Theoretical Basis of Fractographic Methods and Their Application in Fracture Modelling for Cr-Ni Steels

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Fractographic methods derive their knowledge from Euclidean geometry, set theory, metric theory and chaos theory. In engineering technology, the fractography is primarily used for modeling of fatigue and intergranular fractures. As such defects are not smooth due the principle of their origin, they cannot be described using ordinary mathematical tools. However, if the conditions of self-similarity are met, fractal geometry means can describe various irregular, incomprehensible, crooked or fragmented geometric shapes. Fractographic description of the fracture profile allows more accurate quantification of fractures and it also enables identifying possible causes of their initiation. This study contains several examples of specific cases of Cr-Ni steel failures and a basic explanation of their fractographic description.

Keywords: Optical microscopy, Fractography, Cr-Ni steel, Micro fracture, Macro fracture

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