

ABSTRAK

ANALISA VARIASI JARAK CELAH ROLL DAN KETEBALAN PERAK TERHADAP KEKASARAN PERMUKAAN PERAK PADA ALAT ROLLING PRESS PERHIASAN

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(2026: xii + 41 Halaman, 3 Gambar, 9 Tabel, 5 Lampiran)

Penelitian ini bertujuan untuk menganalisis pengaruh variasi jarak celah roll dan ketebalan perak terhadap kekasaran permukaan perak pada proses cold rolling menggunakan alat rolling press perhiasan, serta membandingkan kualitas permukaan hasil pengerolan menggunakan sistem penggerak manual dan motor listrik. Penelitian menggunakan metode eksperimen dengan material berupa perak sterling yang memiliki ketebalan awal 2 mm dan 1 mm. Variasi jarak celah roll yang digunakan pada ketebalan 2 mm adalah 1,7 mm, 1,5 mm, dan 1 mm, sedangkan pada ketebalan 1 mm adalah 0,7 mm, 0,5 mm, dan 0,3 mm. Kekasaran permukaan diukur menggunakan Surface Roughness Tester, dengan tiga kali pengukuran pada setiap spesimen, kemudian dihitung nilai rata-ratanya dalam parameter Ra (Roughness Average). Hasil penelitian menunjukkan bahwa variasi jarak celah roll memengaruhi nilai kekasaran permukaan perak, namun perubahan yang terjadi tidak menunjukkan hubungan yang linier. Perbedaan nilai kekasaran dipengaruhi oleh deformasi plastis, tekanan kontak antara roll dan material, serta fenomena roughness transfer selama proses pengerolan. Selain itu, penggunaan motor listrik menghasilkan putaran roll yang lebih stabil sehingga kualitas permukaan cenderung lebih seragam dibandingkan dengan rolling press manual. Berdasarkan hasil penelitian dapat disimpulkan bahwa pengaturan jarak celah roll dan ketebalan material merupakan parameter penting dalam proses rolling press perhiasan karena berpengaruh terhadap kualitas permukaan hasil pengerolan.

Kata Kunci : rolling press, jarak celah roll, ketebalan perak, kekerasan permukaan, cold rolling.

ABSTRACT

ANALYSIS OF THE VARIATION IN ROLL GAP AND SILVER THICKNESS ON SILVER SURFACE ROUGHNESS USING A JEWELRY ROLLING PRESS

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This study aims to analyze the effect of roll gap variation and silver thickness on the surface roughness of silver during the cold rolling process using a jewelry rolling press, as well as to compare the surface quality produced by manual and electric motor-driven rolling systems. The research employed an experimental method using sterling silver specimens with initial thicknesses of 2 mm and 1 mm. The roll gap variations applied to the 2 mm specimens were 1.7 mm, 1.5 mm, and 1.0 mm, while those applied to the 1 mm specimens were 0.7 mm, 0.5 mm, and 0.3 mm. Surface roughness was measured using a Surface Roughness Tester, with three measurements taken at different locations on each specimen. The average value was then calculated using the Ra (Roughness Average) parameter. The results indicate that roll gap variation affects the surface roughness of silver; however, the changes do not exhibit a linear relationship. The variation in roughness values is influenced by plastic deformation, contact pressure between the rolls and the material, and the roughness transfer phenomenon during the rolling process. Furthermore, the electric motor-driven rolling press provides a more stable roll rotation, resulting in a more uniform surface quality than the manual rolling press. It can be concluded that roll gap adjustment and material thickness are important parameters in the jewelry rolling press process because they significantly influence the surface quality of the rolled silver.

Keywords: rolling press, roll gap distance, silver thickness, surface hardness, cold rolling.