DEVELOPMENT DETAIL DESIGN GALLON WASHER USING DESIGN FOR ASSEMBLY (DFA)

Mohamad Walid Anshar Ichsan Shahib[1], Mira Rahayu[2], Teddy Sjafrizal[3]

Program Studi S1 Teknik Industri, Fakultas Rekayasa Industri, Universitas Telkom, Indonesia
[1]walidansharis@gmail.com [2]mira.rahayu@gmail.com, [3]s.teddy@gmail.com

ABSTRACT

AMDK Tirtawening water the pack is drinking water companies packaging maintained by the government west java province focusing on products which includes water in a container like a cup, and even gallon package 19 liter drinking water. In production process packaging bottles who have been given motive read watermed early gallons 19liter production. AMDK tirtawening do not have the washing machine or tools gallons automatic, by as there a design tool gallons cleansing designed in research ' design instrument laundering gallons using a method of design rasional' products.Design designed to be do details design to get a target and specification clear, and do develop the tool used the design to assembly because design designed s a design custom which the design custom that will cost money design higher than with an instrument is.With the methods detailed stage design with approach dfa is a component stage analysis, stage dfa analysis, efficiency calculation and detail drawing .Results in this research is the results of the analysis efficiency design of 63,41 % to 35,32 % and reduction a component of 27 to 18 , where it is said dfa successfully .

Keyword: AMDK Tirtawening, Repair, Gallon Washer, DFA (Design For Assembly, Boothroyd

1. INTRODUCTION

Design is a creative activity that reflects various the form of the quality and system, like a circle interconnected. In addition, design is factors that who built activities innovation pemanusiaan technology, the dynamics of culture , and economy change (icsid, 1999), below are design created by research “develop the tool laundering gallons ergonomic at the station employment is laundering gallons the outside by using the method ergonomics function deployment.”

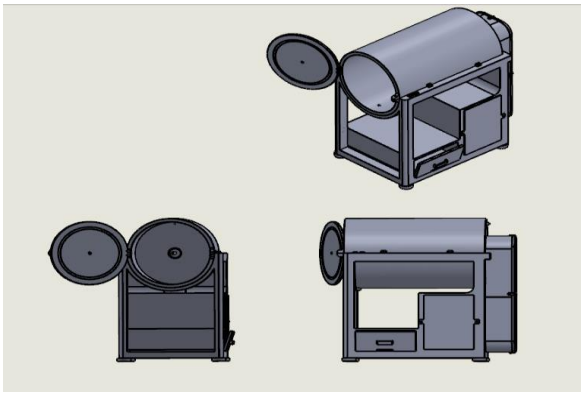

Figure 1. Gallon Washer Concept

The concept of an instrument design laundering gallons are considered to be quite simple, but in planning the development of this need to pay attention to is the criteria for the convenience of assembly, because in the concept design laundering gallon still has not been made yet the design of how to make any products by good. Hence will need to be made how to design for making tools gallon laundering based on ease of assembly .A method of the most common of methodology this is design for assembly (DFA) this method is also the method in the design products that are aimed to ease the process of assembling where design could be simplified or reduced its components .Reduction in the amount of bkomponen in an assembly of having additional benefit generally reduce the total cost of the inside of the assembly (boothroyd, 1980).

By using or applying design for assembly (DFA) on improving design products instrument laundering gallons who was aimed at getting design products are composed of components for it was very are needed and not can be replaced its function by other components.With the number of components minimum and the process

assembly easier it will reduce assembly time as well as the cost of assembly for a product.So researchers to applies the methods of dfa in alternative choice of architect the process of the designs for analysis that in accordance with the methods dfa namely by the title "development detail design instrument laundering gallons used the design for assembly (DFA)".

2. THEORETICAL BACKGROUND

2.1. DFA (Design For Assembly)

A design for an assembly (dfa) is a process by which the product designed by thinking ease in an assembly .If a product only have a little components then of these products will more easily assembled , thus reducing the cost of assembly .In addition , if the parts which is provided with a feature that makes it easier to put together , digerakan , and is oriented , then this will also reduce assembly time and the cost of assembly. The reduction of the sum of part in an assembly of having additional benefit generally reduce the total cost of the inside of the assembly (boothroyd, 1980).
Design for assembly is a draft which the processes of assembly was already planned early in the design of products, in this case features every other component, the number of components in design with consider the process perakitannya so obtained ease -- ease during the process assembly.In general there are two the main factors that affecting time assembly:

1. Number of component
2. Ease in handling, insertion, and fastening of each -- each part

Classification systems assembly according to boothroyd & amp; dewhurst (1991, 1996), classification systems assembly divided into two based on the type of its operation, which is :

1. Classification Of Manual Handling

Some things that it should be noted in the classification manual carrying is measure, thickness, heavy, sarangan, something, easily broken, flexibility, artfulness, adhesiveness, need use hand, need use a hold, the optical apparatus, the mechanical aid.In addition, simetrikal components also have an besardan consisting of 2 (two) type (kristyanto, 1999).

