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# Stochastic Analysis of the Ground Surface

Toshihiro OCHI\*

In this paper the surface qualities of the ground workpieces are analysed by introducing the stochastic process analysis, that is, auto-correlation functions and power-spectra of the profile curves are obtained so as to discuss the periodicity of the curves and the values representing significant correlation-ranges for the variations in the workpiece speed and the classification of the grinding wheel.

Five kinds of grinding wheels investigated are A46H, A46M, A80H, and A46HM. The workpiece investigated is S45C in the shape of  $30 \times 30 \times 150$  inmm.

The depth of cut setting is 1/100 mm constant, and the speed of workpiece is investigated for the following values; 5, 10, 15 and 20 m/min.

A46/80H is particular grinding wheel which is made up of two different grain sizes, and A46HM is made up of two different grades.

Profile curves are obtained by scanning methods.

TOSBAC 3400 digital computer was used to calculate numerical values of auto-correlation functions and power-spectra of the profile curves.

The main results of the analysis are as follows :

- (1) The values representing significant correlation-ranges appear to increase with workpiece speed. These values are much variable with workpiece speed, but the characters are not distinct.
- (2) Periodicity of the profile curves could be distinguished as to only once grinding.
- (3) Comparing the individual period-workpiece speed curves it is showed that the increasing characters for the grinding wheels are quite different.
- (4) The increasing rate of period to work speed is less when the grain size is small and hardness is strong, than when the grain size is coarse and grade is soft.
- (5) In a range of low speed the period of the profile of A46/80H is influenced by the period of A80H and in a range of high speed it is influenced by A46H.
- (6) The period of the profile of A46HM has not any clear tendency.

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