doi:10.1017/S1431927611009627
Microsc. Microanal. 17 (Suppl 2), 2011
© Microscopy Society of America 2011

Quantitative Fractographic Analysis of the Variability in Tensile Ductility of a High Strength Dual Phase Steel

R. S. Jamwal, A. M. Gokhale[1], and S. P. Bhat[2]

1. School of Materials Science and Engineering
Georgia Institute of Technology, Atlanta, GA 30032-0245

2. ArcelorMittal Global R&D, East Chicago, IN 46312

ABSTRACT

Scientific literature contains a large number of contributions that report relationships between *average* microstructural parameters (for example, mean grain size) and *average* properties of materials (for example, yield stress). On the other hand, *fracture sensitive* properties such as ductility, toughness, fatigue life, etc. depend on the average microstructural attributes as well as microstructural distributions and extrema, which is often reflected in the *variability* in the fracture sensitive properties in a set of specimens having the same average microstructure and chemistry. Therefore, there is a need to establish microstructure-properties correlations where averages, variances, and extrema of the microstrucutral attributes are correlated to the variances in the fracture sensitive properties. In this contribution we report a quantitative fractography, fracture profilometry, and stereology-based investigation where the *variability* in the uniaxial tensile ductility of a set of specimens of high strength dual phase steel is correlated to the *variability* in the microstructural distributions and defect populations.

https://doi.org/10.1017/S1431927611009627 Published online by Cambridge University Press