

International Conference on

Design and Production Engineering

July 25-26, 2016 Berlin, Germany

Experimental investigation on silicon sawing process for photovoltaic purposes

Walter Lindolfo Weingaertner

Universidade Federal de Santa Catarina, Brazil

The most promising technology used nowadays for silicon wafering (semiconductor and photovoltaic industry) is the multi-wire sawing with bond abrasives. The process shows high cutting rate and clean operating environment, but the quality of the wafers still must be improved. For that, a wire-saw test rig has been designed and is under construction at LMP's facilities. The test rig is a wire-saw that uses an endless diamond wire to perform the cut. It has been built employing aerostatic bearings and slides that provide high stiffness, high loading capacity and movement accuracy, low vibration transmission and very little stick-slip effect. It is also mounted on an inertial granite block that reduces the influence of vibrations coming from the floor. The endless wire is manufactured by using a device that was designed and built at LMP. The device performs resistance butt-welding of thin diamond wires (around 250 μ m). The wafering experiments shall investigate the process parameters, wear of the diamonds, wafer roughness, wafer subsurface integrity, and the cutting regime transition from brittle to ductile. The wire-saw of silicon under ductile regime represents an important goal that has not been achieved by any company yet. The experimental setup will be able to cut with high cutting speed and low vibration, and therefore, more ductile regime and wafers with better quality are expected.

w.l.weingaertner@ufsc.br