Short Communication

Evaluation of the Weld on In-service Gas Pipeline

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The study evaluated the condition of steel gas pipeline at the site of weld after more than 45 years of service. The deformation cycle of welding and particularly superposition of the thermal and deformation cycle, results in phase transformation and precipitation processes in the thermally affected region. The deformation cycle has a pronounced effect on ageing of the welded joint and the associated increase in its hardness and reduction in notch toughness. The hardness of the weld was measured according to Vickers HV0.05. The highest values of hardness were measured for the weld metal, namely 293 HV0.05. The values of mechanical properties of steel after more than 45 years of service of the pipeline corresponded to values defined by the respective standard. Transition temperature T_T according to Charpy test was equal to -8.5 °C. From the point of view of technical practice, with regard to pipe service properties, it is important that the construction material is loaded at temperatures above the transition temperature T_T . Transcrystalline brittle failure was observed on the specimens that have been broken at T_T temperature.

Keywords: gas pipeline, steel, welded joint, transition temperature, fracture

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