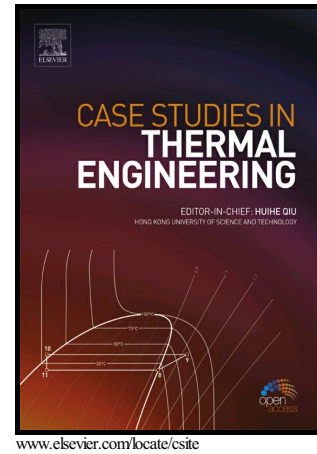


Author's Accepted Manuscript

Numerical thermodynamic model of alpha -type Stirling engine

Khaled M. Bataineh



PII: S2214-157X(17)30334-9
DOI: <https://doi.org/10.1016/j.csite.2018.03.010>
Reference: CSITE271

To appear in: *Case Studies in Thermal Engineering*

Received date: 19 December 2017
Revised date: 19 March 2018
Accepted date: 25 March 2018

Cite this article as: Khaled M. Bataineh, Numerical thermodynamic model of alpha -type Stirling engine, *Case Studies in Thermal Engineering*, <https://doi.org/10.1016/j.csite.2018.03.010>

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 galley proof before it is published in its final citable 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.

Numerical thermodynamic model of alpha -type Stirling engine

Khaled M. Bataineh

Department of Mechanical Engineering, Jordan University of Science and Technology, Irbid- Jordan

ABSTRACT

The objective of this study is to develop accurate practical thermodynamic model for alpha -type Stirling engine with Ross Yoke mechanism. Thermal, pumping, and regeneration losses are considered in developing the thermodynamic model. Two methods for solving the governing equations are proposed. The model is used to predict the power output, and the thermal efficiency. The proposed model is validated against experimental data available from the General Motor GPU-3 Stirling engine prototype. Parametric study is used to investigate the effect of geometric and operation parameters on the engine performance. The effect of regenerator effectiveness, the dead volume ratio, regenerator thermal conductivity, and the heat source temperature, the swept volume ratio on the maximum on engine performance are evaluated. It is found that significant improvement on engine performance can be achieved by optimizing geometric and operating parameters.

Keywords: Stirling engines, Alpha type, thermal losses, Ross Yoke, numerical simulations.

Corresponding author: Tel. +962 2 7201000 Ext. 22383; Fax. +962 2 7201074

E-mail address: (Khaled M. Bataineh) k.bataineh@just.edu.jo

Nomenclature

Download English Version:

<https://daneshyari.com/en/article/7153258>

Download Persian Version:

<https://daneshyari.com/article/7153258>

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