IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 3, May 2024

Thermal Mapping of Hot Section Components of Aero Gas Turbine

Mr. Akshay V. Gade, Mr. Nikhil R. Bayas, Mr. Farhan Siddique, Ms. Chaitanya Gedam
Department of Mechanical Engineering
Jawaharlal Darda Institute of Engineering and Technology, Yavatmal, India

Abstract: *In the realm of aerospace engineering, the optimization of turbine engine performance is crucial for enhancing efficiency and ensuring safety. Monitoring temperature distributions within hot section components is essential for diagnosing potential issues and optimizing engine operation. Traditional methods of temperature monitoring often lack the ability to provide comprehensive spatial data across complex engine geometries. This paper proposes an innovative approach to address this challenge by introducing the automatic mapping of hot section components in aero turbine engines using thermal paint and MATLAB analysis. The methodology involves the application of temperature-sensitive thermal paint onto critical engine parts, followed by controlled engine operation to induce temperature variations. High-resolution imaging captures color changes in the thermal paint, which are then processed using MATLAB to derive temperature distributions. Calibration procedures establish the correlation between paint color and temperature, enabling accurate temperature mapping. Through rigorous experimentation and analysis, this study demonstrates the effectiveness of the proposed approach in generating detailed temperature maps of hot section components. These maps offer valuable insights into temperature gradients, hot spots, and thermal performance, enabling engineers to optimize engine operation and diagnose potential issues effectively. By leveraging the simplicity and versatility of thermal paint alongside the analytical power of MATLAB, this research provides a practical and efficient solution for automatic mapping of hot section components in aero turbine engines. The findings contribute to advancing temperature monitoring techniques in aerospace engineering, ultimately leading to safer and more efficient turbine engine designs*

Keywords: Gas turbine, Thermal Paint, MATLAB

DOI: 10.48175/568