HUMANIS
(Humanities,Management and Science Proceedings)
Vol. 2 • No. 1 • Desember 2021
Pege (*Hal.*) : **121 – 132**
ISSN (*online*) : 2746 - 4482
ISSN (*print*) : 2746 - 2250

JL.Surya Kencana No.1 Pamulang, Tangerang Selatan – Banten
Telp. (021) 7412566, Fax (021) 7412491
Email : humanisproccedings@gmail.com

Special Issue : ICoMS2021 The 2nd International Conference on Management and Science
Website. :http://www.openjournal.unpam.ac.id/index.php/SNH

Work Time Analysis To Reduce Waste Of Work Time On Vin Crepes Takoyaki

Andi Martis[1]; Doyle Faris Bintan Setaputra[2];Ganes Farhan Ahmad Sasmita[3]; Meri Suhartini[4]

[1]*Magister Management, Garaduate Studies of Univerisity of Pamulang-UNPAM, Jl. Raya Puspitek, Buaran, Kec. Pamulang, South Tangerang City, Banten, Indonesia 15310*

E-mail: andimartis.am@gmail.com ; seta.putra@gmail.com ; ganesfarhan@gmail.com ; dosen00017@unpam.ac.id

Abstract: The authors conducted this research at the Takoyaki Vin Crepes outlet located at Al Azhar University, Kebayoran Baru, South Jakarta. The background of this research is that the process of making crepes takes a long time, so to anticipate losing customers in the future, it is necessary to improve working time which is the main goal of this research, as well as setting a standard time as a benchmark. For this reason, the MOST (Maynard Operation Sequence Technique) method is used to analyze the problems that occur. The methodology used is to compare the results of observations of making crepes twice before using conventional training and twice after training with the new method proposed by the author. The results obtained are as follows: before training the working time (Ws) is 2.62 minutes and the standard time (Wb) is 2.83 minutes, after training the resulting working time (Ws) is 2.3 minutes and the standard time (Wb) is) is 2.48 minutes. After applying the MOST method, the standard time (Wb) before training was 1.09 minutes and the standard time (Wb) after training was 1.03 minutes. There was an acceleration of the time of making crepes by 1.74 minutes before exercise (2.83 minutes-1.09 minutes), and after exercise 1.45 minutes (2.48 minutes-1.03 minutes)

Keywords: MOST, average time work, standard time

INTRODUCTION

Vin Crepes Takoyaki has two types of business activities, the first is selling various crepes, takoyaki and okonomiyaki in school canteens, campuses and shopping centers, while Vin Crepes Takoyaki outlets are located at Al Azhar University Indonesia, Kebayoran Baru , Stella Maris School BSD, Stella Maris School Gading Serpong, Kristoforus Grogol School, BINUS Kebayoran Lama School (second brand with the name Eat Treats, selling fast food), ITC Permata Hijau, South Jakarta. But some of them have been closed for various reasons, only a few are still running. The second business is accepting orders from Jabodetabek caterers to fulfill various kinds of events such as wedding receptions, office events, birthdays, circumcisions and so on, while the food sold to fill the foodstall includes crepes, poffertjes, kebabs, dimsum, waffles, choco melted, choco fountain, and others.

From the results of the author's search, it was found that some consumers were not satisfied with the service, in this case the time for making the crepes they ordered was too long. Consumers have to wait 5 to 15 minutes to get acrepes, this has the impact of switching consumers to other places if it is not anticipated as soon as possible to find a solution. For this reason, the author seeks to optimize the time of making crepes by analyzing the working time of making crepes using the MOST method.

With using the MOST method the author try to making observation and comparation between making two crepes using conventional method or we called it before training and making two crepes after training using MOST method. The step of this two activities it is quite similar, first step of the sequence are pouring the dough into the center of blade, and then rotate the dough until we get circle shape using the APA (tools from wood to spread the dough). Next step we put on the topping such as banana, grated cheese and sprinkle chocolate, after all the topping get into the skin we should waiting until golden brown, folding the skin, lifting and the last step is wrapping the skin with paper crepes. The activities before training must follow the step sequence from the first step until the last step, but when we making crepes using MOST method there is another trick way to saving time, on regular way after we folding the skin crepes the next steps are lifting and wrapping but when we doing the trick way after we folding the skin we lifting the skin and then put it a while on the tray and make another movement to pouring dough into the blade and rotate it using APA to get circle shape, after that we wrapping the crepes that already cooked, and continued the step until finish. Every movement was recorded in notes, so it is known how many time that we get per every activities, we calculated using snap back time study, and also MOST method, final step we comparing the result between both of them. As the result we get differences time between before training and after training, and this result we called it as effectiveness time.

