

## Applied Research Activities

### Shaping Effects by Coating of Cutting Edges

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Nearly every cutting tool (mill, drill, saw, knife etc.) is equipped with one or more cutting edges. Also at machine parts edges can provide relevant functionality. The shape of the edge (edge radius, wedge angle) is more or less decisive for the performance. That's why it is mostly coated with hard films for wear protection. So the shape stability is provided for a longer time.

The protective films are typically based on metal nitrides, - oxides or – carbides. They are deposited with thin film technologies such as PVD or CVD.

Unfortunately the geometries of the cutting edges are changed by the coating, in particular the edge radius is enlarged. Therefore the film thickness is limited and the initial radius of the uncoated tool must be smaller than the target radius of the coated edge.

A new coating process based on vacuum arc PVD was developed to overcome this problem. By means of selected coating materials and process conditions the film growth at edges can be controlled properly. So it is possible to grow up edges sharper than the initial edge geometry.

The potential of this coating approach is great, because the film thickness limitation will be overcome. On the other hand the coating process is simplified because the edges to be coated can have a higher radius. So adhesion issues or local overheating are avoided.

The paper gives an overview about the technological approach, testing procedures and results and also a couple of examples.

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