

**A study on eliminating the 9.20% production loss encountered in producing LC717A00AR Capacitance-Digital-Converter LSI (IC Touch Sensor) amounting to P 20,960,250.79 from the months of June to November 2013**

A Practicum Study Presented to the Faculty of  
College of Engineering, Architecture and Technology  
De La Salle University – Dasmariñas



In Partial Fulfilment  
Of Requirements for the Degree of  
Bachelor of Science in Industrial Engineering

Submitted by:  
Larni E. Buaya  
IEE51

Submitted to:  
Engr. Ma. Estrella Natalie B. Pineda

March 2014



## ABSTRACT

This practicum study aims to eliminate the 9.20% production loss encountered in producing LC717A00AR Capacitance-Digital-Converter LSI (IC Touch Sensor) amounting to 20,960,250.79 pesos. Since ON Semiconductor started accepting this product they have been testing and supplying huge amount of LC717A00AR capacitance-digital-converter LSI for electrostatic capacitive touch internationally. Due to high demands, ON Semiconductor Philippines Inc. aims to acquire the target output of LC717A00AR per month. This study should be able to eliminate the problems encountered by providing a new room/area for the refilled LN2 tank, a new area for the TME team, improving the handling material for the DUT (Device Under Test) and developing machine alarms in P2 Testing area. The researcher gathered data, conducted interviews, and observed the entire production for the knowledge that completes this research.



## TABLE OF CONTENTS

Title Page .....	i
Approval Sheet.....	ii
Abstract.....	iii
Acknowledgement.....	iv
Table of Contents.....	v
List of Tables and Figures.....	vii
<b>Chapter I: The problem and its background</b>	
Introduction .....	1
Background.....	2
Statement of the Problem .....	5
Objective of the study .....	5
Scopes and limitations .....	6
Significance of the study .....	6
Design and methodology .....	7
Definition of terms .....	9
<b>Chapter II: Review of related literature</b>	
Plant Layout .....	11
Computer integrated facilities planning and design .....	12
Rack System .....	12
Systematic layout planning .....	13
A quality approach to factory design .....	13
Facilities .....	14



The new relevance of design to business ..... 15

Application of queuing theory ..... 16

Microflex tester ..... 16

Semiconductors ..... 17

Integrated Circuits ..... 17

Electrostatic Sensitive Devices ..... 18

Material Handling ..... 19

**Chapter III: Findings and Analysis**

Percentage contributions of ordered touch sensor devices ..... 20

The product ..... 21

Summary of Loss ..... 25

Breakdown of production loss ..... 27

Problem tree ..... 48

Problem analysis ..... 49

Objective tree ..... 51

Objective analysis ..... 52

**Chapter IV: Alternative Courses of Action**

ACA 1: Provide new area for the refilled LN2 tank ..... 55

Action plan ..... 57

ACA 2 : Provide a new area for the TME team ..... 65

Action plan ..... 66

ACA 3: Improve the handling material for the DUT ..... 73

ACA 4: Develop machine alarms in P2 testing area ..... 83



**Chapter V: Conclusion and Recommendation**

Conclusion ..... 90  
Recommendation ..... 91

**Chapter VI: Detailed plan of Action**

Gantt Chart ..... 92  
Bibliography ..... 97  
Appendices ..... 99  
Appendix A: Resume ..... 100  
Appendix B: Endorsement letter for on-the-job training ..... 103  
Appendix C: Waiver for on-the-job training ..... 104  
Appendix D: OJT/Intern Training Agreement ..... 105  
Appendix E: Certificate of Employment ..... 106  
Appendix F: Certificate of Proofreading ..... 107  
Appendix G: OJT Moments ..... 111

**LIST OF TABLES AND FIGURES**

**Tables**

Table 3.1 Summary of Loss ..... 25  
Table 3.2 Breakdown of production loss ..... 27  
Table 3.3 Process and operation details of LC717A00AR ..... 28  
Table 3.4 Existing process flow diagram: Testing FQ1/FQ3 ..... 30  
Table 3.5 Summary of Existing process flow diagram for  
FQ3 testing (Empty LN2 tank) ..... 31  
Table 3.6 Time study table of existing process  
flow diagram for FQ3 testing (Empty LN2 tank) ..... 32



Table 3.7 Summary of log of refilling  
LN2 tank and its affected units .....35

Table 3.8 Existing process flow diagram  
for FQ1/FQ3 (Down) .....37

Table 3.9 Time study table of existing process  
flow diagram for FQ1/FQ3 (Down) .....38

Table 3.10 Summary of log of down verified by the TME .....40

Table 3.11 Therbligs: Hand motion in  
loading and unloading of tubes .....42

Table 3.12 Summary of RMA reports due to mixed up devices .....44

Table 4.1 Proposal Plan for Re-layout .....61

Table 4.2 Comparative analysis of the proposed layout .....62

Table 4.3 Comparison of the existing layout to proposed layout .....63

Table 4.4 Cost of Implementation .....63

Table 4.5 Proposal plan for re-layout .....69

Table 4.6 Comparative analysis of the proposed layout .....70

Table 4.7 Comparison of the existing layout to the proposed layout .....71

Table 4.8 Cost of implementation: Rearrangement  
of the manufacturing layout .....71

Table 4.9 Comparative analysis of ESD carts .....75

Table 4.10 SWOT analysis of different types  
of ESD protected carts .....77

Table 4.11 SWOT analysis of suppliers of ESD protected carts .....80

Table 4.12 Cost of implementation .....81



Table 4.13 Proposal plan for procurement of the program .....85

Table 4.14 Cost of implementation ..... 86

Table 4.15 Cost Benefit Analysis .....87

**Figures**

Figure 3.1 Percentage contributions of ordered touch sensor devices .....20

Figure 3.2 The product .....21

Figure 3.3 Machine involved in the process .....23

Figure 3.4 Existing flow chart for testing FQ1, FQ3 .....29

Figure 3.5 Layout of the testing area from LC717A00AR  
tester to LN2 tank refilling station .....33

Figure 3.6 Layout of the testing area from  
LC717A00AR tester to TME room .....39

Figure 3.7 Shows table used in the testing area .....41

Figure 3.8 Show general downtime of a production shift .....45

Figure 3.9 Fishbone diagram .....46

Figure 4.1 Proposed layout 1 .....59

Figure 4.2 Proposed layout 2 .....60

Figure 4.3 Proposed layout 1 .....67

Figure 4.4 Proposed layout 2 .....68

Figure 4.5 Proposed alarm for Suffix tester .....84