

Evaluation of milling influence to surface integrity after grinding by Barkhausen noise method

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The effect of grinding on surface integrity of gears, bearings, camshafts etc. is obvious. The contribution deals with the influence of initial manufacturing operation, specifically milling, to resulting surface integrity of gear tested by Barkhausen Noise Analysis technique. Two sets of gears milled by different machines by comparable parameters were used to solve the task. The first series of wheels (Set A) was milled on the older hobbing machine and the second one (Set B) on the new profile milling machine from the reputable manufacturer. The initial production operation was followed by heat treatment of both sample sets in a single batch and grinding with identical abrasive conditions.

The BNA testing of surface integrity was carried out after heat treatment and final grinding. The results of these experiments are summarized in the graph in the Figure 1. Here it is seen that the MP values are lower on the set B than for the set A, both for manual and robotic measurements. It was experimentally approved the effected surface/subsurface damage caused by milling remains in the material through the heat treatment. Based on these results, it can be assumed that different milling affects the resulting surface integrity after heat treatment and final grinding. This difference was observed on the results from both manual and robotic measurements. This study also indicates correlation of the results between these two types of measurements, which is shown in the Figure 2.

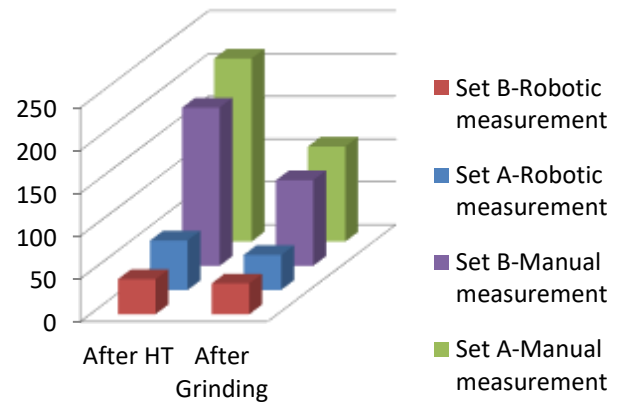


Figure 1 Results of BNA testing

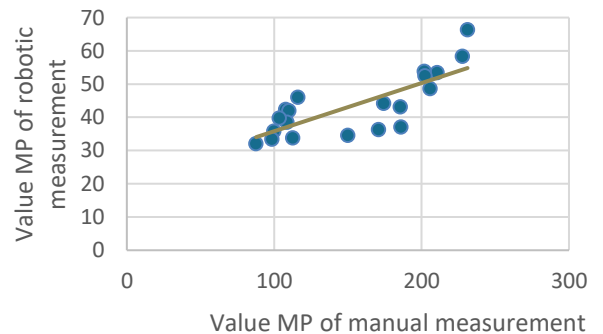


Figure 2 Correlation of manual and robotic measurements