



Analysis Of Product Quality Control To Minimize Defects In Cosmetic Bar Soap Products Using Failure Mode And Effect Analysis (Fmea) And Root Cause Analysis (RCA) Methods At PT. Adev Natural Indonesia

Ari Said¹⁾, Tira Maulidya Saputri²⁾, and Tri Risiko Iswata³⁾, Sugiyanto⁴⁾

¹⁻³⁾Magister Management Pamulang University, Indonesia

E-mail: ^{a)}arisaid20@gmail.com, ^{b)}tiramaulidyas@gmail.com, ^{c)}tririskoiswata@gmail.com, ^{d)}dosen0045@unpam.ac.id

Abstract

Competition between the market for personal care soap and cosmetics products is increasingly competitive. This is proven by the many types of cosmetics produced in the country and abroad that are circulating in the market. Increasing productivity can be done using several research methods including Failure Mode and Effect Analysis (FMEA) and Root Cause Analysis (RCA). The production target is the limit of the company's provisions regarding a production result based on plans that have been determined by the company. PT Adev Natural Indonesia is a company engaged in the manufacturing of cosmetic soaps, such as bar/liquid soap, cream, lotion, toner and other products. To meet consumer satisfaction, this company always tries to be able to produce products according to the number of requests. However, the company pays little attention to production activities which can cause production results to not meet targets. The purpose of this research is to propose the implementation of quality control for cosmetic bar soap products to minimize the presence of defective products so as to improve product quality.

Keywords: Defects, Failure Mode and Effect Analysis (FMEA), Root Cause Analysis (RCA)

INTRODUCTION

Competition between the personal care soap and cosmetic product markets is increasingly competitive. This is proven by the many types of domestic and foreign production cosmetics circulating on the market. The flood of cosmetic products on the market influences a person's interest in purchasing and has an impact on the purchasing decision process. Purchasing a cosmetic product is no longer just to fulfill a desire, but because cosmetics are a need.

From production data carried out during the last 6 month period (December 2021 – May 2022), the company inspected 28,607 bar soap products and 6,553 of them were defective items. Defective products from bar soap are very detrimental to companies both in terms of costs, time and resources. The company's steps so far in overcoming this problem and minimizing losses are by selling some of the defective products to collectors or rebasing them and then disposing of them as waste.

One of the activities to improve quality so that it meets predetermined standards is by implementing an appropriate quality control system, having clear goals and stages, and providing innovation in preventing and resolving problems faced by the company (Gasperz, 2017). This activity can help companies maintain and improve the quality of their products to reduce the level of product defects to the lowest or zero level (zero defects) and also make continuous improvements so as to reduce waste in terms of materials and labor that can be produced. ultimately increasing productivity by reducing defective products

No	Month	Number of Products (Pcs)	Product inspected (Pcs)	Jenis defect (Pcs)					Totally defective product (Pcs)
				Not Precise	Shading	Faded Colors	Hollow	Less fragrance	
1	Des-21	1.274.258	5.382	673	115	481	97	28	1.394
2	Jan-22	1.325.281	5.117	513	87	372	72	22	1.066
3	Feb-22	609.007	2.960	178	92	129	41	17	457
4	Mar-22	509.611	5.808	587	135	396	102	21	1.241
5	Apr-22	530.638	4.802	507	213	369	107	26	1.222
6	Mei-22	561.786	4.538	521	218	304	116	14	1.173
Total		4.810.581	28.607	2.979	860	2.051	535	128	6.553
Persentase (%) Defect				45%	13%	31%	8%	2%	100%

Tabel 1 data produksi PT.Adev Natural Indonesia

(source : Reseach Processing, 2022)

In the table above it can be seen that the production results have a very high number of processes. This can result in defects in many production results, so it is necessary to minimize defects to be more efficient.

Many early adult individuals experience anxiety in choosing their life partner because they choose their life partner based on how they evaluate themselves. Self-esteem plays an important role in anxiety in choosing a life partner in early adulthood because basically choosing a life partner is not that easy, there are many considerations for an early adult when choosing a life partner, and self-esteem is one of the influencing factors.

METHODS

The definition of a production process is defined as an activity carried out by a person or entity to produce a result in the form of goods and services. Production activities are part of the company's organizational function which is responsible for processing raw materials into products that can be sold. The production process is a way, method and technique for creating or increasing the usefulness of a good or service using existing resources (labor, machines, materials and funds). Every company must realize the need to continuously improve quality, change and develop its core business by utilizing quality management as a supporting force for competitive advantage.

Quality is the totality of characteristics of a product that support its ability to satisfy specified or implemented needs. Quality can also be interpreted as the level or measure of product conformity with established standards. So, good quality will result from good processes and in accordance with quality standards that have been determined based on market needs.

DATA COLLECTION

There are two types of data collected, namely primary data and secondary data, which are divided as follows :

1. Primary data, which comes from observations of the company,
2. Secondary data, which consists of work station data along with work process times and previous research references.

