min cutting speed and 0.4994 mm/rev feed rate. The comparison of the machining cost per workpiece using both the cutting tools was found that the coated cutting tool produced less the machining cost per workpiece than that of the carbide cutting tool.

The conventional tool life tests of both the cutting tools at the optimum cutting conditions showed that this proposed method can correctly test the tool life at 5% significant level.

The proposed method presents a simple procedure for the optimization of the cutting conditions in which the procedure can

be applied to any workshop with a computer facility. The method enables production engineers in manufacturing plants to determine the optimum cutting conditions without having to conduct an extensive laboratory test. When the proposed method and computer program are adapted as a regular routine procedure, the optimum method will become an integral part of the production operations. Especially, the proposed method can be readily adapted and used for numerical control machine which has the automated operations as a built-in optimizing program in the future.