

Addition of Facilities to Bottle Capping Machine

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Abstract

Little industry participated in CV milk drink items. Memory Susu Nusantara on Jalan Tirto Agung, Semarang city, the method involved with capping milk bottle covers is as yet done physically. This exploration will have some expertise in planning bottle shutting apparatuses and tables utilizing anthropometric strategies to make bundling time more successful. Sat around idly causes significant expenses, aside from that it additionally causes laborers bother in bottle shutting procedures. In planning this device, the anthropometric information utilized is Hip Level, Hand Reach, Hip to Shoulder, Shoulder Width information. In light of the information acquired and the consequences of the information computations, it was found that the information got was uniform since it was still inside the upper control cutoff points and lower control limits. All in all, by planning a jug covering device with an extra table, it decreases sit around, laborers will turn out to be more agreeable, on the grounds that there is an extra table to kill the time taken by laborers to gather bottles. This new apparatus will make laborers more proficient in shutting bottles contrasted with physically, subsequently acquiring useful time simultaneously.

Keywords: *manual, anthropometry, waste time, efficient*

Abstrak

Industri kecil yang bergerak pada produk minuman susu CV. Memory Susu Nusantara di jalan Tirto Agung kota Semarang dalam proses pemasangan tutup botol susu masih dilakukan secara manual. Penelitian ini akan mengkhususkan pada perancangan alat dan meja penutup botol dengan metode antropometri untuk mengefektifkan waktu pengemasan. Waktu yang terbuang menyebabkan biaya menjadi tinggi, selain itu juga menyebabkan ketidaknyamanan pekerja dalam dalam teknik menutup botol. Dalam perancangan alat ini data antropometri yang digunakan adalah data Tinggi Pinggul, Jangkauan Tangan, Pinggul Ke Bahu, Lebar Bahu. Berdasarkan data yang diperoleh dan hasil dari perhitungan data tersebut didapatkan bahwa data yang diperoleh seragam karena masih berada didalam batas kontrol atas dan batas kontrol bawah. Kesimpulan dengan adanya desain alat *capping bottle* dengan tambahan meja mengurangi waste time, pekerja nantinya menjadi lebih nyaman, karena sudah ada tambahan meja untuk menghilangkan waktu pengambilan botol oleh pekerja. Dengan alat baru ini nantinya menjadikan pekerja lebih efisien dalam melakukan menutup botol dibandingkan dengan manual, sehingga mendapatkan waktu produktif dalam proses pengerjaannya.

Kata Kunci: *manual, antropometri, waste time, efisien*

1. Introduction

Little industry participated in CV milk refreshment items. Memory Susu Nusantara on Jalan Tirto Agung, Semarang city, the most common way of introducing milk bottle covers is as yet done physically. The functioning system isn't viable and in the event that it is finished for quite a while it will make the finger hurt. This examination will have some expertise in the plan of container covers utilizing the anthropometric technique to make bundling time compelling. The sat around causes significant expenses, however it additionally causes burden for laborers in the jug covering method.

Past examinations utilizing reasonable strategies and anthropometric methodologies presumed that by planning another work office as a plastic press device table, there is an adjustment of work act, so the administrator no longer feels serious irritation and back, on the grounds that the plan of the work table is acclimated to the anthropometry of the human body [1].

Research by Antoni Yohanes, Firman Ardiansyah Ekoanindiyo (2020) in regards to the Plan of a Self-loader Plastic Roll Cutting Machine with Anthropometry creates a device as a programmed plastic roll cutting machine in light of anthropometry [3].

Research by Nur Ulfah, Siti Harwanti and Panuwun Joko Nurcahyo (2014) on Work Mentalities and Chance of Outer muscle Problems (MSDS) in Clothing Laborers observed that main work perspectives in

the washing division are in danger of causing MSDs, so it is important to mediate as work disposition preparing right washing [6].

Research directed by Bayu Putut Tri Nugroho, Taufiq Rochman, and Irwan Iftadi (2013) on the Proposed Plan of a Streetcar as a Device for Shipping Grain Sacks With regards to Further developing Work Stance in Rice Factories delivers a device as a streetcar plan for grain sacks moving guides in view of anthropometry with evaluation of the Rappid Whole Body Evaluation (REBA) strategy [4].

Research by Friska Pakpahan, Wowo S. Kuswana, Ridwan A.M. Noor (2016) with respect to Ergonomic Examination in the Act of Keeping up with Haggles Utilizing the Reba Strategy, creates a vehicle lift device to change the level of the vehicle as per anthropometry [5].

Santoso, Agung, Benedikta Anna. (2014) additionally led research on the Upgrade of Anthropometric Seats to Satisfy Estimation Guidelines [7]. By knowing the components of the laborer's body, work hardware, work stations and items can be planned by the specialist's body aspects in order to make solace, wellbeing and work security [8].

