1. Work Design &

Measurement

WORKPLACE IMPROVEMENT IN PLASTIC BASED PRODUCT COMPANY USING WISE GUIDELINE

A THESIS

Submitted in Partial Fulfilment of the Requirements for the Bachelor Degree of Engineering in Industrial Engineering



PAULUS DAMASUS DWI PUTRANTO 15 14 08134

INTERNATIONAL INDUSTRIAL ENGINEERING PROGRAM DEPARTMENT OF INDUSTRIAL TECHNOLOGY FACULTY OF INDUSTRIAL ENGINEERING UNIVERSITAS ATMA JAYA YOGYAKARTA YOGYAKARTA 2019

IDENTIFICATION PAGE

A THESIS ON

WORKPLACE IMPROVEMENT IN PLASTIC BASED PRODUCT COMPANY USING WISE GUIDELINE

> Submitted by Paulus Damasus Dwi Putranto 15 14 08134

Was examined and approved on October 22, 2019

Faculty Supervisor,

Luciana Triani Dewi, S.T., M.T.

Board of Examiners, Chair,

Luciana Triani Dewi, S.T., M.T.

Member,

Member.

Rinn Diar Astanti, S.T., M.MT., D.Eng

Yosef Daryanto, S.T., M.Sc., Ph.D.

Yogyakarta, October 22, 2019 Universitas Atma Jaya Yogyakarta

Faculty of Industrial Technology

Dean,

Dr. A. Teguh Siswantoro, M.Sc.

DECLARATION OF ORIGINALITY

I certify that the research entitled "Workplace Improvement in PT. MAPI using Work Improvement in Small Enterprises (WISE) * in this thesis has not already been submitted for any other degree.

I certify that to the best of my knowledge and belief, this thesis which I wrote does not contain the works of parts of the works of other people, except those cited in the quotations and bibliography, as a scientific paper should.

In addition, I certify that I understand and abide the rule stated by the Ministry of Education and Culture of The Republic of Indonesia, subject to the provisions of Peraturan Menteri Pendidikan Nasional Republik Indonesia Nomor 17 Tahun 2010 tentang Pencegahan dan Penanggulangan Plagiat di Perguruan Tinggi.

Signature

S

S B



tudent Name	: Paulus Damasus Dwi Putranto
ludent ID	: 15 14 08134
ate	: Oktober 22 th , 2019

iii

11

PREFACE

First of all, very deepest gratitude goes to God for the blessing for all this time during the progress on finish my thesis and also a big thank from me to Him for always making stay strong and give patient every day.

In the process of finishing this thesis, I realizes that without guidance, assistance and prayers from various parties this thesis cannot be completed on time, therefore, I dedicate my greatest Thank to:

- Prof. Dr. Ir. Rafael Marthinus Osok M.Sc., and Aloysia Indira Purnawati, S.Sos., as my parents who always give me support and love, so i can finish my thesis.
- Mrs. Ririn Diar Astanti, M.MT., D.Eng. as Coordinator of International Class and Head of Industrial Engineering Program for guiding me all the time during my study in International of Industrial Engineering.
- Mrs. Luciana Triani Dewi, S.T., M.T. as the Thesis Supervisor. Without Mrs. Luciana Triani Dewi, S.T., M.T. assistance in every progress, this thesis would never be completed.
- 4. Anindito Marcellus Gregorius as my brother who always remind me on finishing he thesis.
- 5. All TIKI 2015 members and all my friends for the support of finishing my thesis.

It is important to realize that with all the limitations, this thesis report is far from perfect. I would like to receive some suggestion from other parties for the perfection of this thesis. Finally, hopefully this thesis can be useful for all interested parties.

Yogyakarta, October 22th, 2019

Paulus Damasus Dwi Putranto

TABLE OF CONTENT

CHAPTER	TITLE	PAGE
Title Page		i
	Identification Page	ii
	Declaration Of Originality	iii
	Preface	iv
	Table Of Content	V
	List Of Tables	vii
	List Of Figures	ix
	List Of Tables List Of Figures Abstract	xi
1	Introduction	1
	1.1. Background	1
5	1.2. Problem Formulation	2
	1.3. Objective	2
	1.4. Scope & Limitation	2
2	Literature Review And Theoritical Background	3
	2.1. Literature review	3
	2.2. Theoritical Background	4
3	Research Methodology	11
	3.1. Location of research	11
	3.2. Preliminary	11
	3.3. Data collection	11
	3.4. Data Processing stae	14
	3.5. Improvement Stage	15
4	Data	18
	4.1. Data collection	18
	4.2. WISE data	29

Data Analysis And Discussion	30
5.1. Physical Work Environment priority of Non	29
Comformity	
5.2. Cause analysis of the physical work environment	31
based on the priority	
5.3. Cause analysis summary and improvements planning	44
5.4. Improvements	46
5.5. Evaluation of recommendation improvements	71

Closing And Reccomen	dation	73
Conclusion	SL SL	73
Recommendation		74
$S \land \land$		

