

DESIGN OF A RANGE OF UNIVERSAL YACHT RUDDERS

by

Savvas F Koumis

Project Report
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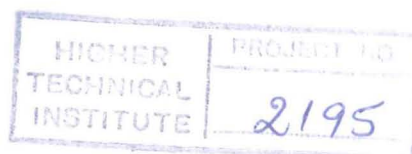
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INTRODUCTION

The aim of this project is to study and design a range of universal yacht rudders, such that the rudders can be stocked for sale.

In order to perform an efficient study, one should take into consideration a lot of factors which could be of great importance in the success of the study.

One of the most basic things is to determine the number of engines the yacht will dispose and, consequently, whether the rudder, (or rudders), is placed directly behind the engine or in a different way. Furthermore, one should require the velocity of the boat for it is a fundamental data for the later-to-be-calculated figures. Other factors should be considered as well, such as **span, chord, etc.** These shall be considered later on.

Due to the fact that there is no way by means of a formula, to evaluate the area or the shape of a rudder, this study will consider these as used normally in yachts of the same purpose and capacity. That is, the study will be based on already designed rudders for a similar purpose as in this case. For example, the dimensions of the rudders used in 15m length yachts, vary as following:

Span: 70, 80cm;

Chord: 30, 40, 50, 60cm.

Therefore, the designs will be based on these dimensions. Another basic factor to be considered, is that of safety. This will be initially based on the regulations for the classification of yachts and small crafts, as registered by Lloyds of England. Published every year in July, the Register contains the names, classes and general information concerning the ships classed by LLOYDS REGISTER of shipping. Finally, during the design process, compatibility between certain components (e.g. stock, bearings, etc) should be considered in order to enable the reduction of the final cost.

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Acknowledgements

Introduction

Manoeuvrability: general concepts, directional stability of course, application to a ship, stability and control of surface ships.

The Ship's rudder: control surface definitions, action of a rudder in turning a ship, limitations of theory, standards for manoeuvring.

Rudder forces: rudder force, centre of pressure position.

Experiments and trials: turning and manoeuvring, directional stability.

Area and shape of rudders.

Rudder types and systems: types, bow rudders, lateral thrust units, special rudders and manoeuvring devices, flow around rudders, factors affecting steering.

Rules and Regulations: materials, rudder stock, construction, support arrangements, pintles and bearings.

Calculations and analysis.

Costing.

Appendices.

Detailed drawings.