Integrated modeling of an entire casting process has become a tool which favors design and optimization of manufactured parts. The aim of this project was to examine and optimize a high-pressure die cast part and its production process with respect to die filling and issues of residual stresses using the commercial software code MAGMAsoft®. The first process analysis revealed problems and defects of the casting which were cold shuts and out-of-plane distortions. Secondly, adjustment in the geometry of the casting and the gating system were carried out and evaluated. Lastly, modifications in the process and machine parameters were done and assessed. All simulations revealed that, the main causes of the problems were: a poor geometry of the casting leading to an improper filling pattern, and a massive gating system bringing thermal imbalance into the solidification process. Thus deformations due to residual stresses occurred. The numerical results were evaluated and appeared to be in agreement with the results from the actual manufacturing process. Based on these findings, proposals for improvements were given. In order to avoid distortions and cold shuts further geometrical adjustments should be considered, mainly in the gating system.