Parametric Optimization of End Milling Operation on EN24 Steel Shaft of Grinding Machine

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The milling of EN24 hardened steel has been applied in many cases in production. The paper investigates the influence of milling operation parameters (cutting speed, feed and depth of cut) on the Material Removal Rate (MRR) and surface finish in milling of EN24 steel. The effect of milling operation parameters is evaluated for minimum Surface Roughness (Ra) and maximum MRR using Taguchi design methodology. EN24 grinding wheel steel shaft is a machined component mounted on grinding machine. Maximum MRR with high surface finish in machining is highly desirable for EN24 steel shaft. The research model can be effectively used to predict Ra and MRR in milling of EN24 steel.

***Keywords*:** EN24, Taguchi design

Introduction

End milling is the process of surface preparation by feeding a workpiece into a revolving cutter, and is a common procedure in industrial fabrication applications. The industries aim to fabricate a large number in relatively lesser time. However, it is important to optimize the machining parameters such as cutting speed, feed rate and depth of cut. EN24 steel shaft is an integral part of a grinding machine. This shaft is manufactured by turning, facing, chamfering and end milling operation. The overall dimensions of shaft are 303 mm length and 108 mm major outer diameter (Figure 1).

- Two number of keyways with dimension of $8^{+0.1}_{+0.05} \times 4$ mm deep and $6^{+0.1}_{+0.05} \times 3$ mm deep.
- One end face slot with dimension of $25^{+0.1}_{+0.2} \times 12^{+0.1}_{0}$ mm.
- Three threaded holes at slot end face with dimension of M10 × 20 mm deep.

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