

***THE EFFECT OF MAIN CUTTING ANGLE (KR) VARIATIONS
WITH SPINDLE SPEED AND DEPTH OF CUT ON SURFACE
ROUGHNESS IN THE TURNING PROCESS OF ST 42 STEEL
MATERIAL.***

Name : Hafizat Hakim
Student Identity No : 2204211291
Supervisor 1 : Imran, S.Pd., M.T.
Supervisor 2 : Irwan Kurniawan, S.T., M.T.

ABSTRACT

This Study aims to determine the effect of variations in the main cutting angle (Kr), spindle speed, and depth of cut on surface roughness during the turning process of ST 42 steel material. The research was conducted using a conventional lathe machine and High Speed Steel (HSS) cutting tools, with varied process parameters including a main cutting angle of 25°, 30°, and 35°, spindle speeds of 300 rpm, 460 rpm, and 755 rpm, and depths of cut of 0.5 mm, 1 mm, and 1.5 mm. The feed rate used was 0.081 mm/rev, and the material used was medium Steel ST 42 with a diameter of 30 mm and a length of 150 mm. The Taguchi method was employed as the experimental design using an L27 (3³) orthogonal array. Based on the results, the lowest surface roughness value was obtained at parameter number twenty-five, with a spindle speed of 755 rpm, a main cutting angle of 35°, and a depth of cut of 0.5 mm, resulting in a surface roughness of 3.35 µm. The highest surface roughness value occurred at parameter number twenty-seven, with a spindle speed of 755 rpm, a main cutting angle of 35°, and a depth of cut of 1.5 mm, resulting in an average surface roughness of 9.71675 µm.

Keywords: turning process, Surface roughness, main cutting angle, spindle speed, depth of cut, ST 42 Steel.