LITERATURE REVIEW AND THEORY

The study literature used in this research refers to Maynard's Industrial Engineering Handbook as the main reference for research, because in this book the originator of the MOST method, namely Kjell Zandin [22] describes all theories related to working time surgery, in addition to supporting the MOST theory the author refers to several books, including by Yudianto [21] on MTM 123, Wignjosoebroto [20] ergonomics in motion studies, Tarwaka [18] basic knowledge of ergonomics, Sutalaksana [17] work system design techniques, Stevenson [15] production operational management, Septianto [14] analysis work design, Ngaliman [12] basic ergonomics time study, Meyers [11] motion time study, Mahawati [10] workload analysis, Iftadi [9] Work system analysis and design, Hutabarat [8] basic knowledge of ergonomics, Frievalds [5] method, standard and work design, Erliana [3] textbook of work analysis and measurement, Benedict [2] engineering psychology.

In addition to books, several journals have also become author's references including: Coal [1] proposed reduction of set-up time using SMED and MOST, Febriana [4] measuring working time with indirect measurement method, Hasyim [6] optimization of cost and time with time method study, Hendrawan [7] job design for the shoe industry using the MOST method, Rahmawati [13] planning work measurements in determining standard time using the time study method, Sumarna [16] processing standard time for incoming mail, Tanjung [19] journal improvement MOST.

Before stepping on the MOST method, each activity needs to be measured through the following methods so that detailed and more actual standard time results are obtained.

SnapbackTime Study

Sutalaksana in Stevenson (2014) states that before calculating the standard time there are several steps that must be carried out first, including:

1. **Determining Data Sufficiency Test**

In this test, statistical concepts are used, namely the level of confidence and level of accuracy. The following is the formula for data adequacy:

$$N' = \left[\frac{k/s \sqrt{N\sum X^2 - (\sum X)^2}}{\sum X} \right]^2 \quad \text{.......................................(1)}$$

K = Confidence Level (99% = 3, 95% = 2)
s = Level of Accuracy (10% 0r 5%)
N = Total Observation Data (real)
N' = Amount of Data Required (theoretical)
X = Observational Data

If N' N, then the data is considered sufficient. If N' > N, then the data is not enough and must be added. After the data is added, the data adequacy test must be carried out again.

2. **Determining the Data Uniformity Test**

Following the formula for calculating the data uniformity test so that data is obtained that matches the amount of data studied:

$$\text{BKA} = \text{Xbar} + k\sigma$$
$$\text{BKB} = \text{Xbar} - k\sigma \quad \text{.......................................(2)}$$

$$\sigma = \sqrt{\frac{\sum (X - Xbar)^2}{N - 1}} \quad \text{.......................................(3)}$$

BKA = Upper Control Limit.
BKB = Lower Control Limit.
Xbar = Average Value of Sub Group.
σ = Standard Deviation
k = Confidence Level (99% = 3, 95% = 2)

3. **Working Time (Ws)**

Working time is the time obtained from the measurement of the process for the manufacture of the product, which is formulated:

$$Ws = \sum X / N \quad \text{.......................................(4)}$$

Ws = Cycle Time Value.
X = Total Subgroup Mean Time.
N = Number of Observations Made

4. **Normal Time (Wn)**

Normal time is a cycle time that has been conditioned with an adjustment factor, which is formulated:

$$Wn = Ws \times fp \quad (5)$$

Wn = Normal Time Value.
Ws = Cycle Time Value.
fp = Worker's Adjustment Factor, in normal conditions then the value of P = 1

5. Standard Time (Wb)

Standard time is the normal time required to complete a product by giving allowances to workers, the formula is:

$$Wb = Wn \times (1 + fl) \quad (6)$$

Wb = Standard Time value.
Wn = Normal Time Value.
fl = Worker Slack Factor,in normal condition then the value of K = 1.

6. Determining the Work Adjustment Factor (Westinghouse)

Westinghouseused as a reference for adjusting working conditions so that a value can be measured in the study.

Table 1. Westinghouse

Skill	Effort	Conditions	Consistency
Super A1 = + 0.15 A2 = + 0.13	Excessive A1 = + 0.13 A2 = + 0.12	Ideal A = + 0.06	Perfect A = + 0.04
Excellent B1 = + 0.11 B2 = + 0.08	Excellent B1 = + 0.10 B2 = + 0.08	Excellent B = + 0.04	Excellent B = + 0.03
Good C1 = + 0.06 C2 = + 0.03	Good C1 = + 0.05 C2 = + 0.02	Good C = + 0.00	Good C = + 0.00
Average D = 0.00	Average D = 0.00	Average D = 0.00	Average D = 0.00
Fair E1 = – 0.05 E2 = – 0.10	Fair E1 = – 0.04 E2 = – 0.08	Fair E = – 0.03	Fair E = – 0.02
Poor F1 = – 0.16 F2 = – 0.22	Poor F1 = – 0.12 F2 = – 0.17	Poor F = – 0.07	Poor F = – 0.04

(**Source**: Sutalaksana, 1979)

Westinghouse is a reference in work adjustments so that values can be measured in research. The value in Westinghouse is adjusted to the conditions in the field, for example, for the super skills we get from professional employees, we can estimate the A1 or A2 values that we deserve for the employee's work, this value depends on our assessment as researchers.

