

Evolution of Widmandstaitten structure in welding joints

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Abstract: The operation of welding induces a metallurgical multitude of phenomenon owing to the fact that it covers high fields' energetic thus causing important variations of the mechanical properties and microstructural of materials. The multipass welding of a HSLA steel strong thickness gives place to a variation of the microstructure of a layer to another. The thermal cycle supports the appearance of a known structure under the name of "structure of widmanstätten". The latter is supported by high heating temperatures and a fast cooling; it often germinates in the form of slat on the austenitic grain boundaries, known like ferrite of widmanstätten. But it can germinate in the form of needles in the grains on the impurities or on the precipitates, it is acicular ferrite. Impact strength and hardness tests were done on the melted zone after welding and heat treatment. The microstructural evolution of each layer influences the entire welded joint, conferring these final mechanical properties to him.

Keywords : heat treatment, HSLA steels, welding, Widmanstätten structure