Optimization of the Turnaround Maintenance (TAM) Performance by TAM Model to Gas Plants in Case Study for Gas Turbines

A.Elwerfalli[1], M. K. Khan[1] and Munive-Hernandez [1]
School of Engineering and Informatics,
University of Bradford, BD7 1DP UK

a.a.k.elwerfalli@student.bradford.ac.uk,
m.k.khan@bradford.ac.uk,
j.e.munive@bradford.ac.uk

Abstract

Oil and Gas companies adopt various maintenance strategies. TAM is one of the major maintenance strategies used in the most oil and gas plants. It is considered an expensive both in terms of time and cost due to a plant shutdown. These plants consist of complex pieces of equipment that run continuously under harsh operating conditions caused by overpressure and fluctuated temperatures. A part of these equipment cannot be inspected and maintained unless entire plant facilities undergo shutdown to conduct the TAM event. The present study aimed to optimize TAM performance based on Critical Rotating Equipment pieces (CREs) of gas plants by using the TAM model that included three stages: i) At the first stage, Non-critical Equipment pieces (NEs) are identified and removed from scope of work (SoW) of TAM to proactive maintenance policy, ii) At the second stage, critical failures of each selected critical rotating equipment are analyzed in order to identify critical components for those pieces based on Risk-Based Failure (RBF) and Fault Tree Analysis (FTA), and iii) At the third stage, failure probability and reliability function for those selected critical pieces of equipment are assessed to determine duration and interval of TAM for the gas plant.
This study is characterized by presenting the TAM model, which is represented the real tool to implement it in oil and gas plants to minimize duration of TAM in order to eliminate failures and extend component life and to reduce TAM cost and production losses, also maximize interval of TAM in order to improve availability and reliability of the plant. The result of TAM model application at gas plants showed that the duration and interval of TAM could be optimized based on gas turbines risks that represented threat to the operating performance and reliability of the plant. An improvement in availability and cost were also presented to evaluate TAM performance optimization.

Keywords

Turnaround Maintenance (TAM) Scheduling, Risk-Based Failure (RBI), Fault Tree Analysis (FTA), and Failures Distributions (FDs).