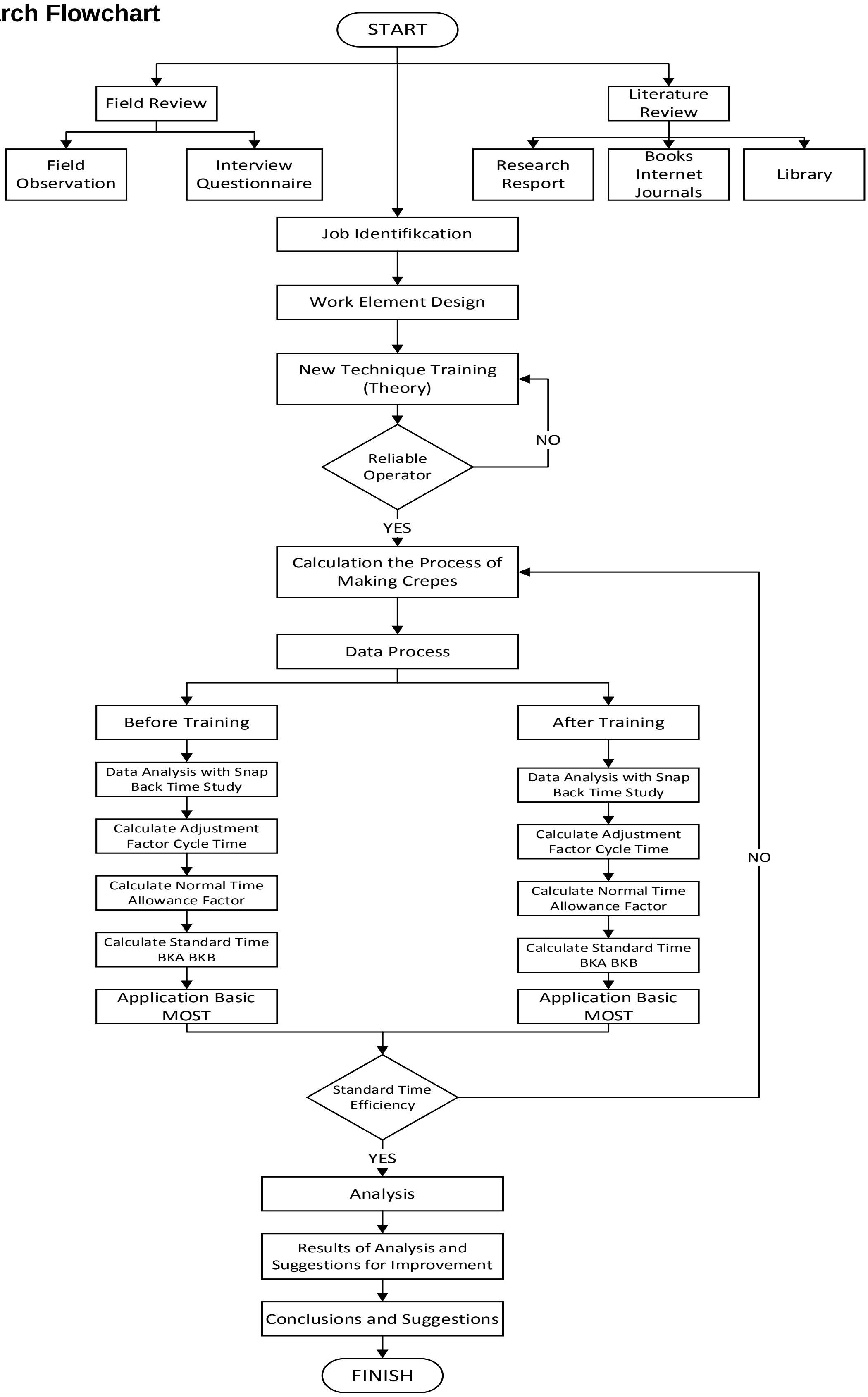
7. Determining Allowance Factors

In general, the allowance for personal needs for men is 0-2.5%, and for women 2-5%, with details according to Barnes, there are three parts, namely:

a. Personal Allowance is leeway given to meet a worker's personal needs, such as going to the toilet, worship, and other personal matters.
b. Delay Allowance is the time given to workers (operators) as a result of unforeseen circumstances.
c. Fatique Allowance is the leeway given to prolong the arrival of fatigue.

