Fiber quality control for MDF production

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For all particle-based composite materials made from raw wood, particle size distribution and morphology are classified as crucial factors for the industrial production process and the resulting product properties. The particle size measurement of TMP (thermo mechanical pulp) fibers for MDF production is still almost non-existent in industrial use. There are no standards for fiber quality available. The quality of wood fibers is not based on reproducible automatic measurement systems, but tested visually and tactilely often on the finished MDF only. Particle measurement systems from other industries cannot be adapted for the measurement of TMP fibers. The major challenges in the analysis of total fiber size distribution of TMP are the large size spectrum, which ranges from 30 microns to several centimeters, the heterogeneous raw material and the measurement of objects that are not describable with simple geometric parameters. In addition, the fibers have to be separated, which is hardly consistently feasible, with the current state of technology. In this paper / presentation a fiber image analysis technology is described to solve the challenges. With the developed software it is possible to accurately and reproducibly analyze the length, width and kinks of individual fibers. In addition, algorithms have been developed which allow the measurement of individual fibers, despite overlapping objects. Moreover, the proposed algorithm allows for a sub-pixel accurate measurement of the fiber's properties. This improved accuracy has been evaluated using manual microscopy measurements of the same dataset.