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Small Group Acivities for Pallet Cover Design Plan

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Abstract
This paper examines the utilization of the Small Group Activity (SGA) method using in manufacuring company as an example. The topic was selected due to issues identified by the company in the domain of quality management. The aim of the investigation is to provide theoretical concepts for the enhancement of group activities and their impact on organizational effectiveness. Methods of Continuous Improvement in the Philosophy of Kaizen (SGA) and a Presentation of the Practical Benefits of Its Implementation. The results indicate that it could be a highly effective method in solving problems and improving. Design and manufacture special pallet racks for Cover components. The elimination of non-value added (NVA) activities in the cover component setting process. Components received from suppliers can either be stored or directly allocated to production. Loading components from suppliers maximizes efficiency as it takes up minimal space and there will no longer be a build-up of waste from strapping plates after the setting process.

Keywords: Continuous improvement, Small Group Activities (SGA), Design

INTRODUCTION

Improvement begins with recognizing that every organisation has issues, which offer opportunities for change. It revolves around ongoing enhancement that involves all members of the organisation and largely depends on cross-functional teams who can be empowered to challenge the current situation [Thessaloniki, 2006]. During the manufacturing process, there are various stages involved, including component setting or setup. The component setting process within a company refers to the determination and provision of elements that contribute to the success of the business. In a manufacturing company, the component setting process involves the installation and assembly of required components for finished products. The process of component setting can refer to the stage of assembly or preparation of the necessary raw materials to produce finished goods. The company must ensure that every required component is available and ready for use in the production process to ensure smooth operation.

PT.XYZ is a manufacturing company with the ability to produce heavy equipment components. The setting process for components at PT. XYZ typically requires a relatively long time due to the heavy material setting and handling utilizing cranes and lifting magnets. There are even some large-sized components that can only be set using a forklift. The purpose of setting up the components is to facilitate the PPIC & Warehouse operators in flowing and supplying components to the production department in a more concise and easily traceable manner according to their respective types and projects.

The initial problem arose when the PPIC and Warehouse department placed an order for component materials from a supplier. However, upon arrival, the materials were not yet configured and required an additional setup process before being sent for fabrication. This unfortunate situation resulted in delayed projects as the warehouse operator had to set up the components first, which was time-consuming. In this instance, PPIC and Warehouse identified

the issue and subsequently addressed it through the design and creation of tailored pallet racking systems for Cover components in accordance with safety and optimum standards.

Understanding the process of early component arrival from suppliers to production. Identifying the factors that can impede the production process. Evaluating the necessity of improvements required. Streamlining the time-consuming component setting procedure that hinders the production process.

The aims of this study are to reduce the setup time for the cover component, streamline the component supply process to fabrication, enhance safety, and eliminate waste freeze.

Design planning is a process that involves creating and planning an object or system while taking into account functional and aesthetic aspects, as well as the needs of the user. Donald A. Norman, a well-known design expert, argues that design planning should consider usability aspects that encompass user-friendliness, user satisfaction and alignment with user objectives. According to Norman, a good design is one that aligns user needs with the product's purpose and function. (Norman, 2021).

The SGA comprises a maximum of (5-8 persons), who join the team voluntarily and remain in it until the end. A culture of cooperation and trust is fostered within the team, with the leader being the sole superior. A culture of cooperation and trust is fostered within the team, with the leader being the sole superior.

A culture of cooperation and trust is fostered within the team, with the leader being the sole superior. All pertinent functional areas are represented within the team, and there is a goal of achieving a compelling outcome. SGA members ought to adhere to these principles. Additionally, collaborating with individuals who have contacts in the project environment can facilitate cooperation. One should possess knowledge and experience as well as the ability to solve problems creatively. It is advisable to avoid individuals who do not intend to sustain their involvement. Credibility, ambition, initiative, and energy are also essential qualities to possess.

The leader of the SGA team should discuss the project's range, goals, schedule, methods, and procedures during the first meeting. Interpersonal issues and methods of teamwork should also be addressed. It is essential to establish clear communication within the team by specifying the rules for planning, information exchange, change implementation, and relations with the environment.

RESEARCH METHOD

Small Group Activity, also known as Focused or Continuous Improvement in English, originates from the Japanese industry where it is called "Kobetsu Kaizen" or Quality Circles.
SGA is a team-based problem-solving method that involves the structured search for root causes of issues and their subsequent elimination. After standardising the solution, the problem's reoccurrence is prevented. The sense of ownership is heightened as the problem is solved by those directly involved in a multifunctional team [].