METHODOLOGY OF RESEARCH

Research Flowchart



Source : Vin Crepes Takoyaki
Images 1. Research Flowchart

Description of the flowchart is researchers collect data from field observations in the form of interviews and questionnaires to 4 employees of Vin Crepes Takoyaki, besides that data is also collected through literature books, internet, journals and libraries, after all the data is collected the researchers identify the problems that occur, design elements of work as well as providing training on new techniques in making crepes so that a reliable crepes maker operator can be obtained. Next, we calculated and recorded the results of making crepes for the 4 employees as many as 80 trials per 1 employee before training, and 80 trials per 1 employee after training. The experimental results before and after training were respectively applied to the analysis of the snap back time study data, calculated cycle time and adjustment factors, calculated normal time and the allowance factor, then calculated the standard time and BKA and BKB, and finally applied to the MOST calculation. After obtaining the final results, then the efficiency of the resulting standard time is analyzed, drawing conclusions and giving suggestions and finished.

Method

A. MOST (Maynard Operation Sequence Technique)

Zandin (2004) suggests that MOST is a measurement technique that is arranged based on the order of sub-activity or movement. These sub-activities are basically obtained from movements that have repetitive patterns such as reaching, holding, moving, and positioning objects and these patterns are identified and arranged as a sequence of events followed by object movement.

B. Basic MOST

The steps in Basic MOST follow several rules that have been set by Zandin.

Table 2 .Parameter Basic MOST

Activity	Sequence Model	Parameter			
General Move	A B G (Get) A B P (Put) A (Return)	A	Action Distance		
		B	Body Motion		
		G	Gain Control		
		P	Placement		
Controlled Move	A B G (Get) M X I (Move/ Actuate) A (Return)	M	Move Controlled		
		X	Process Time		
		I	Alignment		
Tool Use	A B G (Get tool) A B P (Put tool) * (Use tool) A B P (Aside tool) A (Return)	*	Use tool		
		F	Fasten	M	Measure
		L	Loosen	R	Record
		C	Cut	S	Surface Treat
		T	Think		

(**Source**: Zandin 2004)

In Basic MOST there are three motion references, namely General Move which analyzes simple movements of holding or holding an object, placing the object and then returning to its original position, the operator's body position does not move, only the arms and waist move. The second analysis is controlled move, which is a motion analysis similar to a general move, but the operator's body position has shifted. The last analysis of tool use is used to analyze what tools are used and analyze how to move these tools.

Table 3.Parameter General Move

BasicMOST® System		General Move			ABGABPA
Index x 10	A Action Distance	B Body Motion	G Gain Control	P Placement	Index x 10
0	≤ 2 In. (5 cm)				0
1	Within Reach		Grasp: Light Objects Light Objects Simo	Put: Lay Aside Loose Fit	1
3	1 - 2 Steps	Sit or Stand Bend and Arise 50% occ.	Get: Light Objects Non-Simo Heavy or Bulky Blind or Obstructed Disengage Interlocked Collect	Place: Loose Fit Blind or Obstructed Adjusments Light Pressure Double Placement	3
6	3 - 4 Steps	Bend and Arise		Position: Care or Precision Heavy Pressure Blind or Obstructed Intermediate Moves	6
10	5 - 7 Steps	Sit or Stand with Adjustments			10
16	3 - 4 Steps	Stand and Bend Bend and Sit Climb On or Off Through Door			16

(**Source**: Zandin 2004)

In the general move action distance (A) parameter in pouring dough activities at the level within reach (value 1) to reach the dough leadle, body motion (B) is value 0 or no movement, gain control is worth 1 because it holds a light object-directing the leadel to the blade, and the placement is value 3 because there is a double placement of placing the lead in its original place, the position of the operator's body does not move..

