DEVELOPMENT OF A PERFORMANCE MONITORING FRAMEWORK TO FACILITATE DECISION MAKING DURING FAST ATTACK CRAFT MAINTENANCE PLANNING

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Master of Engineering in Manufacturing Systems Engineering

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DECLARATION

This report contains no material which has been accepted for the award of any other degree or diploma in any University or equivalent institution in Sri Lanka or abroad, and that to the best of my knowledge and belief, contains no material previously published or written by any other person, except where due reference is made in the text of this report.

I carried out the work described in this report under the supervision of Prof. H.K.G Punchihewa.

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ABSTRACT

Effective maintenance planning is essential for the Sri Lanka Navy as there are responsible entities for procuring and managing maintenance-related requirements in order to meet significant operational availability of ships and craft. Moreover, improper planning can reduce the ship's availability, which may in turn be reflected in the security perspective in the country. Another issue that requires attention in this field is the cost of maintenance, since improper or inadequate planning could result in breakdowns that could increase the cost of maintenance. Thus, possible key factors that affect ship maintenance planning were identified to provide a framework which can help the decision maker to identify and improve decisions regarding Fast Attack Craft (FAC) maintenance.

At the first stage of the study, a review of the literature was conducted to identify the need for maintenance and to select the key factors that affect maintenance planning. Secondly, maintenance performance measurements of the other navies were evaluated by conducting case studies and interviews with professionals involved in the marine craft maintenance sector. In the third stage, a novel framework was developed to measure the maintenance performance of FAC in the Sri Lanka Navy, which was named as the Fast Attack Craft Maintenance Performance Measurement (FACMPM) framework. For the future research works, these criteria to be examined one by one in order to ascertain and optimize maintenance planning for FAC maintenance. Once it is proved, the framework to be adopted to SLN and same framework to be introduced to Major Ships' maintenance process of SLN.

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LIST OF ABBREVIATIONS

Abbreviation	Description
SLN	Sri Lanka Navy
IO	Indian Ocean
CSD	Commodore Superintend Dockyard
DSD	Deputy Superintend Dockyard
PPM	Planned Preventative Maintenance
CBM	Condition Based Maintenance
UCM	Unplanned Corrective Maintenance
NAD	Naval Armament Department
FAC	Fast Attack Craft
RCM	Reliability Centered Maintenance
TPM	Total Productive Maintenance
RE	Reliability Engineering
CE	Control Engineering
OEM	Original Equipment Manufacturer
KPI	Key performance indicators
MPIs	Maintenance Performance Indicators
MTBF	Mean Time Between Failures
MTTR	Mean Time To Repair
MPMFs	Maintenance Performance Measurement
BPMF	Business Performance Management Framework
OEE	Overall Equipment Efficiency
TMSA	Management and Safety Assessment
OCIMF	Oil Companies International Marine Forum
RUWM	Routine Under Water Maintenance
IMBL	International Maritime Boundary Line
ENA	Eastern Naval Area
CSLOG	Commodore Superintendent Logistics Department
FACMPM	Framework for Fast Attack Craft Maintenance Performance Measurement
MPM	Maintenance Performance Measurement
MTTF	Mean Time To Failure
TBO	Time Between Overhauls