



TOOL CONDITION MONITORING USING VIBRATION ANALYSIS

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ABSTRACT

Cutting tools can be used when they do not reach tool life criteria and can produce parts with desired surface finish and dimensional accuracy. When the cutting edge of the tool reaches one of the tool life criterion, the tool should be replaced by a new one or sending it for regrinding. Tool condition monitoring is carried out by analyzing Amplitude-Time signals using a vibration analyzer. During cutting operations, the cutting tool experiences various stresses such as normal, shear and also thermal shocks. These stresses cause wear and breakage of cutting edge. Tool wear is defined as a gradual loss of tool material at contact zones of work piece and tool material, resulting the cutting tool reaches its life limit. Spindle speed, feed and depth of cut are three machining parameters. Different experiments are conducted by varying one parameter and keeping other two parameters constant so that maximum value of each parameter was obtained This research is based on ISO3685 and investigates their flank wear patterns of HSS tools during machining of EN24. Amplitude time spectrum is analyzed using Matlab and the data is converted into frequency spectra an signals above 5 KHz is filtered to remove noises using a Butterworth filter and the signal is then converted to amplitude-time spectra. The rms of signals is found out to carry out failure diagnosis.

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