Table 4.Parameter Controlled Move

BasicMOST® System			Controlled Move				ABGMXIA
Index x 10	M Move Controlled		X Process Time			I Alignment	Index x 10
	Push/Pull/Turn	Crank	Seconds	Minutes	Hours		
1	≤ 12 in. (30 cm) Button Switch Knob		0.5 Sec.	0.01 Min.	0.0001 Hr.	1 Point	1
3	> 12 in. (30 cm) Resistance Seat or Unseat Hight Control 2 stages ≤ 24 in. (60 cm) Total	1 Rev.	1.5 Sec.	0.02 Min.	0.0004 Hr.	2 Points ≤ 4 in. (10 cm)	3
6	2 stages > 24 in. (60 cm) Total 1 – 2 Steps	2 – 3 Rev.	2.5 Sec.	0.04 Min.	0.0007 Hr.	2 Points > 4 in. (10 cm)	6
10	3 – 4 Steps 3 – 5 Steps	4 – 6 Rev.	4.5 Sec.	0.07 Min.	0.0012 Hr.		10
16	6 – 9 Steps	7 – 11 Rev.	7.0 Sec.	0.11 Min.	0.0019 Hr.	Precision	16

(**Source**: Zandin 2004)

In the controlled move parameter, the activity of turning APA wood in the controlled move column is worth 10 (Index 10) because there are 4-6 turns, process time (X) is 0 because it does not use automatic tools, when using new automatic tools using the values in the table, alignment is value 1.

Table 5.Parameter Tool Use

BasicMOST® System								Tool Use							ABGABP*ABPA
Index x 10	C Cut				S Surface Treat			M Measure	R Record			T Think			Index x 10
	Cuttof	Secure	Cut	Slice	Air-Clean	Brush-Clean	Wipe	Measure	Write		Mark	Inspect	Read		
	Pliers		Scissors	Knife	Nozzle	Brush	Cloth	Measuring Tool	Pencil/Pen		Marker	Eyes/Finger	Eyes		
	Wire		Cuts	Slices	sq. ft (0.1 m²)	sq. ft (0.1 m²)	sq. ft (0.1 m²)		Digits	Words	Digits	Points	Digits, Single Words	Text of Words	
1	-	Grip	1	-	-	-	-		1	-	Check Mark	1	1	3	1
3	Soft		2	1	-	-	1/2		2	-	1 Scribe Line	3	3 Gauge	8	3
6	Medium	Twist Form Loop	4	-	1 Spot Cavity	1	-		4	1	2	5 Feel for Heat	6 Scale Value	15 Date or Time	6
10	Hard		7	3	-	-	1	Profile Gauge	6	-	3	9 Feel for Defect	12 Vernier Scale	24	10
16		Secure Cotter Pin	11	4	3	2	2	Fixed Scale Calipers 12 in (30 cm)	9 Signature or Date	2	5	14	Table Value	38	16
24			15	6	4	3	-	Feeler Gauge	13	3	7	19		54	24
32			20	9	7	5	5	Steel Tape ≤ 6 ft. (2m) Depth Micrometer	18	4	10	26		72	32
42			27	11	10	7	7	OD-Micrometer ≤ 4 in. (10 cm)	23	5	13	34		94	42
54			33					ID-Micrometer ≤ 4 in. (10 cm)	29	7	16	42		119	54

(**Source**: Zandin 2004)

In the parameter tool used this activity occurs when cutting banana toppings, bananas are cut into 6 pieces using a knife entered in the C-cut column, slice-knife-6 so that it is value 24, while the other values follow the general move and controlled move.

RESULTS AND DISCUSSION

Based on the work elements mentioned in the basic MOST parameters, an example of calculating most of the work elements is as follows:

A. General Move, with MOST code: ABG, ABP, A

The activity of pouring the dough: A1 B0 G1, A1 B0 P3, A0

Description

A1 = Reach the LeadleWithout Moving (action distance-within reach);
B0 = Body Motion-0 index;
G1 = Lift the DoughWithLeadle (gain control-light objects);
A1 = Directing the Leadle to the Dough Bowl (action distance-within reach);
B0 = Upright Body Position (body motion-0 index);
P3 = Pouring Dough Onto the Blade andPutting the LeadleBack In Its Place;
A0 = The Position of the Operator's Body Does Not Change(action distance-0 index).

B. Controlled Move, with MOST code: ABG, MXI, A

APA turning activity: A1 B3 G1, M10 X0 I1, A0

Description:

A1 = Reaching APA (action distance-within reach);
B3 = Slightly Bent Body Position (body motion-bend arises 50%);
G1 = Lift APA Point to Blade (gain control-light objects);
M10= Turning APA Clockwise 7-11 Revolutions (Move controlled crank);
X0 = The Value of X is 0 Because it is Controlled Manually(Controlled Move-0 index);
I1 = Positioning APA in Place (Controlled moved-alignment);
A0 = Operator Body Position Does Not Change(action distance-0 index).

