Accepted Manuscript

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PII: S0263-2241(18)30902-3
DOI: https://doi.org/10.1016/j.measurement.2018.09.068
Reference: MEASUR 5926

To appear in: *Measurement*

Received Date: 12 January 2017
Revised Date: 27 August 2018
Accepted Date: 25 September 2018

Please cite this article as: C.A. Paredes-Orta, J.D. Mendiola-Santibañez, F. Manriquez-Guerrero, I.R. Terol-Villalobos, Method for Grain Size Determination in Carbon Steels Based on the Ultimate Opening, *Measurement* (2018), doi: https://doi.org/10.1016/j.measurement.2018.09.068

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Method for Grain Size Determination in Carbon Steels Based on the Ultimate Opening

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Abstract: To understand mechanical properties in materials, grain size determination plays a fundamental role. Although, several automatic techniques for the determination of grain size have been introduced, nowadays a major drawback is associated with the quality of the images. The present work is focused on a novel image processing methodology for grain size determination which permits an accurate grain size determination even for poor quality images. This methodology is based on the watershed-plus-marker approach for segmenting the images. In this technique, the key to achieving a good segmentation is the detection of a set of markers of the regions of interest. Thus, our study focuses on the selection of markers signaling each grain. The method for selecting the markers is based on an improved associate function of the ultimate opening. To remove the undesirable regions a filtering process of this function is proposed to finally find the set of markers.

Keywords. Grain size, Ultimate opening, Morphological filtering, Mathematical morphology, Automatic Method.

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