References

LIST OF TABLES

		PAGE
Table 3.1	Observation Table	12
Table 3.2	WISE guideline	
Table 3.3	Cause Analysis Table	
Table 3.4	5 Whys	
Table 4.1	WISE data	29
Table 5.1	Non comformity	30
Table 5.2	Cause analysis of limited of first-aid equipment	31
Table 5.3	5 whys of no first aid equipment	32
Table 5.4	Cause Analysis of Rearrange layout and flow of	33
	work	
Table 5.5	5 Whys rearrange layout and flow of work	34
Table 5.6	Current Condition of proper guards	35
Table 5.7	5 Whys of proper guards	35
Table 5.8	No easy-to-read labels and signs in order to avoid	36
	mistakes	
Table 5.9	5 whys of no easy to read labels	36
Table 5.10	5 whys of unworthy resting areas	38
Table 5.11	Current condition of unclear pathway mark	
Table 5.12	5 whys of unclear pathway mark	
Table 5.13	Current condition of limited multi shelves	
Table 5.14	5 whys of limited multi shelves	39
Table 5.15	Current condition of limited pallets	40
Table 5.16	5 whys of limited pallets	40
Table 5.17	Current condition of unworthy conveniently home	
	tools	
Table 5.18	5 whys of unworthy conveniently home tools	41
Table 5.19	Current condition of unworthy washing facilities and	42
	toilets	
Table 5.20	5 whys of unworthy washing facilities and toilets	42
Table 5.21	Current condition of limited hadling tools	43
Table 5.22	5 whys of limited hadling tools	43
Table 5.23	Current condition of unclear emergency controls	43

Table 5.24	5 whys of unclear emergency controls		43
Table 5.25	Root cause analysis summary and Improvements		45
Table 5.26	Supporting improvements		46
Table 5.27	Improvements of first aid		49
Table 5.28	List of First Aid		52
Table 5.29	Improvements of providing more shelves		53
Table 5.30	Improvements of providing a new pathway mark		56
Table 5.31	Standard color spesification		56
Table 5.32	New proposal pathway mark in PT. MAPI		57
Table 5.33	Spesification Alternative trolley		59
Table 5.34	Improvement for providing more pallets		62
Table 5.35	Improvements of unwo	orthy resting corners and	64
	cleaning facilites	N E	
Table 5.36	improvements of attac	h labels	67
Table 5.37	improvements of attac	h proper guards	69
Table 5.38	Improvements of uncle	ear emergency swith controls	70

LIST OF FIGURES

			PAGE
Figure 3.1	Improvements stage Flow		17
Figure 4.1	Layout of raw material warehouse department		18
Figure 4.2	Design of racks		19
Figure 4.3	Shelves height		19
Figure 4.4	Materials outside the warehouse		20
Figure 4.5	Materials without category labels		20
Figure 4.6	No proper guards for shelves		20
Figure 4.7	Wrong pathway mark in raw material wa	arehouse	21
Figure 4.8	Finished good department layout	4	21
Figure 4.9	Finished good area	$\backslash \mathcal{L}$	22
Figure 4.10	Finished good product		22
Figure 4.11	Finished good product		22
Figure 4.12	Table of WIP		23
Figure 4.13	Hand pallet truck with no labels		24
Figure 4.14	Container for WIP		24
Figure 4.15	Container for used racks		24
Figure 4.16	Placed for tools		25
Figure 4.17	Tools after used		25
Figure 4.18	Hand truck		25
Figure 4.19	Size of the current production floor		26
Figure 4.20	Crusher department		27
Figure 4.21	Crusher Machine		27
Figure 4.22	Administration layout		28
Figure 5.1	Impact of providing more cleaning tools		47
Figure 5.2	Improvement of expanding the work are	a in Raw	48
	material warehouse		
Figure 5.3	Improvement of expanding the work are	a in Finished	48
	department		

Figure 5.4	Specific box of first aid kit		49
Figure 5.5	Location of first aid kit in RM warehouse		50
Figure 5.6	Location of first aid kit in Crusher department		50
Figure 5.7	Location of first aid kit ir	n production department	51
Figure 5.8	Location of first aid kit in	n finished good department	51
Figure 5.9	Content of first aid kit		53
Figure 5.10	Design plan of shelves		54
Figure 5.11	Design plan of shelves		55
Figure 5.12	Location plan of shelves	JAYA	55
Figure 5.13	Size of production floor		58
Figure 5.14	Location of tool box and	trolley in production floor	61
Figure 5.15	Container	$ / \langle \xi \rangle$	63
Figure 5.16	Pallet		63
Figure 5.17	current resting area cor	dition 5	64
Figure 5.18	layout plan resting area		65
Figure 5.19	Layout plan of administration department		66
Figure 5.20	Proposal Label Category FG department		67
Figure 5.21	Proposal Label handling tools category		68
Figure 5.22	Shelves guard protection		69
Figure 5.23	Design plan of proper guards		70

ABSTRACT

Workplace is an important thing to consider especially in the industrial world. When the workplace is good, workers can work effectively and efficiently. Otherwise, if the workplace is improper, it will disrupt the workers to work effectively and efficiently.

The current workplace condition in PT. MAPI is improper. This improper condition happens because there were problems in the workplace. The problems were the limitation of work area in some departments, the limitation of shelves in the departments, lack of material handling tools and no proper conveniently home place for tools, lack of first aid equipment's, no proper guards in some machines and shelves, unclear pathway mark, unclear position shelves and flow of work, unworthy resting corners, unworthy washing facilities and toilets, no labels for the material handling tools, and unclear emergency switch controls.

The aim of this study is to proposed improvements of the workplace in PT. Mega Andalan Plastik Industri (MAPI). The improvements will be proposed by using the Work Improvements in Small Enterprises (WISE) guideline. WISE guideline was used to identify the non-conformity condition of the workplace. Cause analysis was done using 5 why method to determine the root causes of the non-conformity condition. Improvements was proposed for the root causes identified.

The workplace improvements proposed were PT. Mega Andalan Plastik Industri (MAPI) have to expand the size of work area of some departments, rearrange the layout of certain departments, provide more facilities such as handling tools (home place for the tools, pallets, container boxes, shelves), provide more cleaning tools, provide more first aid equipment's, make a new pathway mark, make a labels for each handling tools, do some maintenance for the proper guards and the unclear emergency switch controls.

Keyword: Workplace improvements, Work Improvement in Small Improvements (WISE) guideline, Cause Analysis, 5 Whys