C. Tool Use, with MOST code: ABG, ABP, (*), ABP, A

Banana cutting activity: A1 B0 G1, A1 B0 P1, C24, A1 B3 P1 A0
Description
A1 = Reaching Knife and Banana (action distance-within reach);
B0 = Standing Body Position Not Moving (body motion-0 index);
G1 = Lift Knife and Banana (gain control-light objects);
A1 = Direct the Banana and Knife to the Top of the Blade (action distance withinreach);
B3 = Slightly Bent Body Position (body motion-bend arises 50%);
P1 = P is Worth 1 Because the Tool Used is AKnife (tool use-cut-knife);
C24 = Cut Bananas 6 Slices (use-cut-knife tool);
A1 = Direct the Knife Back into Place (action distance-within reach);
B0 = Body Motion-Sit or Stand Position;
P1 = Put the Knife Back in Place (Placement-light pressure);
A0 = Operator Body Position Does Not ChangeAction Distance-0 Index).

Table 6.Calculation of Work Elements Before Training (two times)

Calculation of Work Elements After Training				
Work Method			TMU/ Frequency	Total TMU
No	Work Element	Model Sequence		
1	Pouring Dough	A1 B0 G1, A1 B0 P3 A0	(6 x 10)	60
2	Rotating APA	A1 B3 G1, M16 X0 I1, A0	(22 x 10)	220
3	Adding Banana Topping	A1 B0 G1, A1 B3 P1, C24, A1 B0 P1 A0	(33 x 10)	330
4	Grate Cheese	A1 B0 G1, A1 B3 P1, C32, A1 B0 P1 A0	(41 x 10)	410
5	Adding Sprinkle Chocolate	A1 B0 G1, A1 B3 P3, A0	(9 x 10)	90
6	Waiting Skin to Golden Brown	A0 B0 G0, A0 B0 P0, T6, A0 B0 P0 A0	(6 x 10)	60
7	Folding Skin Crepes	A1 B3 G1, M3 X0 I1, A0	(9 x 10)	90
8	Lifting Crepes	A1 B0 G1, A1 B3 P3, A0	(9 x 10)	90
9	Wrapping Crepes	A1 B3 G1, M10 X0 I1, A0	(16 x 10)	160
Total Time				1510

(**Source**: Vin CrepesTakoyaki)

In the activity of pouring the dough, the sequence model is A1 B0 G1, A1 B0 P3, A0, then the values obtained are A1, B0, G1 (1+0+1), A1 B0 P3 (1+0+3), A0 (+0) then if the results are totaled (1+0+1+1+0+3+0 =6) then multiplied by 10 according to the rules of the game in Zandin's MOST determination, so that the TMU value per frequency is 6 x 10 = 60

Likewise with other sequence models, for example rotating APA with sequence model A1 B3 G1, M16 X0 I1, A0 then the value is (1+3+1+16+0+1+0 = 22) multiplied by 10 to 22 x 10 = 220

Table 7. Calculation of Work Elements After Training 1 and 2

Calculation of Work Elements After Training				
Work Method			TMU/ Frequency	Total TMU
No	Work Element	Model Sequence		
1	Pouring Dough	A1 B0 G1, A1 B0 P3 A0	(6 x 10)	60
2	Rotating APA	A1 B3 G1, M16 X0 I1, A0	(22 x 10)	220
3	Adding Banana Topping	A1 B0 G1, A1 B3 P1, C24, A1 B0 P1 A0	(33 x 10)	330
4	Grate Cheese	A1 B0 G1, A1 B3 P1, C32, A1 B0 P1 A0	(41 x 10)	410
5	Adding Sprinkle Chocolate	A1 B0 G1, A1 B3 P3, A0	(9 x 10)	90
6	Waiting Skin to Golden Brown	A0 B0 G0, A0 B0 P0, T6, A0 B0 P0 A0	(6 x 10)	60
7	Folding Skin Crepes	A1 B3 G1, M3 X0 I1, A0	(9 x 10)	90
8	Lifting Crepes	A1 B0 G1, A1 B3 P3, A0	(9 x 10)	90
9	Pouring Dough Back	A1 B0 G1, A1 B0 P3 A0	(6 x 10)	60
10	Rotating APA	A1 B3 G1, M16 X0 I1, A0	(22 x 10)	220
11	Wrapping Crepes	A1 B3 G1, M10 X0 I1, A0	(16 x10)	(-160)
12	Adding Banana Topping	A1 B0 G1, A1 B3 P1, C24, A1 B0 P1 A0	(33 x 10)	330
13	Grate Cheese	A1 B0 G1, A1 B3 P1, C32, A1 B0 P1 A0	(41 x 10)	410
14	Adding Sprinkle Chocolate	A1 B0 G1, A1 B3 P3, A0	(9 x 10)	90
15	Waiting Skin to Golden Brown	A0 B0 G0, A0 B0 P0, T6, A0 B0 P0 A0	(6 x 10)	60
16	Folding Skin Crepes	A1 B3 G1, M3 X0 I1, A0	(9 x 10)	90
17	Lifting Crepes	A1 B0 G1, A1 B3 P3, A0	(9 x 10)	90
18	Wrapping Crepes	A1 B3 G1, M10 X0 I1, A0	(16 x10)	160
Total Time				2860

