

Polkij Anukul 2014: Noise Reduction of Wiper Motor. Master of Engineering (Engineering Management), Major Field: Engineering Management, Faculty of Engineering at Si Racha. Thesis Advisor: Miss Sirirat Muenvanichakul, D.Eng. 75 pages.

The aim of this research was to study the problem of wiper motor noise that was over 50 dB. Four factors associated to this problem i.e. the pitch of frame assy ( $X_1$ ), the diameter of frame assy ( $X_2$ ), surface roughness ( $X_3$ ), and shaft runout ( $X_4$ ) were studied. Preliminary data indicated that surface roughness and shaft runout were important factors affecting the noise intensity (Y). Regression model based on the data showed that both the values of surface roughness and shaft runout had to be kept below 0.004 mm in order to reduce the noise intensity below 50 dB. The optimal values of the factors controlling processes associated with surface roughness and shaft runout were determined by means of  $2^3$  factorial design.

Surface roughness is controlled by commutator unit pressing process. Three factors associated with this process are the pitch of jigs, air pressure and pressing force. The optimal values of 98.2 mm, 0.6 MPa, and 30 kN, respectively, were determined by the factorial design. Shaft runout is controlled by core armature unit pressing process which is, in turn, controlled by the pitch of jigs, air pressure and pressing force. The factorial design resulted in the optimal values of 29.4 mm, 0.4 MPa, and 50 kN, respectively. With all the optimal values of these factors, the average noise intensity of wiper motors produced from the production line was 47 dB.

\_\_\_\_\_  
Student's Signature

\_\_\_\_\_  
Thesis Advisor's Signature