



CFD STUDY OF THE EFFECTS OF FLUID VISCOSITY AND IMPELLER GEOMETRY IN RADIAL CENTRIFUGAL PUMPS

By

Mahmoud Essam Mahmoud Mohamed Youssef

A Thesis Submitted to the
Faculty of Engineering at Cairo University
In Partial Fulfillment of the Requirements for the Degree of
MASTER OF SCIENCE
In
MECHANICAL POWER ENGINEERING

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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Under the Supervision of

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Title of Thesis:

CFD study of the effects of fluid viscosity and impeller geometry in radial centrifugal pumps

Key Words:

Centrifugal pump; blade angle; number of blades; specific speed; fluid viscosity

Summary:

A parametric study was made to study the effect of changing the leading edge blade angle and number of blades for low specific speed (8.25 Specific Speed EU) centrifugal pump with respect to three different pumped fluids viscosity (i.e. water with 1 centipoises cP, fuel oil with 48 centipoises cP and engine oil with 80 centipoises cP) and it was found that increasing the number of blades and leading edge blade angles leads to increase in pump head significantly and limited increase in the total efficiency but this geometrical modification was more obvious for the more viscous fluid (80 cP) where the head increased for 7 blades by 10.88% from 5 blades while for the water (1 cP) the increasing was only 5.26% from 5 blades to 7 blades, the study was made using CFD ANSYS ® 16.0 edition with an independent mesh size.

Acknowledgments

I would like to express my special appreciation and thanks to my advisor Professor Dr. Mahmoud Fouad, you have been a tremendous mentor for me. I would like to thank you for encouraging my research and for allowing me to grow as a research scientist. Your advice on research has been priceless.

A special thanks to my family. Words cannot express how grateful I am to my mother and father for all of the sacrifices that you've made on my behalf. Your prayer for me was what sustained me thus far. I would also like to thank all of my friends who supported me in writing, and incited me to strive towards my goal. At the end I would like express appreciation to my beloved wife who is always my support.

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