

IC-MPPE

A5.25 Know-how based post-treatment and design of layer architecture of coated hard metal cutting tools

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IMPROVED HARD COATING SYSTEMS FOR EFFICIENT MACHINING OF AEROSPACE MATERIALS

INNOVATIVE APPROACH FOR IMPROVED ARCHITECTURE OF HARD COATINGS OF HIGH-END MACHINING TOOLS.

In times of globalization and the resulting air traffic, the performance and efficiency of modern jet engines plays a central role. Current research goals in this regard are to minimize fuel consumption, to reduce pollutant emissions and to reduce weight.

For this purpose, custom tailored modern high performance materials are required for aircraft industry, which in turn require special machining tools for the fabrication of aircraft components, which can withstand highest stresses and temperatures.

Manufacturing processes in which chips are produced (e.g. milling, turning, drilling) belong to the group of machining processes. The tools used for such

processes (see image above) are typically protected by hard coatings in order to increase their cutting performance (i.e. faster machining) and to increase their service life (i.e. the tools last longer).

Within the framework of a long lasting cooperation, scientists from Leoben contribute significantly to the improvement of such hard coatings for difficult to machine materials, which are frequently used in aircraft industry. A recently achieved milestone of the research activities is the knowledge-based design of hard coating materials, interfaces and layer architectures in order to be able to develop coating materials with significantly improved properties.

SUCCESS STORY

By applying the unique portfolio of modern characterization methods available at the scientific partners, the performance of titanium nitride/titanium diboride (TiN/TiB₂) coated high performance tools has been significantly improved.

Impact and effects

With a new and innovative interface design, that is based on a gradual chemical transition, which gradually changes the coating properties, an important step towards consolidating the pioneering position of both the company and the scientific partners could be achieved in the field of hard coatings on tools for difficult to machine materials.

Subsequently, the productivity and customer satisfaction were increased significantly.

The development and continuous improvement of coated tools for high-performance machining of

materials for aircraft industry has enormously strengthened the position of the company partners as market leaders as well as that of the scientific partners in this segment. This in turn has a positive influence on the image (keyword "high-tech") and sales of the company partners. This consequently creates new jobs and preserves existing ones.



Milling tool equipped with indexable inserts during application

Project coordination (Story)

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This success story was provided by the consortium leader/centre management and by the mentioned project partners for the purpose of being published on the FFG website. Further information on COMET: www.ffg.at/comet