

Numerical development of erosion resistant MMCs

Project start: 01.02.2010

Project end: 31.01.2011

Project partners

FKM/VDMA

Aim

Within this project the material properties of erosion resistant MMC-materials will be identified by using numerical models. The aim is to show potentials of MMC-materials which exceed the materials presently used in wear applications.

Approach

The large variety of all imaginable metal/ceramic-composites will be investigated by an extensive parameter study to identify potentials to reduce the erosive wear. The used erosion models will help to identify the sets of mechanical properties which are most favorable to minimize the wear through particle erosion. The MMC-materials with the best will be used for the inverse modeling with self consistent unit-cell models to simulate the necessary properties of the individual phases. For the verification of the simulations experimental investigation of the erosion resistance will be carried out as well. Therefore, material samples will be tested to measure the impact angle, particle size and particle velocity dependent material removal rates. This data will be compared to the calculations made by the erosion model. Furthermore, the microstructure and damage of the samples will be investigated by light microscopy and where necessary by SEM.

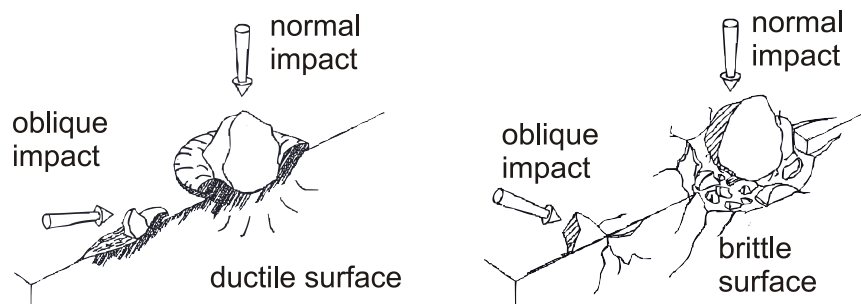


Figure 1: Damage mechanisms for particle erosion [Finnie et al.]

Acknowledgement

The research project is funded by FKM/VDMA, the financial support is acknowledged.

Contact

Dipl.-Ing. (FH) Andreas Reuschel

Tel.: +49 / 711 685-62547

Fax: +49 / 711 685-62635

E-mail: andreas.reuschel@imwf.uni-stuttgart.de