Abstract:
Precise information about the load distribution in the tooth contact can improve the quality of calculation results regarding strength and durability of spur and helical gear stages. A method of measuring the load distribution of spur gear stages in lab conditions has been developed. The basic idea is, that tangential deformations on the backside of a loaded tooth flank are directly linked to the load distribution on the tooth flank. A measuring procedure to detect the aforementioned tangential deformations has been developed. The measurement results can be compared to calculated load distributions with two methods. The first method is to generate tangential deformations out of a calculated load distribution by using the finite element method (FEM). The measurement results can be compared to the so determined tangential deformations. The second method is to directly generate a load distribution out of the measurement results. Calculated load distributions can be directly compared to a so determined load distribution. Therefore, an iterative calculation approach using the FEM has been developed. Using the methods mentioned before, calculated load distributions can be validated. © 2017 The Japan Society of Mechanical Engineers.

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