World Academy of Science, Engineering and Technology
International Journal of Industrial and Systems Engineering
Vol:13, No:07, 2019

Effects of Tool State on the Output Parameters of Front Milling Using Discrete Wavelet Transform

Authors : Bruno S. Soria, Mauricio R. Policena, Andre J. Souza

Abstract : The state of the cutting tool is an important factor to consider during machining to achieve a good surface quality. The vibration generated during material cutting can also directly affect the surface quality and life of the cutting tool. In this work, the effect of mechanical broken failure (MBF) on carbide insert tools during face milling of AISI 304 stainless steel was evaluated using three levels of feed rate and two spindle speeds for each tool condition: three carbide inserts have perfect geometry, and three other carbide inserts have MBF. The axial and radial depths remained constant. The cutting forces were determined through a sensory system that consists of a piezoelectric dynamometer and data acquisition system. Discrete Wavelet Transform was used to separate the static part of the signals of force and vibration. The roughness of the machined surface was analyzed for each machining condition. The MBF of the tool increased the intensity and force of vibration and worsened the roughness factors.

Keywords : face milling, stainless steel, tool condition monitoring, wavelet discrete transform
Conference Title : ICEMSO 2019 : International Conference on Engineering, Manufacturing and Supply Operations
Conference Location : Berlin, Germany
Conference Dates : July 22-23, 2019