

Application: Automated visual check of the cylinder face and analysis of the honing structure

Task: the entire cylinder face must be checked visually in a few seconds and the honing structure needs to be evaluated.

Measurement instrument: *BMT CylScan* (Fig. 5)

Fig. 1 shows an image scanned with the *CylScan* device. The honing structure is the digital analogon to the fax film paper. The evaluation software enables both the detection of defects and the analysis and quantitative evaluation of the honing structure.

Evaluation examples:

- Calculation of the honing angle at locations which the user can select (Fig. 2). The calculated angles and locations can be saved together with the image of the honing structure.
- The honing angle distribution (Fig. 3) shows the variation of the honing angle across the entire cylinder area.
- With the help of an FFT the periodogram is calculated (Fig. 4). This representation enables sophisticated statements regarding the honing structure. The two peaks (in the image at approx. 70°-80° and 100°-110°) correspond to the two families of honing grooves which result from the up- and down movement of the honing tool. The more narrow and higher the peaks the better defined is the angle of the corresponding family of grooves and the more uniform are the groove distances. Due to the manufacturing process the two honing groove families are marked to a different extent. Homogeneity and relative markedness are described by numerical parameters.



Fig. 1: Scanned cylinder face

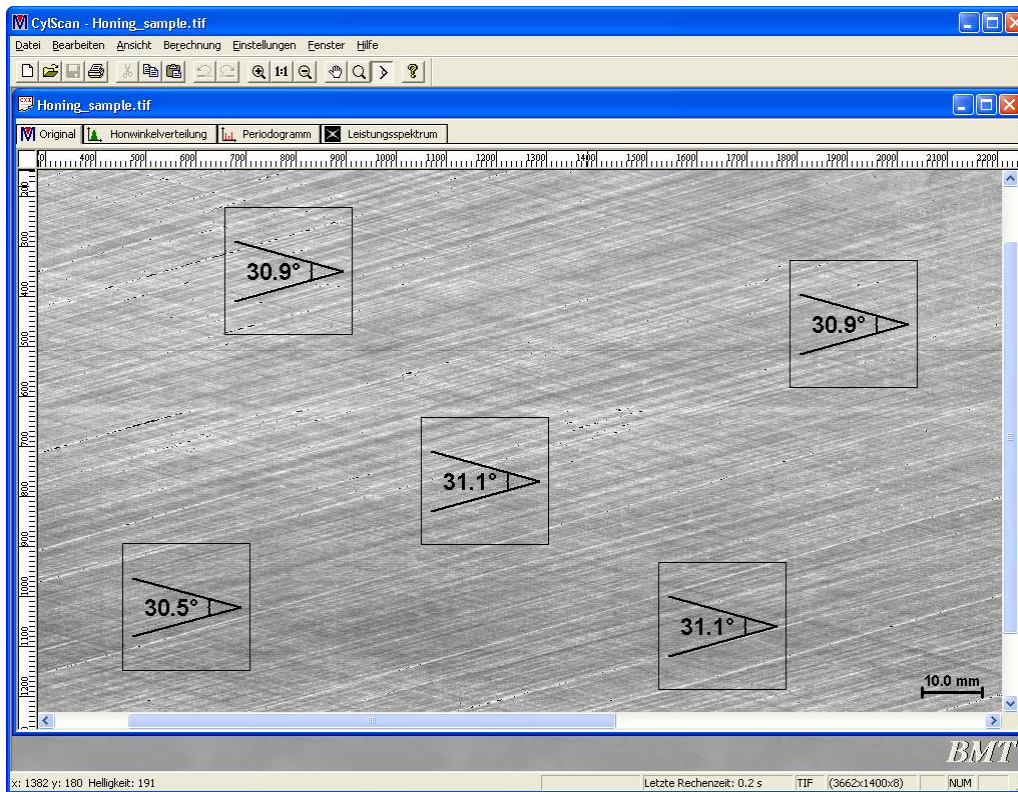


Fig. 2: Calculation of the honing angle at distinct spots which have been selected by the user.

