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Title : Tile glaze defects characterization by digital microscopy

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In the ceramic tile industry, the characterization of defects on the glaze surface is mainly subjective. Indeed, even if the operator follows a precise procedure, the characterization of the flaws strongly depends on the physical condition of the operator and on the external environment. As an example, the operator needs to inspect the tile surface at different angles to see smaller defects and looks for reflections of a light source. This is basically the same way that is used by a technique known as optical deflectometry. Moreover, if there is not enough or too much light, the defects cannot be seen. The main purpose of this research was then to enhance the characterization of the defects by defining an objective and standard procedure for inspection and measurement. After the improvement of the method, the research was focused on the relation between the proportion and size of the defects and the kaolin used in the composition of the glaze.

After investigation on various techniques, a digital microscope was used to perform the characterization. Consequently, the characterization of the defects no longer depends on the operator nor on the external environment but on the performance and standard operating procedure used on the microscope. As the microscope cannot target all the surface of the tile in a reasonable amount of time, a representative surface was selected to perform the analysis. Moreover, to compare the different levels between a perfect and a poor quality tiles, several classes of quality were defined, and an appropriate scale for the different degrees of quality was developed.