Application of Reliability Centered Maintenance (RCM) in Electrical Power Plant

Hadi Abou-Chakra and Ramzi Fayad
Department of Industrial Engineering
Beirut Arab University
Lebanon

Abstract

The approach to maintenance in the power industry has changed in recent years. Competition has pushed companies to focus on maintenance and equipment reliability aiming to achieve higher returns on asset investments, to increase output and revenue, and to ensure safety and environment integrity. The availability of a complex system, such as a gas turbine, is strongly associated with its parts reliability and maintenance policy affecting the system degradation and availability. This paper presents a method for reliability and availability evaluation of gas turbines installed at a local electrical power plant. The method is based on system reliability concepts, such as functional tree development, application of failure mode and effects analysis to identify critical components of system reliability, and reliability and maintainability evaluation based on a historical failure database. The method also proposes the application of Reliability Centered Maintenance concepts to improve complex system maintenance policies aimed at the reduction of unexpected failure occurrences in critical components. The application is at two gas turbines, each with an output of 150 MW, installed in a 450 MW combined cycle power plant.

Keywords
Reliability, maintenance, power plant, gas turbines, failure modes