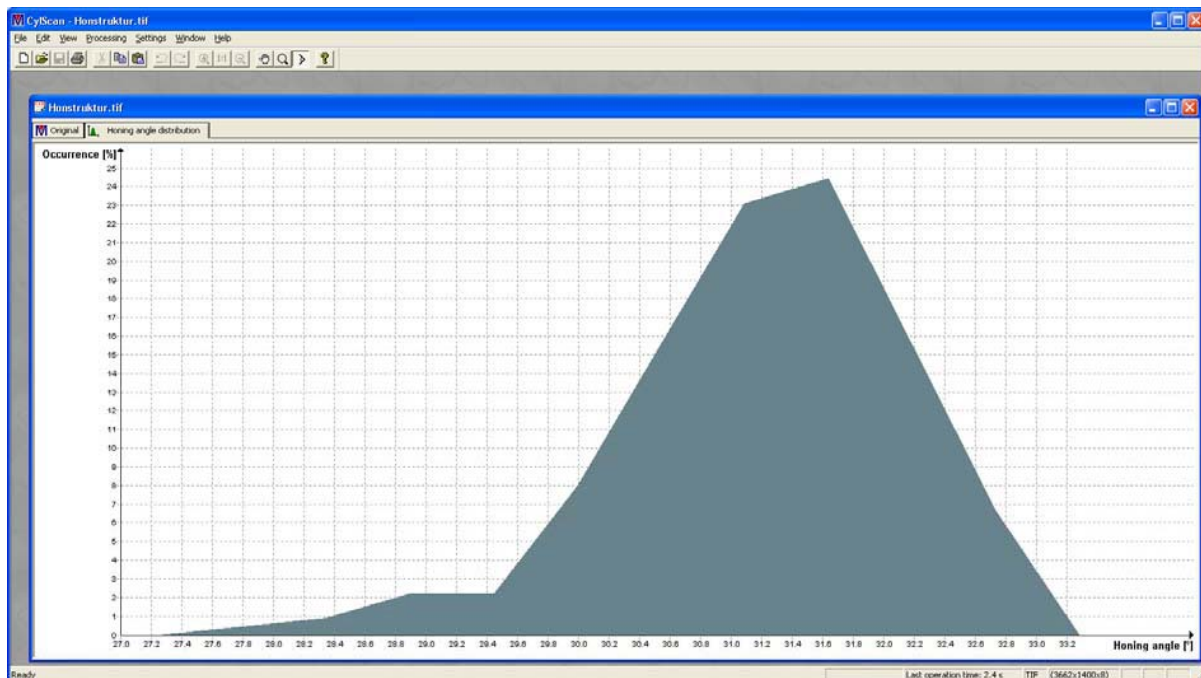


Fig. 3: Honing angle distribution

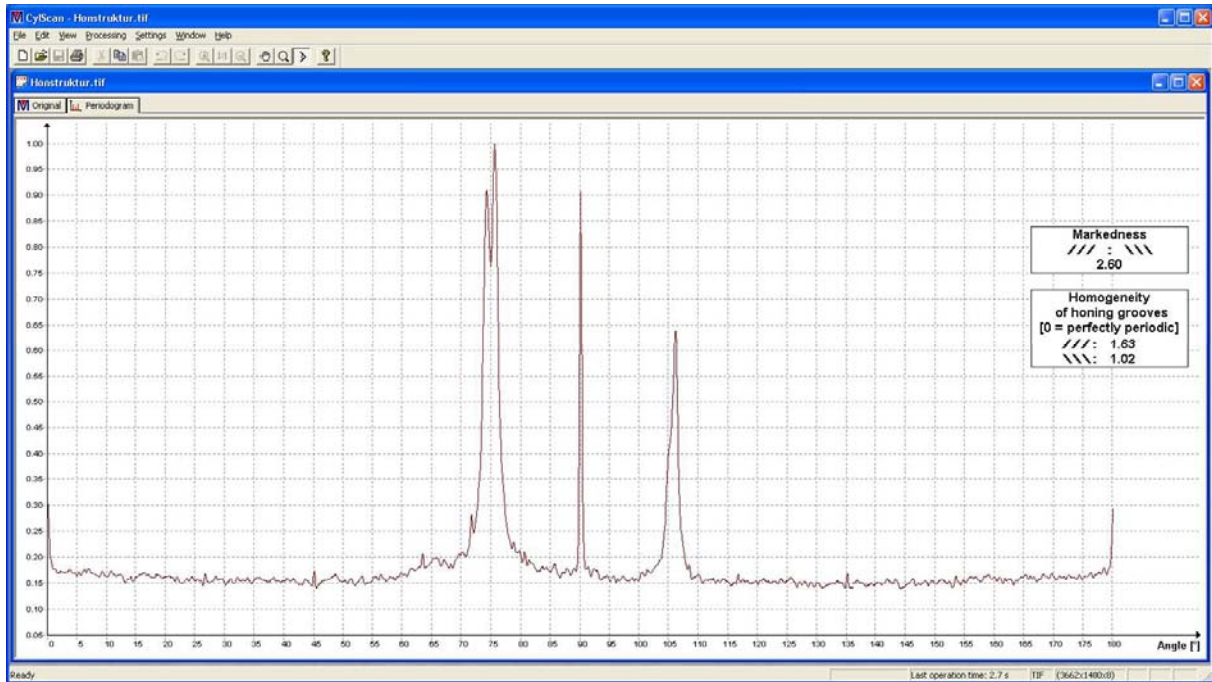


Fig. 4: FFT of the honing structure with numerical parameters for the markedness and homogeneity.

