

## Article Abstract

<b>Title:</b>	Failure analysis of gas turbine blades in a gas turbine engine used for marine applications
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<b>Abstract:</b>	High pressure temperature (HPT) turbine blade is the most important component of the gas turbine and failures in this turbine blade can have dramatic effect on the safety and performance of the gas turbine engine. This paper presents the failure analysis made on HPT turbine blades of 100 MW gas turbine used in marine applications. The gas turbine blade was made of Nickel based superalloy and was manufactured by investment casting method. The gas turbine blade under examination was operated at elevated temperatures in corrosive environmental attack such as oxidation, hot corrosion and sulphidation etc. The investigation on gas turbine blade included the activities like visual inspection, determination of material composition, microscopic examination and metallurgical analysis. Metallurgical examination reveals that there was no micro-structural damage due to blade operation at elevated temperatures. It indicates that the gas turbine was operated within the designed temperature conditions. It was observed that the blade might have suffered both corrosion (including HTHC & LTHC) and erosion. LTHC was prominent at the root of the blade while the regions near the tip of the blade were affected by the HTHC. It could be concluded that the turbine blade failure might be caused by multiple failure mechanisms such as hot corrosion, erosion and fatigue. Hot corrosion could have reduced the thickness of the blade material and thus weakened the blade. This reduction of the blade thickness decreases the fatigue strength which ultimately led to the failure of the turbine blade.
<b>Keywords:</b>	Failure analysis, Turbine blade failure, Superalloy, Hot corrosion, Sulphidation, Metallurgical examination.