### 5S IMPLEMENTATION IN BENGKEL ABC

#### A THESIS

Submitted in Partial Fulfillment of the Requirements For the Degree of Bachelor of Engineering In Industrial Engineering



Christianto Raharjo Putro 081405711

INTERNATIONAL UNDERGRADUATE PROGRAM
DEPARTMENT OF INDUSTRIAL ENGINEERING
FACULTY OF INDUSTRIAL TECHNOLOGY
UNIVERSITAS ATMA JAYA YOGYAKARTA
YOGYAKARTA
2013

### STATEMENT OF ORIGINALITY

I declare that this thesis which I wrote does not contain the works or parts of the works of other people, except those cited in the quotations and bibliography, as a scientific paper should.

Yogyakarta, April 26, 2013 Author,

Christianto Raharjo Putro

#### A THESIS

ON

# 5S IMPLEMENTATION IN BENGKEL ABC

by

Christianto Raharjo Putro

081405711

was examined and approved on April 26, 2013

Faculty Supervisor, Co- Faculty Supervisor,

(Deny Ratna Y., S.T., M.T.) (Ririn Diar A., D.Eng.)

Board of Examiners,

Chair

(Deny Ratna Y., S.T., M.T.)

Member,

(The Jin Ai, D. Eng.)

Member,

(M. Chandra D. K., S.T., M.T.)

Yogyakarta, April 26, 2013

ty of Industrial Technology Atma Jaya Yogyakarta

FANOLOG INDUSTRISTY STYANTO, M. Eng., Ph.D.)

"Improvements are always needed because the time is goes on. Let's do!"

Special gift for my Father Rahardjo Santoso and Mother Maria Theresia Sugianingsih, my Brother Abram Raharjo Putro, my Sister Bernadetha Raharjo Putri, my Sister Catarina Cahyaningtyas, my little beautiful princess Andrea Florensia Elysia Raharjo, and Rebekka Rismayanti. I love you all!

#### **FOREWORD**

The writer would like to thankful to Lord for His blessings so the writer could finish the research and this final project report well. The writer so blessed to finish research entitled with "5S Implementation in Bengkel ABC." as a partial fulfillment of the requirements for the degree of bachelor of engineering in International Industrial Engineering in Universitas Atma Jaya Yogyakarta.

The writer would like to thank to people that have supported the writer into this part:

- 1. Ir. B. Kristyanto, M.Eng., Ph.D., Dean of Faculty of Industrial Technology,
- 2. The Jin Ai, S.T., M.T., D.Eng., Head of Industrial Engineering Study Program and as examiner for suggesting improvements for this research and conducting the writer to be a good research writer,
- 3. Ririn Diar Astanti, S.T., M.M.T., D.Eng., Coordinator of International Industrial Engineering Program and as co-adviser of the research for helping the writer from the beginning until this research report was done and for patiently conducting and educating the writer to have a good sense in making a report and being a good student,
- 4. Deny Ratna Yuniartha, S.T., M.T., as Adviser of the writer's research for her leading and training so the writer have a good self-esteem to done this research quickly.
- 5. Rahardjo Santoso and Maria Theresia Sugianingsih, blessed father and mother that always supporting,

- educating, leading, caring, and loving me from my zero until the writer's 23 y.o. age. The writer is nothing without both of you. The everything.
- 6. Abram Raharjo Putro, Bernadetha Raharjo Putri, Catarina Cahyaningtyas, and Andrea Elysia Florensia Raharjo. My brother and sisters that educating, helping, leading the writer by your experiences and our discussion to finished this report well and quickly. My cousin, you have changed this world, honey.
- 7. Rebekka Rismayanti. The writer could not express his feelings because you already have it all. Ik hou van jou, Fusion in nine.
- 8. TIKI 2008; Toni (ton, thank you so much), Tatas (bro, thank you for your support), Sita (thank you, sist!), Jojo (hi, sist, I will always remember about kali.hahaha), Yoas and DosQ (thank you and keep on spirit, dude!), and Cakra (cak, thank you for always supporting and inspiring me. Morover from your translating questionnaire). This batch is amazing!
- 9. TIKI-UMUM; the writer misses you all.
- 10. Hendro Kusuma and Monica Lestari. Our discussions were great and you know, both of you are great friends.
- 11. Obayoshi Hutama Prayitno. Thanks for you helping during inputting the data and for lending the writer your amazing bike.
- 12. Putra, fantastic miniature, dude!
- 13. Betha, thank you for always supporting me from Grogol and Cibinong.

