

**FLAW ANALYSIS ON GLASS FIBER REINFORCED
PLASTIC INSHORE PETROL CRAFT HULL USING PULSE
ECHO TECHNIQUE**

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Master of Science



University of Moratuwa, Sri Lanka.

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Dissertation submitted in partial fulfillment of the requirements for the degree
of Master of Science in Materials Science



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DECLARATION OF THE CANDIDATE & SUPERVISOR

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The above candidate has carried out research for the Master's thesis under my supervision.

Name of the supervisor: Mr. V Sivahar

Signature of the supervision:

Date:

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Abstract

The Glass fiber Reinforced Plastic (GRP) material is considered as the most prominent material for small boat industry due to the convenience of workmanship and light weight. Although the technology of GRP boat construction has been developed immensely for the last three decades, the technology related to the periodic assessment of GRP hull has not been developed in the same way compared to the steel and aluminum boat construction industry due to the inhomogeneous nature of the GRP structure.

At the designing stage of GRP boat, number of factors such as compressive modulus, tensile modulus, ultimate flexural strength, ultimate compressive strength and ultimate tensile strength will be considered in order to meet the level of performance expected by the end user. However the deterioration of the boat structure with the age, reduces the level of confidence to deploy the boat under same role.

In general flexural strength of GRP is measured destructively. However the destructive tests make the structure unusable, as such this study focuses on estimating flexural strength through nondestructive method with the aid of ultrasound technology.

The objective of this study; is to develop two independent relationships such as “Number of repeated blows Vs. Percentage Echo height” and “Number of repeated blows Vs. Flexural strength” using the data obtained from selected specimens. These specimens were obtained from the most prominent areas of damages expected on a GRP hull. These were then narrowed down to a single relationship, that is “Percentage Echo height Vs. Flexural strength”.



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List of Abbreviations

IPC	Inshore Petrol Craft
GRP	Glass fiber Reinforced Plastic
NDE	Non Destructive Evaluation
TTM	Through Transmission Mode
PEM	Pulse Echo Mode
P&CM	Pitch & Catch Mode
AC motor	Alternative Current motor
SEM	Scanning Electron Microscope
LCD	Liquid Cristal Display

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