Sari, A. M. (2013) one technique that can be utilized to decide the size of the elements of the human body is because of an anthropometric investigation connected with the estimation of the components of each and every human body [9]. Firman Ardiansyah E (2019) The information handling of the nordic body map survey was done to decide the objections on the skeleton and muscles of the laborers [10].

2. Material and Methods

The materials utilized are SNI ensured, while every gear utilized in this study has been aligned in advance. It plans to create exact and precise estimating instrument readings. Other than that, as far as perusing estimating instruments and information assortment, more than 1 individual was additionally done methodically.

Table 1. Research Materials and Equipment

No.	Tools and Materials	Source	Amount
1.	Stand drill	Buy	One unit
2.	As Stainless	Buy	50cm/ D 43mm
3.	Nylon	Buy	50cm/ D 43mm
3.	Nut bolt	Buy	Adapt
4.	Hollow iron	Buy	30x30 mm
5.	Aluminum plate	Buy	3 mm
6.	Dimmer	Buy	one unit
7.	Electric drill	Buy	One unit
8.	Lathe services	Buy	2x
9.	Switch <i>on/off</i>	Buy	One

a. Data processing

1. Test data adequacy

This data processing aims to test whether the data collected is sufficient or insufficient, if the amount of data is still not sufficient then additional observation data will be carried out.

2. Test data uniformity

Data uniformity testing is carried out to obtain uniform data. The data used is anthropometric data obtained from body measurements of employees and the surrounding community at milk producers who have direct contact.

3. Percent

This data processing aims to determine the size of a product through the 5th, 50th or 95th percentiles. The objects of observation are milk producer employees with an age range of 15 - 70 years consisting of men and women.

b. Design of the table or base on the bottle closing machine which refers to data from anthropometry that has been processed/tested.

1. Design Testing

After the product design has been completed, employees will then carry out testing to analyze the level of comfort and expected function.

2. Analysis and Discussion

The analysis and discussion are intended to identify the weaknesses and shortcomings of the product design for further development of the product.

3. Conclusions and Suggestions

After the data has been processed and analyzed, the final step is to draw conclusions and make several suggestions and input based on the results of observations and experience.

c. Pre-Design Design

Discussing the weaknesses of previous pressing tools to be improved using anthropometric and ergonomic approach concepts.

d. Design Planning

After knowing the weaknesses of the previous design tool, the actual tool design can be carried out.

3. Results and Discussion

Anthropometric information which gives size information to different pieces of the human body in specific percentiles which is extremely valuable while planning an item or work office. (Ginting, 2010). The essential information assortment strategy is completed by estimating the elements of the human body (workers) CV. Memory Susu Nusantara on Jalan Tirto Agung, Semarang. From estimations of human body aspects completed on representatives and the encompassing local area with an age scope of 15 - 70 years, the outcomes got are made sense of in the accompanying **Table 2**.

Table 2. Data from anthropometric measurements of employees

No.	Name	Type	TP	PKB	JT	LB
1.	Selamet	L	82	48	68	50
2.	Siti M.	P	75	50	67	47
3.	Nining	P	76	50	67	50
4.	Abet	L	80	49	70	49
5.	Kasto	L	80	48	70	48
6.	Solikin	L	80	46	67	46
7.	Yati	P	76	49	67	46
8.	Royo	L	77	50	68	48
9.	Harto	L	82	48	69	50
10.	Tri	P	76	50	66	47
11.	Wati	P	77	52	67	48
12.	Dasiun	L	80	49	68	50
13.	Edi	L	80	50	68	49
14.	Anto	L	81	50	70	50
15.	Darto	L	81	46	69	50
16.	Gunawan	L	79	50	70	50
17.	Niken	P	78	48	60	47
18.	Sri	P	78	48	66	46
19.	Yanti	P	75	50	60	46
20.	Narko	L	76	52	67	48
21.	Imam	L	81	48	68	50
22.	Ninik	P	81	47	66	47
23.	Wawan	L	80	48	68	48
24.	Adi	L	80	48	68	47
25.	Imron	L	80	50	70	50
26.	Amad	L	80	49	69	50
27.	Harno	L	76	52	68	50
28.	Atun	P	78	48	60	46
29.	Suliyah	P	76	50	65	46
30.	Agus	L	80	50	69	50

From this information, this study will utilize anthropometric information that is straightforwardly connected with shortcomings in the jug shutting process. Anthropometric information that are straightforwardly related are Hip Level, Hand Reach, Hip To Shoulder, Shoulder Width.