A. alpha (α) symmetry, namely gyrations components to an axis who perpendicular axes revenue.
B. beta (β) symmetry, namely gyrations components to the axis of revenue

2. Classification system for manual and fastening

The second phase in in a process assembly is the process of entering installing and binding (pengencangan) focusing on interaction between confront components as contact them and put them together

A. Assembly Efeciency (DFA Index)

The formula used to calculate effisiensi assembly is as follows :
:E = NM. ta/ TM
E : Assembly Efeciency (DFA Index)
NM : Minimum part count
ta : Assembly times for each part
TM : Total of assembly time
So efesiensi assembly is a ratio of assembly time ideal before the assembly actual or design early a product.Reference this measure reckoned based on the number of the minimum situai gain an ideal.Boothroyd - dewhurst criteria give 3 points to be fulfilled before performs the separation or reduction components, are:

a. Do components have the movement of relative to components are assembled before?
b. Do components have a kind of material different or to be diisolasikkan?
c. c. Do components is a component which are parcel of other components assembly?

If one of 3 this met then components it is necssary separate components or in other words cant combined.

3. RESEARCH METHOD

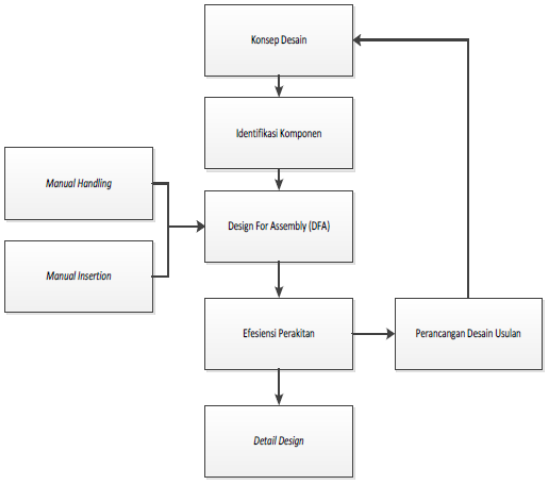

Figure 2 Conceptual Model Research

This research do design detailed to the concept of instrument laundering gallon and do design design for assembly that gets ease in assembly , and minimation number of components products.

4. RESULT AND DISCUSSION

The arrangement of assembly initial design.

