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Grinding temperature measurement by infrared thermography

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Abstract

In the grinding process, the whole grinding power is converted as heat in the wheel workpiece interface. A large amount of the total heat flux in the grinding area is dissipated into the workpiece. These physical phenomena strongly affect the surface integrity of the workpiece and can lead to undesirable burning marks, microstructural transformations, residual stresses and cracks. Numerical simulation can give information about possible damages on the workpiece in the near ground area. The input parameter of the numerical model is the part of the heat flux going into the workpiece. The results of the computed residual stresses strongly depend on its accuracy. In this paper, a method based on the infrared measurements and inverse methods is presented for the determination of the heat flux entering the workpiece. The difficulties the experimenters have to face to measure the true temperature fields are discussed. Experimental devices are presented and interesting results are shown. This method contributes to improve the knowledge on the way the damages appear in the case of grinding by both numerical and experimental investigations. Finally, the method give information on the choice of the best processing parameters to avoid grinding damages and to increase productivity with the certainty to deliver high-quality ground surfaces.