

Study on Magnetic Abrasive Finishing Characteristics of Nitinol Wire Using a Rotational Magnetic Field

Jeong Su Kim¹, Cheng Yin¹, Jing Fu Hou¹, Lida Heng¹ and *Sang Don
Mun¹

¹ *Division of Mechanical Design Engineering, Chonbuk National University, 664-14,
Duckjin-gu, Jeonju 561-756, Republic of Korea*

¹⁾ jeongsu1592@naver.com

¹⁾ yoonsung_ys@hotmail.com

¹⁾ [hj1994@naver.com](mailto:hjf1994@naver.com)

¹⁾ henglida1@gmail.com

¹⁾ msd@jbnu.ac.kr

ABSTRACT

Due to the recent research in demand for fine-diameter wires, there has been an active study on the method of magnetic abrasive finishing. The abrasive materials used the iron particle, diamond paste, and light oil and mixed together to perform the magnetic abrasive finishing process. The light oil is a toxic substance, and it is not good for human health. Instead of the light oil; the olive oil, grape seed oil, and castor oil were mixed together to perform in the finishing process. In this paper, four types of oil were selected such as light oil, and three types of environmental-friendly oils (i.e., olive oil, grape seed oil, and castor oil), which are mainly used as grinding oil in the magnetic abrasive finishing process. First, we compared the light oil, and the best environmental-friendly oil (olive oil) at rotational speed of 1500 rpm, which showed the good results of surface roughness, and change in diameter. Second, the selected environmental-friendly oils and conditions were analyzed for the processing characteristics according to the change in the magnetic pole shapes. Third, the analysis result of processing characteristics according to variation of the processing diamond paste particle (0.1, 0.5, 3.0 μ m) was selected. The results showed that olive oil, square magnetic pole, and 0.1 μ m diamond paste particle were the best conditions. According to SEM micro images, the surface roughness, and change in diameter was improved by new environmental-friendly oil, effectively.

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