(**Source**: Vin CrepesTakoyaki)

Information for the activity of pouring the dough, obtained the sequence model A1 B0 G1, A1 B0 P3, A0, then the values obtained are A1, B0, G1 (1+0+1), A1 B0 P3 (1+0+3), A0 (+0) then if the result is totaled (1+0+1+1+0+3+0 =6) then multiplied by 10 rules of the game in MOST according to Zandin's determination to be 6 x 10 = 60

For other sequence models, following the calculation method of pouring dough, the steps are only to add up the values attached to the variables A, B, G, P, X, I, M and so on according to the sequence model and then the result is multiplied by 10. For example rotating APA with the A1 sequence model B3 G1, M16 X0 I1, A0 then the value is (1+3+1+16+0+1+0 = 22) multiplied by 10 to 22 x 10 = 220

From the work element calculation table before training 1 obtained a total time of 1510 TMU for making crepes-1 and 1510 TMU for making crepes-2, Zandin said that 1 TMU = 0.00001hours = 0.0006 minutes = 0 0.036 seconds Then the normal time obtained from the calculation using the MOST 1510 TMU method x 0.0006 minutes x 2 trials = 1.812 minutes. Allowance time for workers to carry out personal needs such as defecation, rest and so on, the allowance given is 0.2, then the resulting Standard Time:

Wb = Wn x (1+ fl)

Wb = 1.812 x (1+ 0.2)

Wb = 2.17 minutes (for 2 times of making crepes skins, or worth 1.09 minutes for 1 time of making crepes.

In this study the authors compared the results of standard time before and after training with 2 times of making crepes as a reference for the calculation and both were calculated by snapback time study and the MOST method, then in the same way the following calculations are obtained:

From the calculations in Table 7, the total time is 2860 TMU, Zandin states that 1 TMU = 0.00001 hours = 0.0006 minutes = 0.036 seconds, so the normal time obtained is from the calculation using the MOST 2860 TMU method x 0.0006 minutes = 1.716. Allowance time for workers to carry out personal activities such as defecation, rest, etc.) r 0.2. Then the resulting Standard Time:

WB = WN x (1 + fl)

WB = 1.716 x (1 + 0.2)

WB = 2.0592 minutes (for 2 times of making crepes, or worth 1.03 minutes for 1 time of making crepes)

CONCLUSIONS

From the calculation of the time of making crepes mentioned previously, there is an improvement in time, namely before training WB snap back 2.83 minutes and after training 2.48 minutes. Meanwhile, WB MOST before training was 1.09 minutes and after training was 1.03 minutes. Then the standard time improvement before training was 1.74 minutes (2.83 minutes - 1.09 minutes, and the standard time after training was 1.45 minutes (2.48 minutes - 1.03 minutes). Indeed, the WB MOST has been successfully applied for this paper case, Work Time Analysis To Reduce Waste Of Work Time On Vin Crepes Takoyaki

ACKNOWLEDGEMENT

Alhamdulillah praise to Allah SWT the Almighty, just because His blessing and Mercy the researchers has complete this papr for ICoMS 2021, which is entitled **"**Work Time Analysis to Reduce Waste of Work Time on Vin Crepes Takoyaki**".** A lot of people provided support and motivation to authors in arranging this paper and at this moment, authors would like to thank very much to Director of Graduate Studies UNPAM, Dr. Ir. H. Sarwani. MM. MT and all our lectures for the advices and supervision, our families, and also our friends in class 02S2MM01. Last but not least, authors are also very appreciative to Dr. Taswanda Taryo, M.Sc. and Dr. Meri Suhartini who has reviewed this paper thoroughly.

REFERENCE

Batubara, Fathia, Safitri. (2019). Usulan Pengurangan Waktu Setup Menggunakan Metode SMED serta Pengurangan Waktu Proses Produksi dan Perakitan Menggunakan Metode MOST.

Benedictus, Yanto (2019) Engineering Psychology: Prinsip Dasar Rekayasa Kerja Berbasis Integrasi Fisik, Psikis dan Teknik. Jakarta. Universitas Katolik Atma Jaya

Erliana, (2015). Buku Ajar Analisa & Pengukuran Kerja. Aceh. Fakultas Teknik ProdiTeknik Industri Universitas Malikulsaleh

Febriana et.al.(2015). Analisis Pengukuran Waktu Kerja dengan Metode Pengukuran Kerja Secara Tidak Langsung pada Bagian Pengemasan di PtJapfa Comfeed Indonesia Tkb.

