

HIGHER TECHNICAL INSTITUTE
MECHANICAL ENGINEERING DEPARTMENT

DIPLOMA PROJECT

DESIGN AND CONSTRUCTION OF A TEST RIG FOR THE
INVESTIGATION OF CAVITATION IN PUMPS
(M/760)

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JUNE 1996

**DESIGN AND CONSTRUCTION OF A TEST RIG
FOR THE INVESTIGATION OF
CAVITATION IN PUMPS**

by

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Project Report

Submitted to

the Department of Mechanical Engineering

of the Higher Technical Institute

Nicosia Cyprus

in partial fulfillment of the requirements

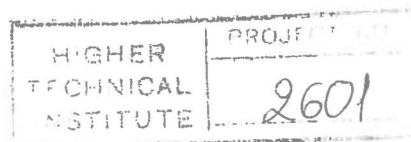
for the diploma of

TECHNICIAN ENGINEER

in

MECHANICAL ENGINEERING

June 1996



*This project is dedicated to the memory
of our supervisor Mr. Marios Pattichis.*

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ACKNOWLEDGEMENTS

We would like to express our sincere thanks and appreciation for guidance given by our project supervisors Mr. Constantinos Neocleous, and Mr. Marios Pattichis for the fulfillment of this project.

We also acknowledge with special thanks the help, guidance, and support given to us by Mr. Stavros Nicolaou who offered us his workshop and Mr. Dinos Constantinides who sponsored the pump used in the tests.

Finally thanks are also to all those who helped to bring this project to an end.

SUMMARY

Cavitation is the most devastating and destructive phenomenon in pump operation, limiting the field of safe application. As the objectives of this project is to study the phenomenon of cavitation in pumps and design a cavitation testing rig the following steps were followed throughout the entire work:

- Description of the different types of pumps, principles of operation, and performance characteristics.
- Definition of the phenomenon of cavitation in pumps and the parameters related to.
- Study and analysis of the various methods of testing for cavitation including the measurements required and the appropriate instrumentation, always according to ISO standards class B.
- Selection of a particular testing arrangement and detail design of the rig.
- Construction of the testing rig.
- As the best verification for any theory is the experimental establishment, the final step was to perform tests on the rig to determine the conditions, parameters under which it occurs and its effects escorted by a closer study and investigation on the origin and mechanism of the phenomenon of cavitation based on the experimental results.

Constantinides Yiannakis
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"Design and Construction of a Test Rig for the Investigation of Cavitation in Pumps."

INTRODUCTION

The oldest invention for the conversion of useful work (mechanical energy) into natural energy (liquid energy) recorded since the earliest years of the human existence go to one machine, the pump.

Pumps show up from the earliest years of civilization and are variously known, depending up on which culture recorded their description, as Persian wheels, water wheels, norias, Archimedean screw e.t.c. Perhaps the most interesting is that since the ancient years technology has met a vast development but still pumps remain one of the most used machines. Its function, to move any liquid from one place to an other against differences in elevations and against any resistance to flow made it popular over the centuries. Now days pumps are highly efficient, reliable and flexible as there is one for any application and for any liquid, from highly volatile ether to thick sludge.

Although the astonishing improvement of this hydraulic machine, still is another human creation, being label with the mark of imperfection, consequently having a number of restricting factors, phenomenons that reduce its field of application. The most devastating and undesirable phenomenon that might occur during incorrect operation of a pump is cavitation, because of its destructive effects both in performance and lifetime of the machine.

So it's wise to prevent and avoid cavitation, ensuring an efficient installation. This can be done by knowing the factors affecting and under what conditions occurs by testing the pump on a cavitation testing rig.