The SGA is comprised of individuals working together to solve a particular problem. Or improve an important issue: Optimal team size is between 5 and 8 people. Team members can come from one or several sub-businesses. The leader of the team is determined by the team members themselves, who organize their work. The composition of the team is dependent on the topic the group is dealing with. A substantial number of individuals involved in direct interaction with the subject are essential. Line workers play a crucial role in enhancing their teamwork abilities. The structure of an SGA project is derived from the PDCA-circle from Dr. W. Edward Deming and exists of 8 steps on the basis of the SGA circle (Fig. 1).

Figure 1. SGA improvement circle (Diana and Krzysztof, 2016)

The method used in this study follows eight steps within the SGA (Small Group Activity) Circle:

Choose a subject.

This is the first step in the planning phase, which involves identifying the problem statement. The issue is a problem that needs to be addressed by the SGA team which is taken from the problems that are growing in the work environment.

Set a target.

This step is the second in the planning phase, which involves selecting one of the identified issues based on mutual agreement and determining improvement targets for it. The targets established ought to be specific, measurable and time-bound.

Problem Analysis

Problem Analysis is the third step in the plan stage, which involves tracing the causes of the selected problem based on the human, machine, method, and material categories until the root cause of each category is identified. In this stage, the Fishbone diagram is used as a problem analysis tool.

Invent Solution

The fourth step in the plan stage, which involves collecting ideas from each member.

Make a Plan

Where the accepted ideas are incorporated into a plan for improvement. The improvement plan should include activities and responsible parties.

Execute the Solution

At the implementation stage, the solution will be executed according to the planned improvements that have been agreed upon and thoroughly discussed by all members of the SGA team. In carrying out the improvements, it is important to explain the necessity for seriousness and full participation from all SGA team members according to their assigned tasks. It is also expected that all improvement plans will be completed within the agreed timeframe.

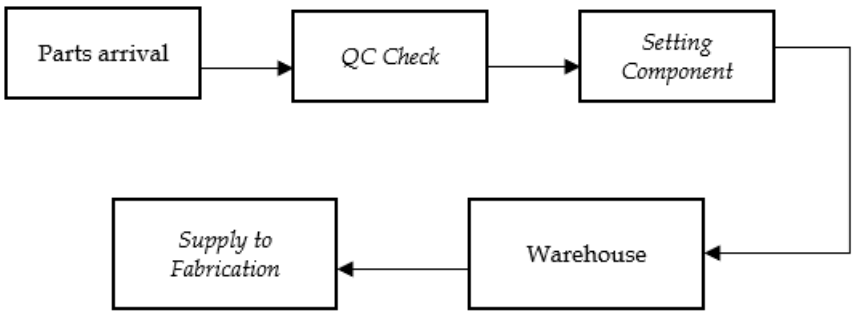
The next step is to compare process and outcome conditions before and after the improvements. If a positive outcome is observed post-improvements, standardisation of the executed modifications will be conducted. In response to unsatisfactory results post-improvements, the planning and implementation of corrective actions must be re-evaluated. This stage falls within the check phase.

Finally, the last stage is act. After the corrective actions have been implemented and have addressed the root cause of the issue, the next stage is to establish standardisation that will serve as a reference for work in the workplace, and also prevent recurring problems. If necessary, this standardisation can also be extended to other work areas or areas related to the work. The standards that are developed may include standards for work methods, personnel (operators/mechanics), materials, machinery, and the work environment.

RESULTS AND DISCUSSIONS

It is a series of activities that occur when components ordered from suppliers arrive and are placed in the receiving area.(fig 2)

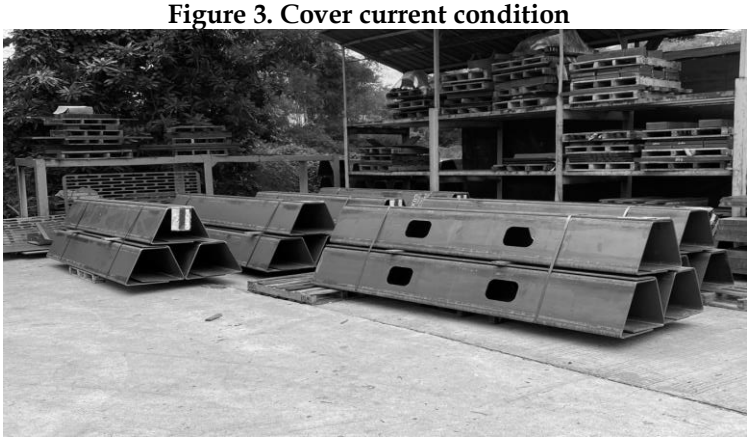
Figure.2 Flowchart Arrival process component



Supplier

The components still arrive from the supplier on wooden pallets with a maximum of six pieces per pallet and without being set or configured between the left and right sides.(fig.3.)

