Viability of Lean Manufacturing Tools and Techniques in the Apparel Industry in Sri Lanka

A dissertation submitted to the Department of Mechanical Engineering of the University of Moratuwa in partial fulfilment of the requirements for the Degree of Master of Engineering in Manufacturing Systems Engineering

by

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Dedication

To my dear parents and wife,

Declaration

"I hereby declare that this submission is my own work and that, to the best of my knowledge and behalf, it contains no material previously published or written by another person nor materials, which to substantial extent, has been accepted for the award of any other academic qualification of a university or any other institute of higher learning except where acknowledgement is made in the text."

UOM Verified Signature

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31.01.2011

I endorse the declaration by the candidate.

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Abstract

Lean Manufacturing can be considered as a business strategy which was originated and developed in Japan. It tries to identify waste and eliminate it. Thus it leads to improvement in productivity and quality and companies can achieve a competitive advantage over others. Starting from the automotive industry, it has rapidly spread into many other industrial sectors and there has been significant development and localization of the Lean Manufacturing concept in both developed and developing countries worldwide. In implementing this concept there are tools and techniques developed by Toyota which can be used effectively.

The initial step of this research is to study about the Lean Manufacturing. It starts by looking at how Lean Manufacturing first began. Then it seeks to identify the core principles, tools and techniques of Lean Manufacturing. After that an extensive literature review was carried out to find successful Lean tools and techniques currently use in worldwide. The next step is to identify tools which are used frequently and which are not used. There will be a study to find out the barriers of implementing other tools and techniques

After studying the global scenario the next step is to look at the Sri Lankan context. Sri Lankan industries, especially apparel sector have attempted to implement this, but a little research work is carried out in regarding its suitability. This research is an attempt to identify a suitable Lean model for the apparel industry in Sri Lanka using real world data, structured surveys, observations, and on site interviews. Also the study will reveal period of Lean implementation, suitable implementation methods, order of implementation, tools which are avoided, sustainability of different tools, challenges faced, ways of overcoming challenges and benefits achieved after applying Lean Manufacturing concepts in the apparel sector of Sri Lanka.

The findings states Lean Manufacturing can be applied to mass production apparel industries and has made positive impacts. As implementation of Lean concepts is still in development stage, the full benefit is not yet achieved. However current situation suggests that the industry can go forward with Lean. In this research the author has come up with a model which can be used to implement Lean in a systematic manner and each manufacturer must develop their own Lean system through training, experiments and kaizen.

Originality of the research: The research builds up a Lean Model which is not yet developed for the apparel sector in Sri Lanka. It can be further modified to suit the global apparel industry and other industries as well.

Keywords: Lean Manufacturing, Lean tools and techniques, Apparel industry, Viability, Sri Lanka

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Notations / Nomenclature

dept.	: department
pgm.	: program
etc.	: et cetera
BOI	: Board Of Investment
CAD	: Computer Aided Design
CAM	: Computer Aided Manufacture
CEO	: Chief Executive Officer
CME	: Canadian Manufacturers and Exporters
CPSH	: Cost Per Standard Hour
CTSR	: Cut To Ship Ratio
DIFOT	: Delivered In Full, On Time
DTD-FG	: Dock-to-Dock Finish Goods
DTD-RM	: Dock-to-Dock Raw Material
DTD-WIP	: Dock-to-Dock Work In Progress
ERP	: Enterprise Resource Planning
FTT	: First Time Through
FSS	: Floor Space Savings
GSP	: Generalized System of Preferences
IE	: Industrial Engineering
JIT	: Just – In – Time
LEI	: Lean Enterprise Institute
LM	: Lean Manufacturing
M & S	: Mark and Spencer
MI	: Michigan
OEE	: Overall Equipment Effectiveness
PDCA	: Plan Do Check Act
POUS	: Point – Of – Use – Storage
RFID	: Radio Frequency Identification
RM-OTD	: Raw Material On Time Delivery
SMED	: Single Minute Exchange of Dies
SPSS	: Statistical Package for the Social Sciences

SQDC	: Safety Quality Delivery Cost
SQDCM	: Safety Quality Delivery Cost Morale
TBM	: Time Based Management
TPM	: Total Productive Maintenance
TPS	: Toyota Production System
TSD	: Total Systems Development
EU	: European Union
UK	: United Kingdom
USA	: United States of America
VSM	: Value Stream Mapping