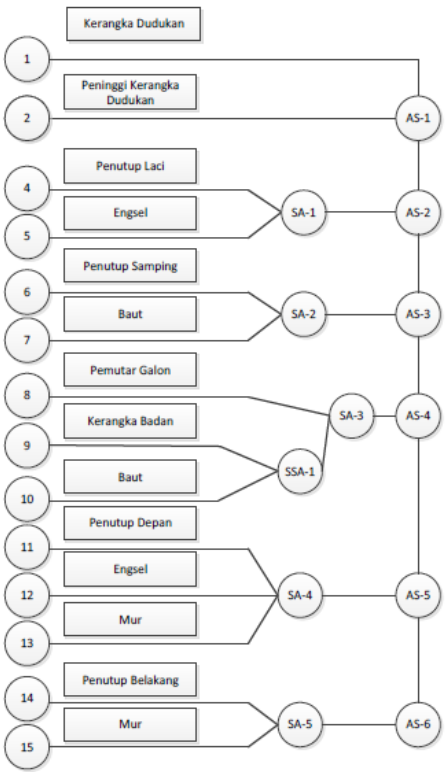

Figure 2. Arrangement of assembly initial Design

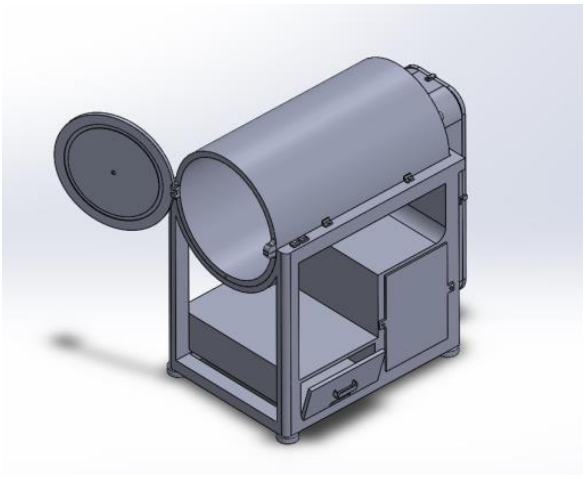

Figure 3 Gallon Washer Initial Concept

E = 19 x 3 / 161.37 = 0.3532
Assembly efeciency
= 0,35323 x 100% = 35.323%

The arrangement of assembly of new design.

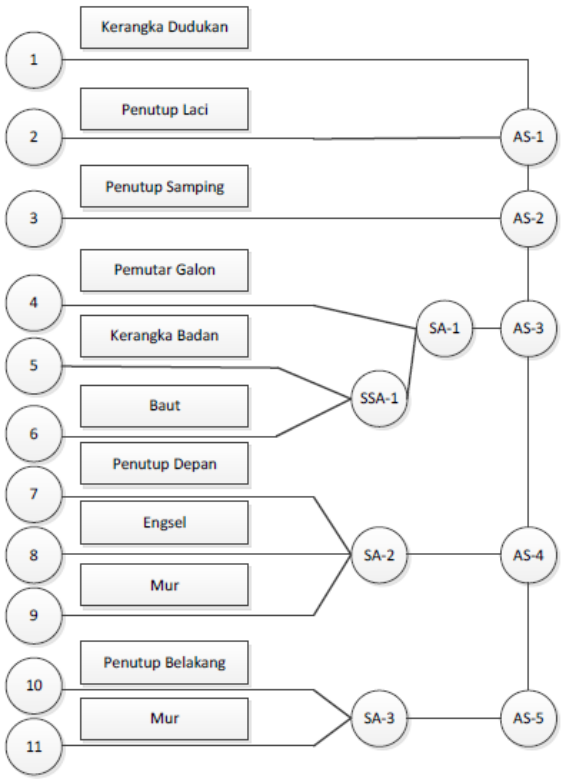

Figure 4 Arrangement of assembly New Design

The calculation on DFA an index on re-design

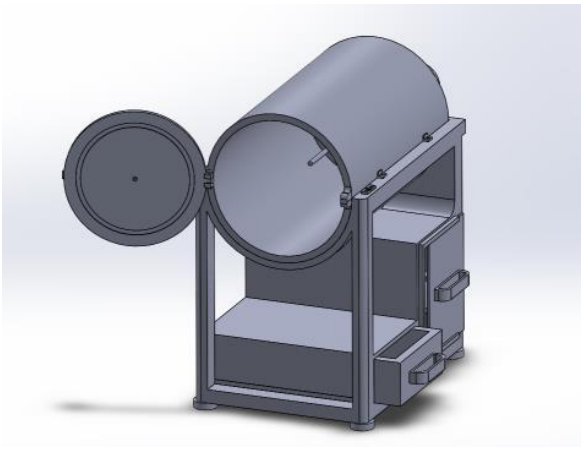

Figure 5 Gallon Washer Initial Re-design concept

E = 19 x 3 / 89.89 = 0.63411

Assembly Efeciency

= 0,63411x 100% = 63.4108%

5. CONCLUSION

After do the processing of the data based on approach DFA so produced new design with several differences in way fastening and joining at one components .Components changed design can be seen in table below .

Table 1 Conclusion Effeciency

Design Concept	Efficiency of Assembly	Assembly time	Number of component
Current	35.32%	161.37	27
Proposed	63.41%	89.89	18

At the calculation for design use formula e = nm.ta / tm where e is design for effeciency / DFA Index , so obtained DFA Index to model the initial concept of is as much as 35.323 % .While dfa index to the design of proposal is as much as 63.4108 % , where can be seen that design proposal more efficient of 28.09 % . In the process assembly .When viewed from assembly time as a whole , model the initial concept of having assembly time of 161.37 seconds while to model the concept of proposals have time design of 89.89 seconds .In the 71.48 seconds ahead it can be said that design proposal is design easier assembled.

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