Superplastic Molding Technique Optimization for a Gas Turbine Engines Thin-Walled Inlet Ring

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The paper deals with the application of a superplastic forming technological process for lightweight parts of a gas turbine engines production. The problem of a comprehensive design was stated and solved for a simple shape part such as jet engine inlet ring. In the performance of a task both an inlet ring design and superplastic forming features were taken into account. To solve technological optimization problem the objective function, optimization parameters and constraints were selected. The sequential quadratic programming method was selected and implemented to solve the considered problem. To cut down numerical computations the number of geometric optimization parameters was reduced by means of cubic splines in geometric blank representation. The optimal laws for providing a molding pressure to ensure a part quality were found as well. The paper presents the possibility to apply the suggested approach for other gas turbine engine parts design.

Keywords: *optimal design, superplastic forming, comprehensive design, thin-walled parts, jet engine parts, optimization.*

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