

Effect of Carbon Amount of Dual-Phase Steels on Deformation Behavior Using Acoustic Emission

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Abstract : In this study acoustic emission (AE) signals obtained during deformation and fracture of two types of ferrite-martensite dual phase steels (DPS) specimens have been analyzed in frequency domain. For this reason two low carbon steels with various amounts of carbon were chosen, and intercritically heat treated. In the introduced method, identifying the mechanisms of failure in the various phases of DPS is done. For this aim, AE monitoring has been used during tensile test of several DPS with various volume fraction of the martensite (VM) and attempted to relate the AE signals and failure mechanisms in these steels. Different signals, which referred to 2-3 micro-mechanisms of failure due to amount of carbon and also VM have been seen. By Fast Fourier Transformation (FFT) of signals in distinct locations, an excellent relationship between peak frequencies in these areas and micro-mechanisms of failure were seen. The results were verified by microscopic observations (SEM).

Keywords : acoustic emission, dual phase steels, deformation, failure, fracture

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