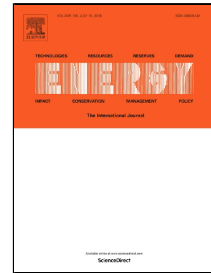


Accepted Manuscript

Prediction on Performance Degradation and Maintenance of Centrifugal Gas Compressors using Genetic Programming

F. Safiyullah, S.A. Sulaiman, M.Y. Naz, M.S. Jasmani, S.M.A. Ghazali



PII: S0360-5442(18)31116-2
DOI: 10.1016/j.energy.2018.06.051
Reference: EGY 13093
To appear in: *Energy*
Received Date: 02 May 2017
Accepted Date: 08 June 2018

Please cite this article as: F. Safiyullah, S.A. Sulaiman, M.Y. Naz, M.S. Jasmani, S.M.A. Ghazali, Prediction on Performance Degradation and Maintenance of Centrifugal Gas Compressors using Genetic Programming, *Energy* (2018), doi: 10.1016/j.energy.2018.06.051

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Prediction on Performance Degradation and Maintenance of Centrifugal Gas Compressors using Genetic Programming

F. Safiyullah¹, S. A. Sulaiman^{1*}, M. Y. Naz², M. S. Jasmani³, S. M. A. Ghazali³

1. Department of Mechanical Engineering, Universiti Teknologi PETRONAS, 32610 Seri Iskandar, Malaysia.
2. Department of Physics, University of Agriculture, 38040 Faisalabad, Pakistan.
3. PETRONAS Carigali Sdn. Bhd., Kerteh, Terengganu, Malaysia.

Corresponding author: shaharin@utp.edu.my, +60-53687013

ABSTRACT

In oil and gas industry, the performance prediction of gas compressors is approaching criticality. Usually, maintenance engineers rely on recommendations set by the original equipment manufacturer (OEM) for maintenance activities. Since compressors are operated in offshore conditions, OEM recommendations may over predict or under predict the maintenance schedule. An improper verdict on compressor maintenance interventions may increase the equipment downtime because of unavailability of the resources and poor readiness of the spare parts. The aim of the presented research was to develop a diagnostic model for gas compressors by using the genetic programming (GP). The OEM isentropic and actual isentropic heads were compared, and the maintenance activity of a gas compressor was predicted by calculating the performance degradation. The computational codes were developed separately for OEM isentropic and actual isentropic heads through GP. Hereinafter, the empirical equations were derived from the developed computational codes to predict the optimum time for the routine maintenance. For rotational speed between the tested regions, GP predicted 92% accurate interpolation between the curves. It reveals that using the developed GP model, the operators can accurately predict the compressor's health and plan ahead the equipment maintenance at any time.

Keywords: Genetic programming; Gas compressor; Maintenance prediction; Performance degradation.

Download English Version:

<https://daneshyari.com/en/article/8071163>

Download Persian Version:

<https://daneshyari.com/article/8071163>

[Daneshyari.com](https://daneshyari.com)