Thick-walled ductile iron casts have been studied by applying (i) cooling rate calculations by FVM, (ii) microstructural characterization by 2D SEM and 3D X-ray tomography techniques and (iii) fatigue testing of samples drawn from components cast in sand molds and metal molds. An analysis has shown correlations between cooling rate, structure and fatigue strengths demonstrating the benefit of 3D structural characterization to identify possible causes of premature fatigue failure of ductile cast iron.

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