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Project Title: Failure analysis of gas turbine second stage blade

Department:	Metallurgy	Employer:	Zahedan electrical power company
Project/Program Manager:	Saeed Khani Moghanaki	Executor:	Aliakbar Fallah Sheykhleri
Project Financial Code:	220013	Project Quality Code:	CMTZP01
Type of Project/Program:		Assistant:	Research board

Project Staff:

Project Necessity: The necessities of the present project are the following items: 1- to prevent similar failure in the power plants, 2- To reduce major overhaul costs, 3- to reduce the costs of power generation stops, 4- to provide stable power, and 5- to reduce the number of unforeseen overhauls.

Project Goals: The main goal of the present project is failure analysis of GE-F5 gas turbine second stage blades.

Abstract: In the present study, failure analysis of gas turbine second stage blades was performed by utilizing standard methods. The microstructures and fracture surfaces of the blades were investigated by optical microscope (OM) and field emission scanning electron microscope (FESEM). The Hot and cold tensile test were carried out to evaluate the mechanical properties of the blades. The operation history of the turbine such as oil temperature, bearing vibration, the number and type of prior trips, and etc. were investigated. The results showed that the fuel were accumulated into the exhaust duct due to fire failure. The auto-ignation and explosion of the accumulated fuel in the exhaust duct led to second stage blade failures.

Steps and Methodologies: The experimental procedures of the present report are as following: 1- investigations on the pictures and films, 2- operation history, 3- investigation on the damages type, 4- visual inspection, 5- microstructural investigations, 6- farctography, and 7- evaluations of mechanical properties.

Main Results (technical outputs, patents, papers, books, reports, etc.):

The report was sent to Zahedan electrical company.