Figure 3. Cover current condition



The Cover component must be manually set using a forklift which takes a relatively long time and The strapping often breaks, making the setting process difficult.

Fabrication

The production area for Work in Progress components is limited, hence the need for component setting processes.The mobilization of difficult and less secure component supplies is hindered by the narrow path in the A building's production area.

Safety

The previous pallet used non-standard hollow steel and was not able to be handled by a crane (a used pallet for the Ring TRF HCMI component).

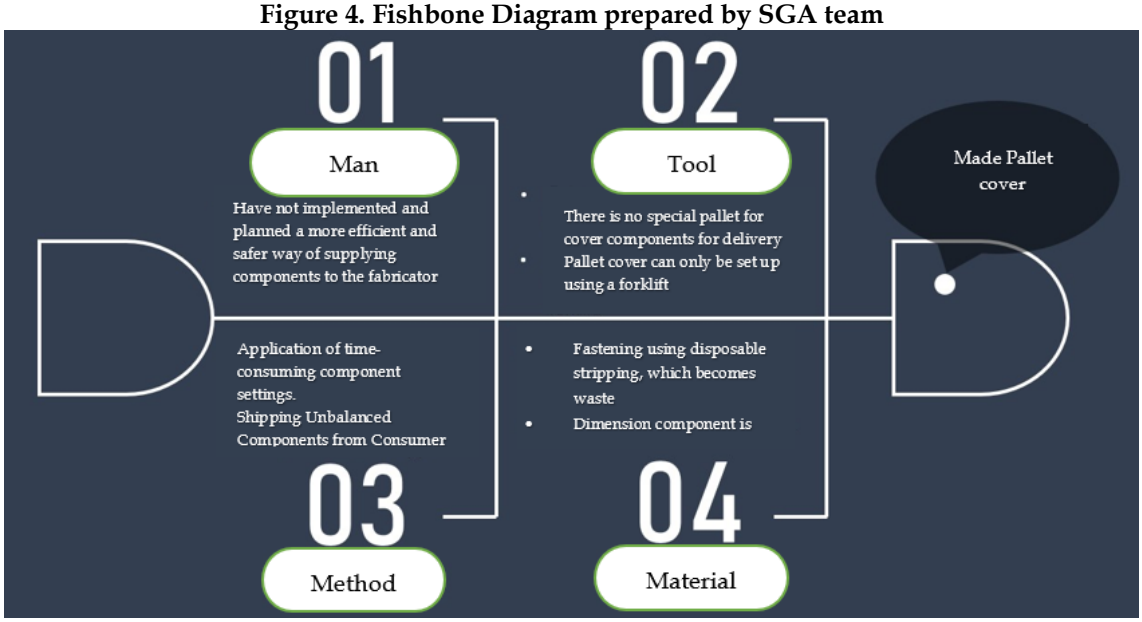
Environment

Accumulation of residual waste from the straping plate after the setting process.

Problem Analyisis

The following is a fishbone diagram to identify the reasons for the need to manufacture Pallet Cover (fig.4)

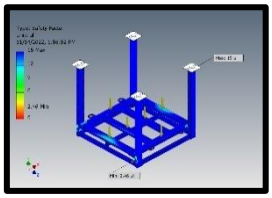
Figure 4. Fishbone Diagram prepared by SGA team



Production of Pallet Cover

Table 1. Improvement activity

No.	Description	Documentation	
1.	Tool Design		
	a. Tool design b. Material purchase	**a**	**b**



