

## OP 481

### Temperature and stress simulation of thermal barrier coatings on gas turbine blades

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The Atmospheric Plasma Spray (APS) process is used to deposit Thermal Barrier Coating (TBC) on the superalloy substrate of gas turbines. TBC is used in a wide range of components operating in adverse environments where erosion, wear, corrosion or heat shorten component life. However, residual stress, which is stress caused by thermal mismatch, occurs at the interface between the base material and the coating layer due to the thermal conductivity and thermal expansion coefficient of different materials, and residual stress is one of the main factors in the peeling of the coating layer. In this study, to determine the distribution and size of residual stress occurring in the APS process for the turbine blade model, a numerical analysis model of the heat shield coating layer of the 8YSZ coating layer on the surface of the base material CM247 was established based on ANSYS finite element analysis software, and the heat Transmission-stress analysis was performed. As a result of the analysis, the location in the blade shape where peeling of the coating layer may occur is inferred.

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