- 14. PS. Sheruqah Voice and PSM UAJY. Inspiring the writer about: Doremi is not as easy as ABC.
- 15. D'joroks. The group with ideal warmness of heart.
- 16. Friends in KKN GH III. Thank you.
- 17. Other good and amazing friends and people that always supporting the writer to finished this research.
- 18. Bang Supri and Bang Yandi. Thank you for helping me finished this research. Both of you are the keys.

  May the 5S always be with us. Bless you.
- 19. Pak Yadi, Pak Endang, Yoga, and Galih. The oasis in saturday night until sunday morning during ronda. Glasses of hot ginger.
- 20. Dragster 26". Thank you, dad.
- 21. For others that are not mentinoned yet. Thank you.

Hopefully that this report would bring much advantages for the readers. Thank you.

Yogyakarta, April 2013

Writer

# TABLE OF CONTENTS

Title Page			i
Statement of Originality			ii
Identification Page			iii
Dedication			iv
Foreword			7
Table of Co	ntents		viii
List of Tak	oles		>
List of Fig	gures		xi
List of App	endices		/X
Abstract			xvi
Chapter 1:	Introduction		
	1.1. Research	Background	1
	1.2. Problem F	ormulation	6
	1.3. Research	Objective	/7
	1.4. Scopes ar	nd Limitation	7
	1.5. Research	Methodology	7
Chapter 2:	Literature Rev	riew .	
	2.1. 5S in Mar	nufacturing Company	16
	2.2. 5S in Ser	rvice Company	17
	2.3. Recent Re	esearch	19
Chapter 3:	Basic Theory		
	3.1. 5S		20
	3.2. Red Taggi	ng	22
	3.3. Store Lay	out Management	22
	3.4. Ergonomic	s	24
	3.5. Sign Cold	ors	25
	3.6. Questionr	naire	26
	3.7. Servqual		28
Chapter 4:	Company Profil	e and Data	
	4.1. Company F	rofile	29
	4.2. Company E	Business Process	29
	4.3. Recent Co	ondition Data	32
	4.4. Service T	ime Data	50
	4.5. Questionr	naire Data	53

Chapter 5:	Data Analysis and Discussion	
	5.1. 5S Improvements	57
	5.2. Free Area	104
	5.3. Payback Period	107
	5.4. Service Time of Employee "A" and	110
	Employee "B"	
	5.5. Employee Questionnaire	118
	5.6. Customer Questionnaire	120
Chapter 6:	Conclusion and Suggestion	
	6.1. Conclusions	125
	6.2. Suggestion	126
REFERENCES		
ADDENDICES		

# LIST OF TABLES

Table	4.1.	Storefront Contents	43
Table	4.2.	Service Time Form	52
Table	4.3.	Likert Questionnaire for Employees	55
Table	4.4.	Guttmann Questionnaire for Employees	55
Table	4.5.	Questionnaire for Customers	56
Table	5.1.	Employee Interview	58
Table	5.2.	Red Tag Log	60
Table	5.3.	Classification Form	69
Table	5.4.	Sales Item Data	70
Table	5.5.	After 5S Implementation Organizing Spare Parts on Storefront	75
Table	5.6	Oil Rack Level Height after Redesigning	78
Table	5.7.	Anthropometric Data	79
Table	5.8.	Summary Table of Spare Parts Location	89
Table	5.9.	Inspection Form for Toilet Area	93
Table	5.10.	5S Implementation Cost	108
Table	5.11.	Net Profit	109
Table	5.12.	Employee 'A's Service Time Before	113
		and After 5S Implementation	
Table	5.13.	Service Time Diference Between	114
		Before and After 5S Implementation	
		of Employee A	7.1.
Table	5.14.	Employee 'B's Service Time Before	116
		and After 5S Implementation	
Table	5.15.	Service Time Diference Between	117
		Before and After 5S Implementation	
Table	5 16	of Employee B Likert Scale (employee)	119
		Validity and Reliability Test of	119
Table	J. 17.	Likert Scale (employee)	113
Table	5.18.	Guttmann Scale (employee)	120
Table	5.19.	Profile of Respondent	121
Table	5.20.	Validity Testing (customer)	122
Table	5.21.	Reliability Testing (customer)	122
Table	5.22.	Respondent Agreement From Customers	123
		With the Effect of 5S Research to	

