**Presentation Title:**
Scanning measurements on a large gear standard

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**Abstract:**
For quality control and inspection, gears are usually measured on coordinate measuring machines. In industrial practice, this is done almost exclusively in scanning mode, because time efficiency is a decisive economic factor compared to single point measurements. This advantage is particularly pronounced for large parts, such as gears used in wind energy systems. Another advantage of scanning measurements is that the features are recorded with a high point density, which allows filtering as required by the standard ISO 1328-1:2013. The Physikalisch-Technische Bundeanstalt (PTB) in Germany has also recently switched its gear calibration operation to scanning mode measurements. For this purpose, the advantages and disadvantages of tactile scanning measurements were investigated in more detail, e.g., to better assess dynamic effects and their impact on gear calibration.

Detailed considerations for large gear standards followed using a gear standard with a diameter of about 2 meters. On the chosen standard, we have examined flank and profile lines of both internal and external gears as well as spur and helical gears. An important scanning parameter is the scanning speed, which was varied from 1 mm/s to 50 mm/s, while additional single point measurements were carried out as means of comparison. This allows to identify the possible disadvantages of the dynamic effects that can occur during scanning, such as the stick-slip effect. Furthermore, the influence of different point densities and filter settings was investigated. The measurement results of the utilized large gear standard will be presented as an example.

Finally, the contributions from the scanning process to the measurement uncertainty were investigated. The results will be discussed and compared with the single point method.