



## PROFILE STRUCTURING OF WOOD SURFACE

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### Abstract

*In the paper, a new approach to the structuring of functional surface is presented. Wood surface structuring by milling is of stronger and stronger interest. Four-side moulder for planing grooves on wood surface is offered by Weinig enterprise. Using longitudinally profiled knives the last cutter head in moulding machine creating functional surface is brought in axial movement which results in rustical surface.*

**Key words:** *structuring, surface, wood, moulding, Weinig*

### INTRODUCTION

Traditional process of structuring of wood that means underlining its texture means extracting from its surface of soft (early) wood and leaving hard (late) wood. Surface machined in such a way reminds naturally used wood.

Brushing is the most often used technology of surface structuration (sometimes called raising – although these names do not describe the same machining process). It is one of the ways of wood surface preparation for usage for example floor board. Some producers differentiate two kinds of surface structuration that is brushing with delicate plastic brush and brushing with metal brush. The first one is brushing and the other one is raising. Both of them are performed by brushing machines – Fig.1. The disadvantage of such machine is that wire brush doesn't choose only soft wood and often extracts also late wood [3].

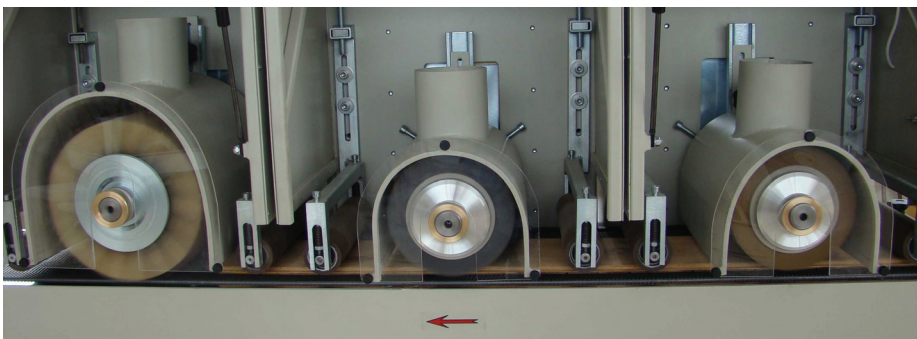


Fig.1 View of brush machine with brushing heads

Additionally on floor boards are created among others side chamfering and irregular ones, different kinds of indentations, traces of chisel, traces of pinhole borer and corrugate—everything is done to make a floor board look old.. The next stage is laying on such board a layer of oil or varnish. Each kind of wood can be sanded from soft coniferous to had exotic wood through careful choice of machining parameters.

Maximum difference in the height of a profile can reach up to 18 mm keeping at the same time homogenous sanding effect in each part of sanded element. Usage of suitable flap wheel and load eliminates a danger of rounding sharp edges of profile.

Usage of greater number and kinds of sanding modules equipped in pair of spindles having any direction and axis location lets obtain specialistic versatile production line.

### STRUCTURING BY MILLING

Lately of great interest is another method of wood surface structuring via cutting. Wenig[2,4] manufacturer presented method of chamfers obtaining – corrugate on the surface with knives having specially shaped edges. For created structured profile not to be homogenous the last head which gives final effect is brought into an axial movement.

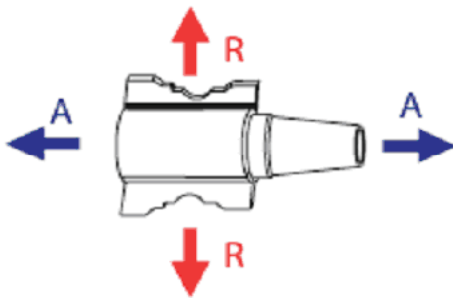


Fig.3 Horizontal head with knives to surface structuring

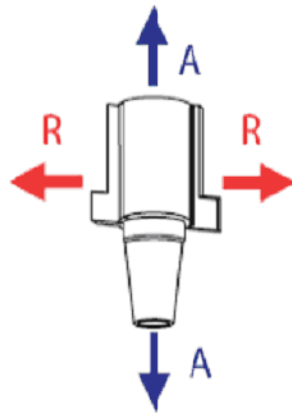


Fig.4 Vertical head with knives to surface structuring

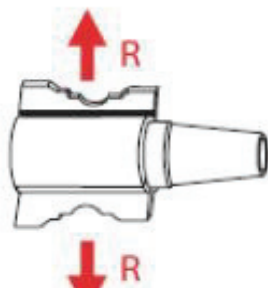


Fig.5 Horizontal head with knives to surface structuring - only radial movement

Spindle moving along axis (fig. 3, 4 and 5) gives nonhomogenous course of corrugating. Such examples can be seen on Fig. 6.

Such movements can also be performed by side heads – vertical. Moving along A-A axis (Fig. 3 and 4) head as a result of cutting results in non-uniform corrugating, examples of which are presented in Fig. 6



Fig.6 Selected different surface structures obtained with cutting method.