# LIST OF FIGURES

Figure	1.1.	Top View Store Room Layout	2
Figure	1.2.	Right Side of Store Room	3
Figure	1.3.	Left Side of Store Room	3
Figure	1.4.	Bottles Hide Spare Parts Inside	4
		Storefront	
Figure	1.5.	Three Boxes of Used Oil Bottles	4
Figure	1.6.	Spare Parts Arrangement in front of	5
		the Washbasin	
Figure	1.7.	Hand Grinder on Tire Rack	6
Figure	1.8.	Research Methodology	8
Figure	1.9.	Questionnaire Methodology Flowchart	13
Figure	4.1.	Customer and Shop Business Process	31
Figure	4.2.	Shop Layout (dimension in	33
		centimeter)	
Figure	4.3.	Working Area Layout	34
Figure	4.4.	Front Condition of The Shop	34
Figure	4.5.	Working Area Condition	35
Figure	4.6.	Storeroom Layout	37
Figure	4.7.	Storeroom Condition	37
Figure	4.8.	Storeroom Arrangement	28
Figure	4.9.	A Narrow Access in Storeroom	28
Figure	4.10.	. Used Oil Bottles on Store Floor	39
Figure	4.11.	. Spare Parts Organizing on Wall Rack	40
Figure	4.12.	. Bolt Rack Dimension	40
Figure	4.13.	. Bolt Rack Condition	41
Figure	4.14.	. Used Parts Beside Bolt Rack and	42
		Under the Washbasin	
Figure	4.15.	. Used Oil Bottles Block Views to the	42
		Storefront	
Figure	4.16.	. Magnet Opener (picture 1) and Air	43
		Screw Driver (picture 2) on the	
		Storefront	
Figure	4.17.	. Dirty and Crowded Storefront	44
Figure	4.18.	. Storefront Dimension	44
Figure	4.19.	. More Needed Item on Low Level of	45
		Rack (square boundary)	

Figure	4.20. Body Posture in Taking Item	More Needed	46
Figure	4.21. Boxes on Stocks (picture Grinder (circle in picture Used Battery (square or on Tire Rack	ture 2), and	46
Figure	4.22. Condition before 5S Imp	plementation	47
Figure	4.23. Special Tool Location	on Oil Rack	47
Figure	4.24. Oil Rack Dimension and Before 5S Implementation	-	48
Figure	4.25. Cashier Desk Condition		49
Figure	4.26. Toilet Condition		50
Figure	4.27. Stopwatches		51
Figure	5.1. Red Tag		59
Figure	5.2. Red Tag Number 1 and 2: and Gas Cable Stocks und		62
Figure	5.3. Red Tag Number 3: Plast:	ic above	63
	Washbasin		
Figure	5.4. Red Tag Number 4: a Cart Parts Beside Storefront Front Door		63
Figure	5.5. Red Tag Number 5,6, and	7: a Carton	63
3	of Used Parts and Empty front of Cashier Desk		
Figure	5.6. Red Tag Number 8: Damage front of Cashier Desk	e Mattress in	64
Figure	5.7. Red Tag Number 9: Used I	Body Parts	64
	above Tire Stock		
Figure	5.8. Red Tag Number 10: Head behind Front Door	Lamp Stock	64
Figure	5.9. Red Tag Number 11 and 12 Disc Brake under Cashier Carton of Used Oil Bott? Cashier Desk	r Desk and a	65
Figure	5.10. Red Tag Number 13: Used Washbasin	d Tubes under	65
Figure	5.11. Red Tag Number 14 and 3 and Cloths inside Toile		65
Figure	5.12. Red Tag Number 16: Dead	d Tree in	66

Figure	5.13.	Red Tag Number 17: Used Oil Bottles in front of Storefront	66
Figure	5.14.	Red Tag Number 18 and 19: Used Oil Bottles on Tire Rack and Used Parts under Oil Rack	66
Figure	5.15.	Thrown Away Things	67
Figure	5.16.	Cleaning (seiso) Process before Seiton	68
Figure	5.17.	Company Sales Contribution From Every Category	71
Figure	5.18.	Grouping Process of Spare Parts on Wall Rack	72
Figure	5.19.	Cleaning up and Putting Spare Parts Back to Wall Rack	73
Figure	5.20.	Temporary Label for Wall Rack	74
Figure	5.21.	Flexible Label	75
Figure	5.22.	5S Team Organizes Spare Parts in	75
		Storefront	
Figure	5.23.	Spare Parts inside Storefront	76
Figure	5.24.	Storefront Condition After 5S Implementation	76
Figure	5.25.	Oil Rack Levels after Redesigning	77
		Forward Reach Capability	80
_		Machine Oil Sales Data	80
_		Improved Condition of Oil Rack and	81
		Its Contents	
Figure	5.29.	Recent Condition of Tire Rack	82
Figure	5.30.	Recent Condition of Tire Rack	83
Figure	5.31.	Clean the Floor Before Put the Rack	84
		Back	
Figure	5.32.	Tube Rack Dimension	85
Figure	5.33.	Tube Rack	85
Figure	5.34.	New Bolt Rack	86
Figure	5.35.	New Bolt Rack Dimension	87
Figure	5.36.	Tools Rack	87
Figure	5.37.	Toilet Condition (After)	88
Figure	5.38.	Money Drawer	88
Figure	5.39.	Before and After Corner Condition	91
		of the Store Room	
Figure	5.40.	Clean the Air Compressor	92
Figure	5 41	Clean the Entrance Door Rail	92