2.	Production process			
	a. *Cutting / Modification* b. *Welding* c. *Finishing*	**a** 	**b** 	**c** 

Cost of Making Pallet Cover

Tabel 2. Table making Pallet cost

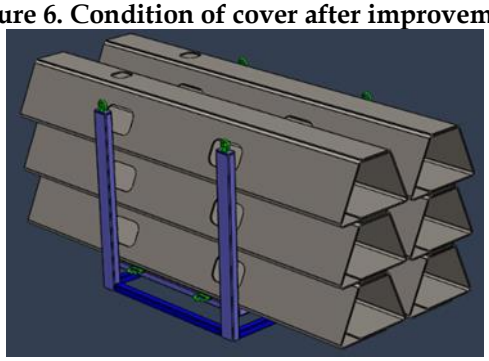
Pallet cost				
Material Cost				
No.	Material	Qty /size	Price (m/pcs)	Price
1.	100x50mm Hollow Square Beam 5mm	7m	Rp.35.668	Rp.249.678,00
2.	100x50mm Hollow Square Beam 3mm	3,4m	Rp.21.780	Rp.74.052,00
3.	50x50mm Hollow Square Beam 3mm	5m	Rp.12.348	Rp.61.743,00
4.	Hook Lifting Eye (Scrap)	4pcs	Rp.1221	Rp.4.844,00
5.	Turn Buckle M16	2pcs	Rp.57000	Rp.114.000,00
	Total			Rp.504.317,00
	*Inhouse Scrap Material/Kg : Rp.3.300			
Manufacturing cost & labor cost				
No.	Process		Time (hour)	Price
1.	Cutting Material		0,5	Rp.145.743,00
2.	Tackweld, Welding, Finishing Part		2	Rp.582.972,00
	Total			Rp.728.715,00
	Grand Total cost/pallet			Rp.1.233.032,00
*Basic Ratio/Hour : 18,57 US$: Rp. 291.486,72				

Figure 5. Design pallet prepared by SGA Team

Condition after improvement

The condition where after using the new pallet cover resulted in some benefits such as the cover components that come from the supplier are already in units (L/R) so it no longer requires a setting process, components that come from suppliers can be stored directly or routed straight to production, loading components from suppliers can be more optimal because it does not take up much space, the supply process can use a crane. The placement of components in the production area is easier and safer.

Figure 6. Condition of cover after improvement



Cost Data Analysis Before Repair

It can be observed that the daily average arrival of Cover components during the months of November to December is 8 – 9 units. Below is a table 3. analysing the cost of setting up the cover components using the old method prior to implementing pallet covers (table

Table 3. Setting Component cost with old method

Cost analysis *Setting* old method

Setting Component cost (per *pallet* = 6 *unit*)		
Process / Activity	Time (hour)	*Overhead Cost*
Setup component	0,40	Rp. 116,594,69
Total		Rp. 116,594,69
**Basic Ratio/Hour : 18,57 US$*		Rp. 291,486,72
**Cost Setting / unit*		Rp. 116.594,69 / 6

Cost *Setting* component / month (Nov – Mar)

Tipe	Nov	Des	Jan
SF 200STD	30	72	61
SF 200F	144	144	150
Total *unit PO*	174	216	211
Overhead Cost	Rp.3.381.245,95	Rp.4.197.408,77	Rp.4.100.246,53

Tipe	Feb	Mar	
SF 200STD	0	104	
SF 200F	192	120	
Total *unit PO*	192	224	
Overhead Cost	Rp.3.731.030,02	Rp.4.352.868,35	
Total *Setting* Nov-Mar 2023			Rp. 19.762.799,62

From the table above it can be seen that setting up the SF200 cover components takes 40 minutes per pallet and costs Rp. 116,594.69. The total accumulation of component setting costs for the period November to December is Rp. 19,762,799.62.

Diesel Usage Forklift/Hour

Table 4. Diesel usage

Diesel usage / Liter	Day	1 workday / hour	Total 4 day (hour)	hour / Liter
60	4	10.5	42	1.4

*Price of Solar Rp. 18.739/Liter

The complete cost of setting up components for the period November to March 2023 is GBP 19,762,799.62. The total cost of producing/palletizing is Rp 1,233,032.00. The overall cost of the above-mentioned expenses is Rp 20,995,831.62.

