

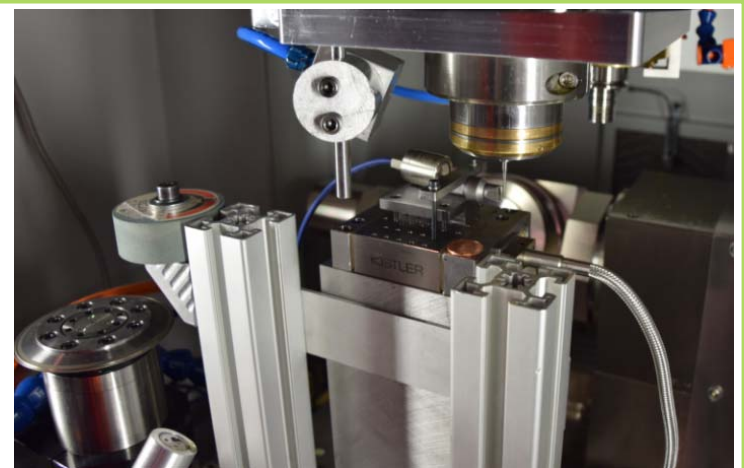
An analytical model for micro grinding of Titanium material

Ziel

Micro-machining is gaining popularity due to the recent advancements in micro-electro mechanical systems (MEMS) and biomedical engineering as well. It is important to investigate grinding of the part in micro scale, since it is not possible to scale down the process knowledge and machine tools, from macro-scale machining, to smaller dimensions. This master thesis focuses on to present an analytical model for the micro grinding process to predict grinding forces and surface roughness. A methodology for predicting the micro-grinding forces and surface roughness will be offered based on physical analysis of the process. It will consider the single grit interaction, heat transfer behaviour, and micro-grinding wheel topography. To this end one of the existed model will chosen and developed for the micro-grinding of Titanium with MATLAB by considering the crystallographic effect.

Methodik

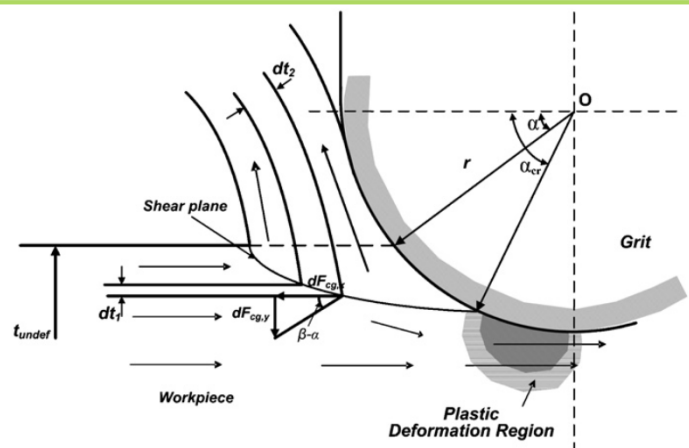
Predicting the grinding process is an important way to prevent doing experimental works. It can be achieved by considering the physical nature of the cutting process into the mathematical model. To this end a theoretical model should be validated by MATLAB software. There are several way to model the process that by doing the literature review the best one shall be chosen and developed.



Experimental setup for micro grinding

Aufgaben

- Doing literature review on modeling of grinding process
- Finding a suitable method to model the process.
- Developing the model for micro machining
- Validate the model



A mechanical interaction of the single grit in micro-grinding.