VIBRATION CONTROL BY USING THE TERMINAL CONTROL OF HSM

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Abstract

HSM Terminal, operated manually by the operator is modified so that the expanding field of feed rates and spindle speeds can be controlled by an external electric potentiometer.

Key words: chater control, HSM, accelerometer, electric potentiometer.

INTRODUCTION

The experiment is performed on a woodworking center, using an accelerometer and an experimental protocol developed specifically for this application.

MATERIAL AND METHOD

The maximum cutting depth is on pieces of beech and oak using a spindle HSK-F63 LEITZ-A-76, V26 5RH/Dx with a length of 10 cm. Acceleration is measured near the front of the tree using type Brüel & Kjaer accelerometer 4393v. The operating frequency is set to 10 kHz. The tension on the shaft speed and the speed of advanced work are adjusted to obtain a new set of working parameters. Regulating and control systems are then used for HSM own speed and feed speed shaft is pending.

Measurements were performed; the mechanical vibration acceleration signal recording on the machine HSM ROVER 346 with a measuring system consists of: DELPHIN (hard: Measurement on Top Message acquisition system and software: Software MHouse), the SC MOBILE S.A. Tileagd, in Dec. 2009 (Figure 1).

Records were made for processing different types of timber-load and for different shaft speeds processing system, the results being stored in ASCII files (name file.asc>).

ASCII files were then decoded and converted into data files, specific programming environment MATLAB ® (name file.mat>). The decoding of ASCII files was performed using a decoding program specially designed for this operation <decod_amdtv.m> the MATLAB ® programming environment.

Data files obtained were used for further processing by another program MATLAB ® <amdtv_fft.m> that view is the most important part of acquired signals.

Fig. 1. Control panel vibration control system to HSM ROVER 346.

RESULTS AND DISSCUSIONS

For each type of processing and speed in the spectrum, one can read the most significant frequencies, especially the corresponding entry tool to track all the essences of wood, especially the oak.

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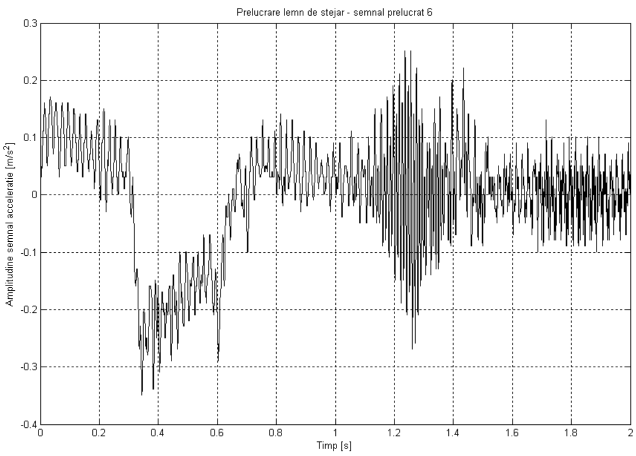

Fig. 2. Processed acceleration signal processing to speed oak n = 15 000 r / min

Acceleration signal and acceleration signal spectrum obtained shows the influence of anisotropic structure of wood, especially wood entry tool.

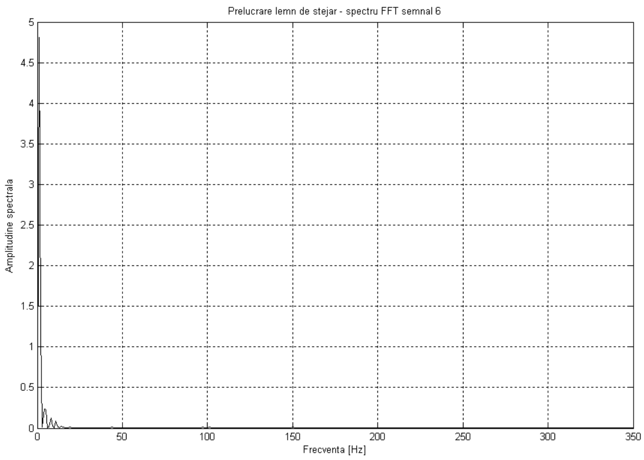

Fig. 3. Spectrum Signal Processing oak acceleration at speed n = 15 000 r / min

Variation of speed and feed speed is done manually by the operator control panel processing center operating on the principle of a voltage variation of external electric potentiometer (Figure 4).

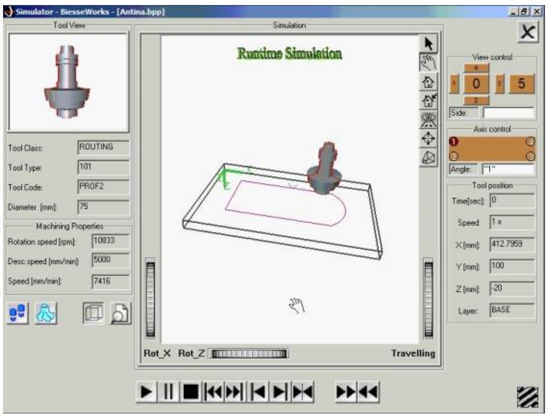

Fig. 4. Simulator BiesseWorks vibration control system for external and internal milling operations

By using an external electric speed potentiometer, the initial speed can be changed without adjustment from 50% to 120% and the feed rate can be varied from 0% to 100% of the initial advance speed.

CONCLUSIONS

The method presented provides a practical tool to control excessive vibration wood processing centers by simulating the milling process and easily adjustment of speed and feed speed.

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