Figure	5.42.	Make a Trash Bin	92
Figure	5.43.	Used Spare Parts Container	93
Figure	5.44.	Wipe Cloth to Clean Hand from Dirt	94
Figure	5.45.	Label on Tools Rack	95
Figure	5.46.	Labels on Oil Rack	96
Figure	5.47.	Labels on Wall Rack	96
Figure	5.48.	Label on Hanging Rack	97
Figure	5.49.	Labels on Tool Rack	97
Figure	5.50.	Temporary Boundary for New Coming Stocks	98
Figure	5.51.	Final Boundary for New Coming Stocks	98
Figure	5.52.	Boundary in front of Grinder	99
Figure	5.53.	Clean Toilet	100
Figure	5.54.	5S Poster	100
Figure	5.55.	Employees Read 5S Poster	101
Figure	5.56.	Self-Commitment	102
Figure	5.57.	Shop Layout After 5S Implementation	102
Figure	5.58.	Bengkel ABC Layout after 5S Implementation	103
Figure	5.59.	Storeroom Layout (picture A,B, and	103
		C) after 5S Implementation	
Figure	5.60.	Waste Area	105
Figure	5.61.	Mean of Net Profit in Quarter 1 in 2012 & 2013	110
Figure	5.62.	Employee A's Service Time	114
Figure	5.63.	Employee's B Service Time	117
Figure	5.64.	Opinion of Respondents	123

# LIST OF APPENDICES

Appendix	<ul><li>1. Spare Parts Sales Data from August</li><li>November 2012</li></ul>	127
Appendix	2. Interview Result	130
Appendix	3a. Service Time Forms Before 5S Implementation	141
Appendix	3b. Service Time Forms After 5S Implementation	142
Appendix	4. Validity and Reliability Pilot Test for 35 Respondences (Customers Questionaires)	143
Appendix	5. Questionnaire for Employees in Bahasa Indonesia (Likert Scale)	144
Appendix	6. Questionnaire for Employees in English (Likert Scale)	153
Appendix	7. Questionnaire for Employees in Bahasa Indonesia (Guttmann Scale)	161
Appendix	8. Questionnaire for Employee in English (Guttmann Scale)	166
Appendix	9. Questionnaire for Customers in Bahasa Indonesia (Likert Scale)	171
Appendix	10. Questionnaire for Customers in English (Likert Scale)	178
Appendix	11. Questionnaire for Employee Result	184
Appendix	12. Questionnaire for Customers Result	185

#### **ABSTRACT**

Bengkel ABC is a repair shop that sells spare parts and maintains motorcycle. In addition, there are unused parts (waste) from maintenance activity. Therefore, Bengkel ABC has to organize two types of parts inside the shop, which are new spare parts and waste. In point of fact, the employees did not know how to organize spare parts and wastes in a good order.

This research uses 5S as a tool to organize spare parts and wastes in Bengkel ABC. 5S consists of 5 steps, which are; seiri (sort), seiton (straighten), seiso (shine), seiketsu (standardize), and shitsuke (sustain).

This research evaluated by 5 performance evaluation, there are; free space, payback period, service time data, interview, and questionnaire. Based on the 5 performance evaluation, 5S implementation in Bengkel ABC results several condition. There are 30,200cm² more space after 5S implementation and affect the owner to utilizes these free space to increases the number of stocks. In fact that this research invests some money to make improvements, the company gets their investment in implement 5S back in 48 days.

The average service time are decreased by 4.56 and 10,83 seconds respectively for employee A and Employee B. Based on the questionnaire, both employees and customers give positive respons to the effect of 5S.

Keywords: 5S, repair shop, waste, free space, payback period, service time, interview, questionnaire