Table 3. Results of Calculation of the Average Anthropometric Data

No.	Name	TP	PKB	JT	LB
1.	Selamet	82	48	68	50
2.	Siti M.	75	50	67	47
3.	Nining	76	50	67	50
4.	Abet	80	49	70	49
5.	Kasto	80	48	70	48
6.	Solikin	80	46	67	46
7.	Yati	76	49	67	46
8.	Royo	77	50	68	48
9.	Harto	82	48	69	50
10.	Tri	76	50	66	47
11.	Wati	77	52	67	48
12.	Dasiun	80	49	68	50
13.	Edi	80	50	68	49
14.	Anto	81	50	70	50
15.	Darto	81	46	69	50
16.	Gunawan	79	50	70	50
17.	Niken	78	48	60	47
18.	Sri	78	48	66	46
19.	Yanti	75	50	60	46
20.	Narko	76	52	67	48
21.	Imam	81	48	68	50
22.	Ninik	81	47	66	47
23.	Wawan	80	48	68	48
24.	Adi	80	48	68	47
25.	Imron	80	50	70	50
26.	Amad	80	49	69	50
27.	Harno	76	52	68	50
28.	Atun	78	48	60	46
29.	Suliyah	76	50	65	46
30.	Agus	80	50	69	50
$\sum X$		2361	1473	2015	1449
$\sum \bar{X}$		78,7	49,1	67,1667	48,3

In handling anthropometric information from the consequences of estimations taken, there are 3 phases of information handling, to be specific information sufficiency test, information consistency test and percentile.

Table 4. Data adequacy test calculation results

No	Anthropometric	N	N'	conclusion
1.	Hip Height	30	1,190889441	$N' < N$, enough data
2.	Hip To Shoulder	30	1,519821137	$N' < N$, enough data
3.	Hand Reach	30	2,62645547	$N' < N$, enough data
4.	Shoulder Width	30	1,744331431	$N' < N$, enough data

Table 5. Results of data uniformity calculations

No.	Anthropometric Dimensions	Standard Deviation	The calculation results Upper Control Limit	Lower Control Limit
1.	Hip Height	2,18379613	85,2513884	72,14866116
2.	Hip To Shoulder	1,53914441	53,7174332	44,4825668
3.	Hand Reach	2,76783662	75,4701799	58,8631601
4.	Shoulder Width	1,62204639	53,1661392	43,4338608

The fifth percentile, 50th percentile, and 95th percentile is utilized for sizes in the plan of the container cap. The determination of the fifth percentile implies that the estimation is completed on 5% of the populace that is little, while the 50th percentile implies that the estimation is done on half of the populace with a typical size and for the 95th percentile. implies that the estimation is completed in 95% of the huge

populace. To make it simpler to work out percentiles, estimations are done with the assistance of the SPSS variant 20 application.

Table 6. Results of calculating percentile data using SPSS 20.0

	Hip Height	Hip To Shoulder	Hand Reach	Shoulder Width
Valid	30	30	30	30
Missing	0	0	0	0
Std. Deviation	2,18380	1,53914	2,76784	1,62205
Percentiles				
5	75,0000	46,0000	60,0000	46,0000
50	80,0000	49,0000	68,0000	48,0000
95	82,0000	52,0000	70,0000	50,0000

The information that has been acquired and handled is then gone on by deciding the size of the instruments and materials utilized. Assurance of size depends on anthropometric information and related gear information as in the accompanying table:

Table 7. Determination of Design Size

No.	Design Size	Anthropometric Data	Size	Reason
1.	Seat height	Hip Height	Percentile 50	Workers who are short and tall can use the tools made.
2.	Machine width	Hip To Shoulder	Percentile 95	In the process of installing bottle caps, it is wide enough so that workers do not have difficulty due to insufficient space.
3.	Distance to Machine	Hand Reach	Percentile 5	Adjustments to the distance between bottles in the machine and to the next process so that they are not too far away.
4.	Height of seat to engine	Shoulder Width	Percentile 5	So that the machine is not too high for short stature workers.

Table 8. Design size of semi-automatic bottle capping machine

No.	Section Name	Size
1.	Seat height	80 cm
2.	Machine width	50 cm
3.	Distance to Machine	60 cm
4.	Height of seat to engine	46 cm



Figure 1. Bottle capping design

4. Conclusion

Subsequent to mentioning observable facts, estimating anthropometric information on body aspects, computations and generally speaking investigation, the accompanying ends can be drawn in regards to bottle covering apparatuses: With the plan of an extra table on the container covering device, it diminishes

sit around, laborers will turn out to be more agreeable, on the grounds that specialists don't need to take bottles to and from. This new apparatus will make laborers more proficient in shutting bottles contrasted with physically, accordingly acquiring useful time all the while.

5. References

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