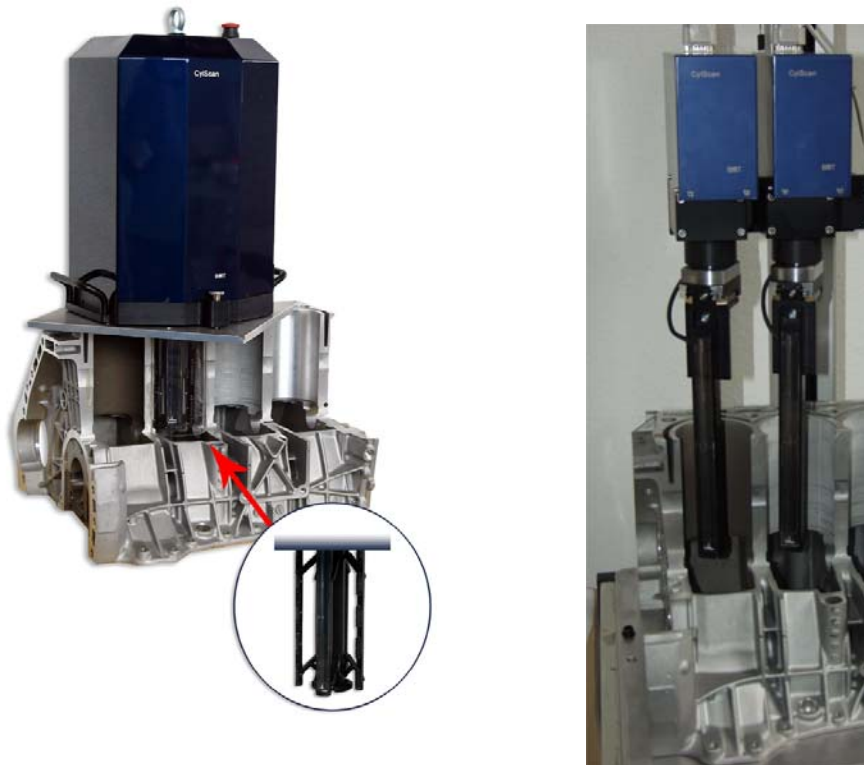


Fig. 5: BMT Cylinder scanner. The picture on the right shows the version for the in-line application. By checking all cylinder bores simultaneously a complete engine block can be controlled within 20s.