Freivalds, Nieble. (2003). *Methods, standards and work design.* New York: Mcgraw Hill.

Harras, H., Sugiarti, E., & Wahyudi, W. (2020). Kajian Manajemen Sumber Daya Manusia Untuk Mahasiswa.

Hasyim, Hadiatma, Suryo (2017). Optimasi Biaya dan Waktu pada Pelaksanaan Pasangan Granit dengan Metode Time Study.

Hendrawan, Riyadi. (2018). Desain Pekerjaan pada Industri Sepatu Magetan dengan Metode MOST dan Simulasi Manufaktur.

Hutabarat. (2017). *Dasar-Dasar Pengetahuan Ergonomi.* Malang: Media Nusa Creative.

Iftadi, Astuti. (2016). Analisis dan PerancanganSistemKerja. Jogjakarta Deepublish

Lesmana, R., Sunardi, N., & Kartono. The Effect of Financing and Online Marketing on MSMEs Income Increasing at Intermoda Modern Market BSD City Tangerang Selatan. *American Journal of Humanities and Social Sciences Research (AJHSSR*), 5(7), 25-34

Lesmana, R., Sunardi, N., Hastono, H., & Widodo, A. S. (2021). Perceived Quality Membentuk Customer Loyalty via Brand Equity pada Pengguna Smartphone Merek Xiaomi di Tangerang Selatan. *Jurnal Pemasaran Kompetitif*, *4*(2), 157-167

Lesmana, R., Sutarman, A., & Sunardi, N. Building A Customer Loyalty Through Service Quality Mediated by Customer Satisfaction. *American Journal of Humanities and Social Sciences Research (AJHSSR*), 5(3), 38-45

Mahawati.et.al.(2021). Analisis Beban Kerja dan Produktivitas Kerja, Medan. Yayasan Kita Menulis

Meyers, F. (1999). *Motion and time study for lean manufacturing.* New Jersey: Prentice-Hall.

Ngaliman, Yanto. (2017). *Ergonomi Dasar-Dasar Studi Waktu &Gerakan untuk Analisis &Perbaikan Sistem Kerja.* Yogyakarta: Andi.

Rahmawati(2015). Perencanaan Pengukuran Kerja dalam Menentukan Waktu Standar dengan Metode Time Study Guna Meningkatkan Produktifitas Kerja pada Divisi Pompa Minyak PT. Bukaka Teknik Utama.

Septianto, A. (2018). *Analisa Perancangan Kerja.* Yogyakarta: CV. Budi Utama.

Stevenson. (2014). *Production Operational Management.* Jakarta: Salemba Empat.

Sumarna, Utaria. (2015). Waktu Baku Pengolahan Incoming Mail Surat Kilat Khusus di PT. Pos Indonesia Cilegon .

Sunardi, N., & Lesmana, R. (2020). Konsep Icepower (Wiramadu) sebagai Solusi Wirausaha menuju Desa Sejahtra Mandiri (DMS) pada Masa Pandemi Covid-19. *JIMF (Jurnal Ilmiah Manajemen Forkamma)*, *4*(1).

Sutalaksana, (2006). *Teknik Perancangan Sistem Kerja.* Bandung: ITB.

Tanjung Toan Saravanan, A.N.M. Karim, H.M.Emrul Kays, A.K.M.N Amin, M.H Hasan. (2014). Journal Improvement of Workflow and Productivity through Application of Maynard Operation Sequence Technique (MOST). International Conference on Industrial Engineering and Operations Management Bali, Indonesia. Malaysia: SAutomotive Industry SdnBhd and Department of Manufacturing and Materials Engineering. International Islamic University.

Tarwaka. (2015). *Dasar-Dasar Pengetahuan Ergonomi dan Aplikasi di Tempat Kerja.* Surakarta: Harapan Press Surakarta.

Wahyu, W., & Salam, R. (2020). KOMITMEN ORGANISASI (Kajian: Manajemen Sumber Daya Manusia).

Wahyudi, W. (2021). Ketidakpuasan Dosen Atas Kepemimpinan Ketua Program Studi. *Scientific Journal Of Reflection: Economic, Accounting, Management and Business*, *4*(4), 859-868.

Wignjosoebroto. (2004). *Ergonomi Studi Gerak dan Waktu Teknik Analisis untuk Peningkatan Produktifitas Kerja.* Surabaya: Guna Widya.

Yudianto, W. (1994). *Cara Praktis Penggunan MTM 1,2,3.* Bandung: Universitas Kristen Maranath.

Zandin, K. B. (2004). *Maynard's Industrial Engineering Handbook.* Pennsylvania: Mcgraw Hill.