

ABOUT VIBRATION DETERMINATION METHOD IN MILLING PROCESS ON CROSS SECTIONS OF LAMINATED SOLIDWOOD

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Abstract

This work paper is about the measurement of the vibration in cross cutting by milling laminated solid wood which requires some drilling conditions. The scientific work has treated different aspects of the vibration in milling process. This values characterizing the values of the dynamic parameters.

Key words: Wood Milling, splintering, Cutting Power.

INTRODUCTION

"The operating status" and the diagnostics normal vibration of milling machines encountered in industry is one of the main concerns of designers and those who exploit them. One of the characteristics of the "status" is the vibrational movement.

A global broadband measurement of vibration gives quick information of the admitted vibration level, useful to the general condition of a dynamic machine or to efficiencies of the vibration isolation.

Monitoring the dynamic equipment through periodic or continuous measurement of overall vibration, the appropriate standard, suggest that intervention on a machine will be made only when measurements show that this is necessary.

MATERIALS AND METHODS

To diagnose the normal vibration produced by milling machine we used for measurements the vibration equipment.

The vibration measurements were performed with IMPAQ FFT spectrum analyzer, manufactured by Benstone Instruments Inc. -USA.

IMPAQ is portable analyzer, with color graphic screen, keyboard and with display functions of the measured and analyzed graphics in the field [20].



Fig. 1 – The Impaq analyzer

Modulele software utilizate pentru analiza și diagnosticarea vibrațiilor au fost următoarele:

The used Software modules for the analysis and diagnosis of the vibration were used as follows:

- a. The vibrometer – the software allows the overall vibration measurements according to ISO 10816, to establish the rating of the functioning machinery.
- b. The waveform analyser and the FFT – The software allows analysing the waveform and spectrograms frequency on one or more channels. The analysis is necessary for detection of the defects on dynamics machinery. The software allows the settings activation for frequency domain, measurement parameter, number of mediation and so on.
- c. The Data Explorer – The programme allows the analysis and interpretation of measurement data with the Impaq analyser on computer.

RESULTS AND DISCUSSION

The vibration sensor used for making the measurement was a piezoelectric accelerometer for general usage with 100 mV/g sensibility. It's recommended to making vibration measurement for machinery with 600 rpm.

For vibration determination we make a lot of tests on different wood type material at cross and longitudinal milling (fig. 2).



Fig. 2. The connection of the Impaq analyser to milling machinery

From these measurements we observed the decreased vibration when the machine-tool assembly is working in capacity. From obtain data we can observe the vibration values (table 1)

Table 1

The testing on the different wood type material in cross and longitudinal milling process

Nr.crt	Material	Speed	Deepness [mm]	Milling process	Vibration [mm/s]
1.	Fir	V1	9	C	5
2.	Fir	V1	9	L	4,65
3.	Fir	V2	9	C	3,1
4.	Fir	V2	9	L	5,2
5.	Oak	V1	9	C	4,1
6.	Oak	V1	9	L	6,2
7.	Oak	V2	9	C	2,4
8.	Oak	V2	9	L	4
9.	Fir	V1	13,5	C	1,6
10.	Fir	V2	13,5	C	The machine is stoped

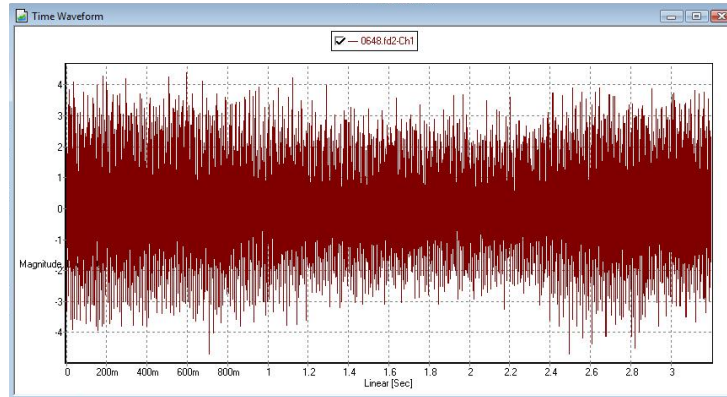


Fig. 3. The vibration graphic on cross milling process

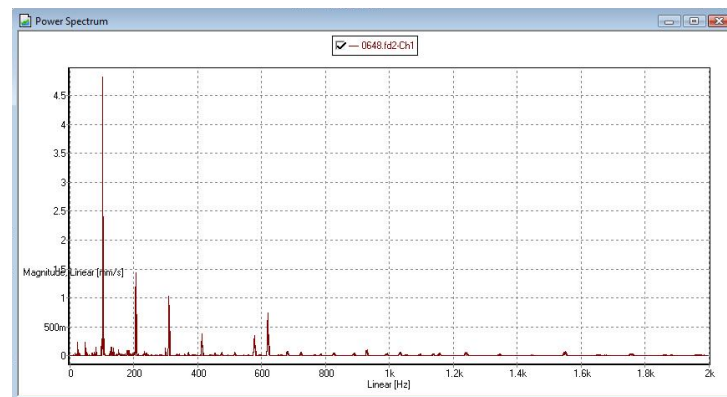


Fig. 4. The power spectrum of vibration graphic on cross milling process

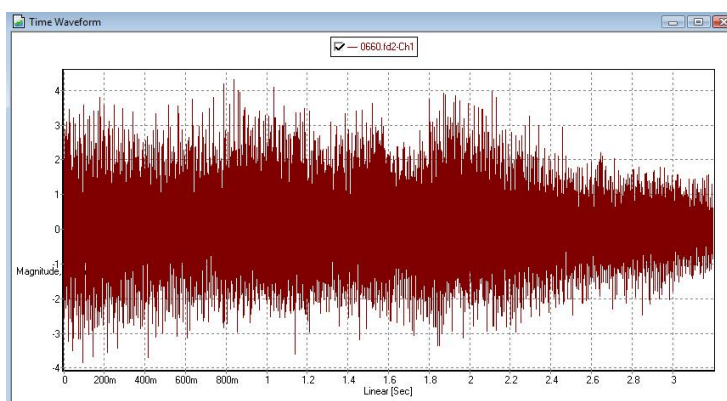


Fig. 5. The vibration graphic on cross milling process

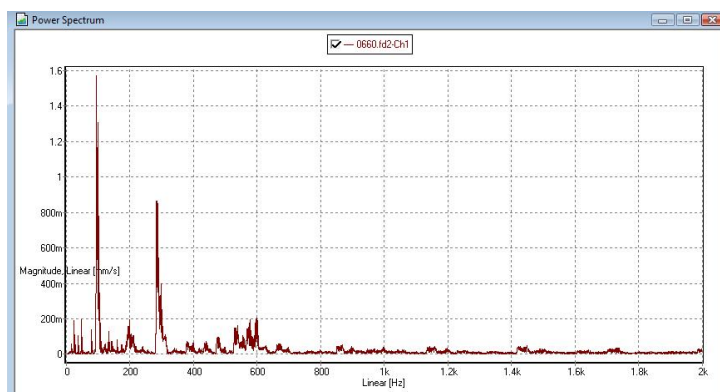


Fig. 6. The power spectrum of vibration graphic on cross milling process

CONCLUSIONS

The vibration apparition is due in special to milling tools degree wear.

We observe the variation of vibration values is depending to cutting speed, milling deepness and milling type process (cross or longitudinal milling).

In case of cross milling process we observe a big cutting resistance.

To reduce the vibration is necessary to make the equilibration of milling tools.

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