## PRODUCTION PROCESS

Created surface structure depends on head feed speed (oscillation), which can result in symmetric surface view. It is caused by head movement with identical deviation along axis to the right and to the left or upwards or downwards. This type of structuring can be seen in ironplates machining [Biermann and all 2010].

The oftener changes of head position are performed and the more random it is, the more sharply outlined the surface which gives better visual effects of such surface.

## PLANNED SURFACE STRUCTURE

The increase of structural complexity of an element surface is created during interfeeration of movement paths of 2 or more cutting heads

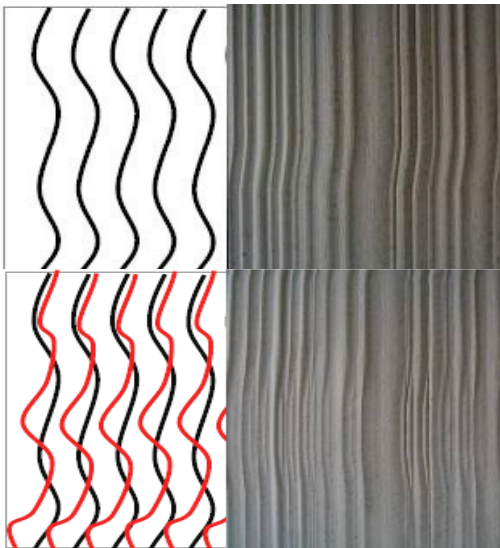


Fig. 7 One course of structuring element through machine tool- uniform pattern

Fig. 8 Two courses partly interferring

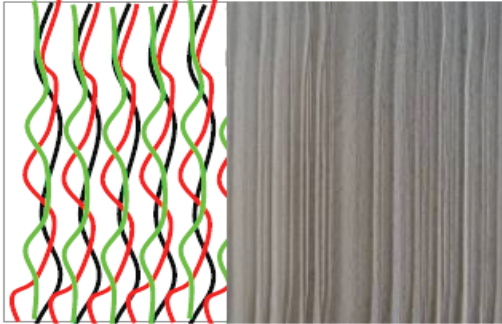


Fig. 9 Three interfering courses. A complex surface structuring

In all cases one can see random chosen length of axial head move..

## STRUCTURE PLANNING

Surface structure depends on rotation speed of machining tool and feed speed of machined material. In production process structure planning is possible with one head. The more often in this stage of production surface planing is repeated the more interesting is final surface structure.

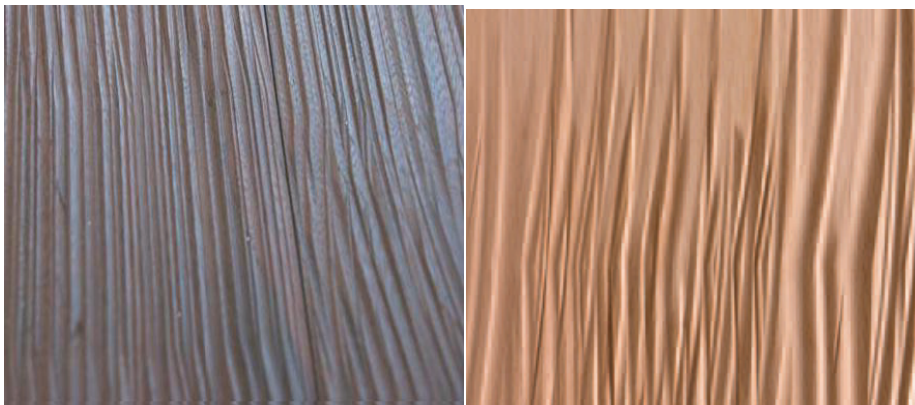


Fig. 10 View of surface having high structure complexity

## FACTORS DETERMINING AXIAL OSCILLATIONS OF HEAD

Construction of head for surface structuring on all vertical and horizontal planes is possible to use in normal planners for profilings [3].

Factors determining axial oscillations:

range of axial movement of head,

- positioning
- rotary speed of head,
- feed speed
- introduction of limitations in axial movement – Fig.11.

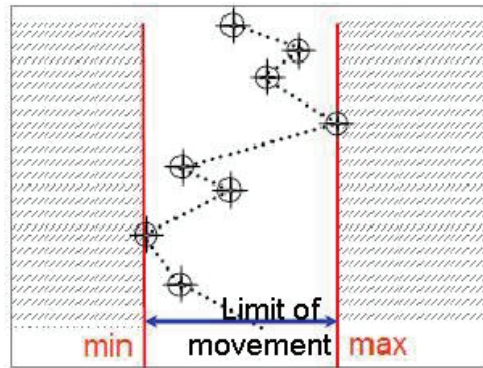


Fig.11 Scheme of chosen point position changes on blade of knife of spindle the milling



Fig. 12 Four – side planner –adapted to surface structuring



Fig. 13 Example of the wooden elements after structuring

## CONCLUSIONS

Structuring of functional surfaces substantially raises attraction of producers offer creating possibility of producing non-homogenous surface products. At the same moment it provides them with rustical view. More and more sophisticated designs chosen by producers and consumers stimulate introduction of new solutions in the field of wood planing.

## LITERATURE

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