Table 5. Accumulation of the total cost

Remark	Nov	Des	Jan	Feb	Mar
Total unit PO	174	216	211	192	224
Overhead *Cost*	Rp.3.381.245	Rp.4.197.408	Rp.4.100.246	Rp.3.731.030	Rp.4.352.868
Total Price Using Solar	Rp.310.532	Rp.385.488	Rp.376.564	Rp.342.656	Rp.399.765
Rental cost *Forklift*	Rp.420.861	Rp.498.701	Rp.487.157	Rp.464.399	Rp.517.171
Total/ Month	Rp.4.112.636	Rp.5.081.598	Rp.4.963.968	Rp.4.538.085	Rp.5.269.805
Accumulation *Cost*	Rp.4.112.639	Rp.9.194.237	Rp.14.158.206	Rp.18.696,291	Rp.23.966.096

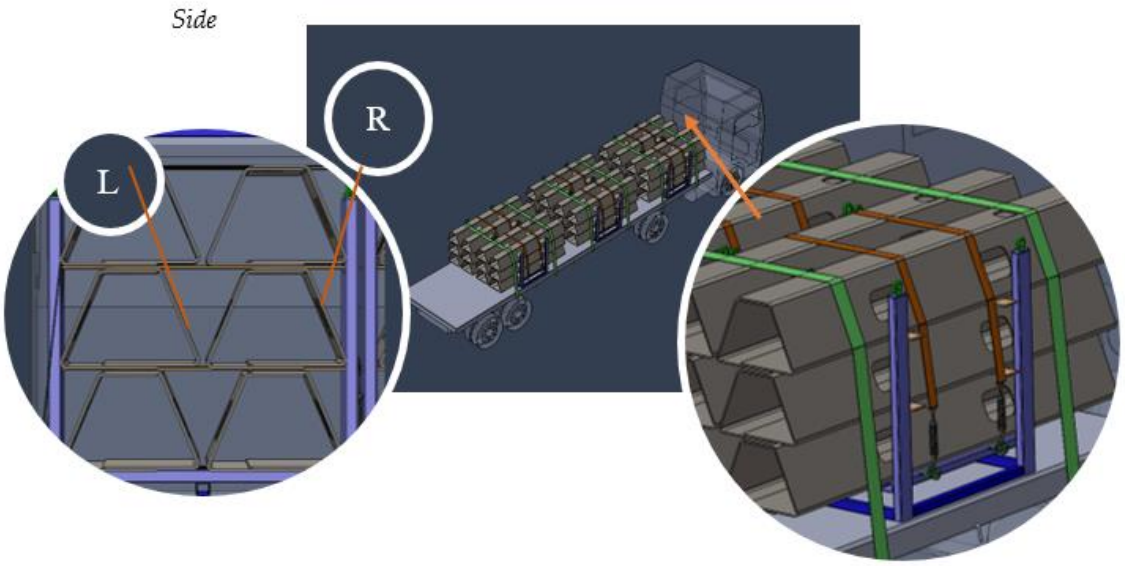
According to the table above, the total cost of setting up the cover components from November to March 2023 amounts to Rp 23,966,096.69. Return on Investment (ROI) By optimizing the production of 16 units of SF200 pallet covers (considering current demand), the cost is calculated as follows:

Price = Unit cost of pallets produced x cost of pallet production = 16 x Rp 6,670.09 = Rp 106,721.44.

Therefore, the investment will be recovered after 5 months without making any adjustments to the cover components. In the sixth month and beyond, when using a new pallet, the total setup cost will be completely eliminated.

Standardization in this context refers to the creation of clear and documented procedures and work instructions for executing tasks consistently.

Figure 7. Packing & Delivery new system



The latest Packing & Delivery process employs pallet covers in order to eliminate the component cover settings process and reduce strapping plate waste. Two ratchet straps connected to a turnbuckle have replaced the strapping plates as the fastening mechanism for the component cover itself.

As the final stage of standardization, several steps are required Creating a One Point Sheet as a requirement for the packaging component cover process at the supplier. Communicating information to the supplier. After the agreement between PT.

As the final stage of standardization, several steps are required Creating a One Point Sheet as a requirement for the SF200 packaging component cover process at the supplier.

CONCLUSION

SGA is a valuable tool for companies seeking to resolve problems, as it fosters employee commitment and enhances the company culture. Additionally, time management is essential for the effective execution of the SGA.The elimination of non-value added (NVA) activities in the cover component setting process. The company has saved Rp. 116,594.69 for every 6 covers without the need for the cover setting process. The cost of manufacturing a new pallet cover for a quantity of 16 units will be covered once the setting process is eliminated after 5 months. Components received from suppliers can either be stored or directly allocated to production. Loading components from suppliers maximizes efficiency as it takes up minimal space. Additionally, there will no longer be a build-up of waste from strapping plates after the setting process. The use of pallet covers should be maximized to ensure the cost of manufacturing is covered. If the use of pallet covers is deemed insufficient due to high demand from customers, a request for increased pallet cover production should be submitted to the Engineering Project department.

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