DATA PROCESING

Data processing is carried out using failure mode and effect analysis (Fmea) and root cause analysis (Rca), in this way :

1. Assess cycle time
The purpose of failure mode and effect analysis (Fmea) and root cause analysis (Rca) is to find the causes of production defect problems.
2. Collect process data
To implement failure mode and effect analysis (Fmea) and root cause analysis (Rca) efficiently, it is necessary to determine how long the operator and machine spend on each part of a process.
3. Identify product defects.
With a comprehensive data collection, you can easily identify defects during the production process and results.
4. Optimize process order and reassign resources
By identifying defects during the production process, and having carried out the basis for process optimization. Now it is time to rearrange the process sequence to balance the available raw materials and to eliminate defects.
5. Sync manual activities
Share the workload among operators by distributing activities in the most efficient way.
6. Assign tasks automatically based on availability
In environments where many employees perform standard tasks, you can use digital tools to assign those tasks automatically.
7. Set up a quality support system.
Allow operators to submit support requests if defects occur during the production process or tasks that do not comply with standard procedures.

RESULT AND DISCUSSION

In general, it consists of several types of bar soap variants produced at PT Aldev Natural Indonesia, but what differentiates the Variant soap types is that they are legal and legal according to consumer demand. PT Aldev Natural Indonesia also produces other products such as lotion, liquid soap, toner and other cosmetic products. However, this research was proven valid for the production of cosmetic balm cream products because cosmetic balm products are the most natural products in production. The following is an overview of the production of bar soap products for the period December 2021 – May 2022, explained in **Table 2** below:

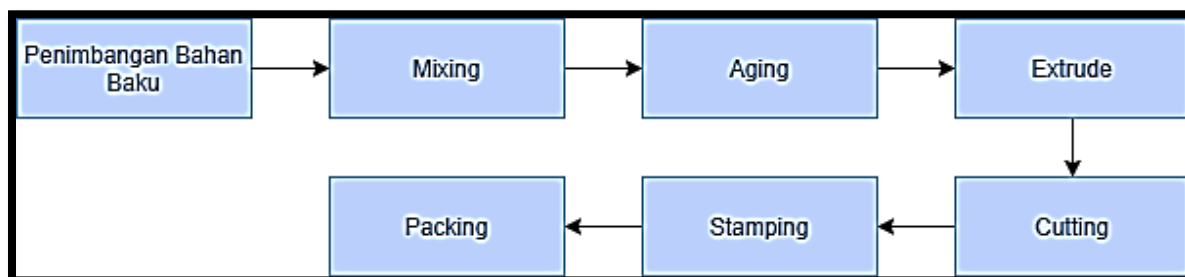
Table 2 Production Data Des 21- Mei 22 Pada PT. Adev Natural Indonesia

No	Month	Amount	
		Kg	Pcs
1	Des-21	117478,99	1.274.258
2	Jan-22	117529,54	1.325.281
3	Feb -22	56582,39	609.007
4	Mar -22	45105,18	509.611

5	Apr -22	42917,46	530.638
6	Mei-22	51884,58	561.786
Total		431.498,14	4.810.581

Source : Data Div. Production PT Adev Natural Indonesia

Then the data above is produced through several production processes at PT Adev Natural Indonesia explained in **Figure 1** below:



Source: Data PT. Adev Natural Indonesia, 2022

Figure 1 Production Process Flow

In the picture above, it can be seen that the following is an explanation of how picture recognizes the production process of PT Adev Natural Indonesia:

1. Weighing raw materials. The first stage in the production process at PT Adev Natural Indonesia is carrying out the weighing process of the raw materials to be used. Raw materials are weighed according to the production needs to be carried out or adjusted based on orders.
2. Mixing, The next stage is the mixing process. This is a process where the ingredients that have been weighed are put into the machine for a mixing process so that the ingredients are mixed evenly.
3. Aging, Proses Aging is the process of cooling raw materials that have gone through the mixing process. The raw materials that have undergone the mixing process are poured into molds/containers and then placed in the Aging room for approximately 5-6 hours so that they become solid with an ideal temperature of 7-10 °C
4. Extrude, Process The next step is to remove the soap from the mold/container. The production process for making soap from molds uses an extruder machine.
5. Cutting, The soap that has been removed from the mold then goes through a cutting process to be cut into pieces. In this process, Quality Control is also carried out to identify defective products.
6. Stamping, The cut soap is then sent to the Stamping yard for the process of forming the soap surface according to consumer requests. In this process, the surface of the soap is also cleaned from soap residue that sticks to the cutting process.
7. Packing, The soap is then packaged before being sent to the consumer.

EVALUASION AND RESULT

Based on calculations that have been carried out on production results in the imprecise and cloudy defect categories, as well as suggestions for data processing using fmea and rca, the results obtained are as in **Table 3** below:

Table 3 Recalculation of FMEA categories is not precise

No	Process Components	Consequences of Failure	S	O	D	RPN
1	Material	Soap form is not Perfect	8	5	6	240
2	Working Method	Soap form is not	8	6	3	144

No	Process Components	Consequences of Failure	S	O	D	RPN
		Perfect				
3	Machine	Soap form is not Perfect	8	6	6	288

(Source: research processing, 2022)

From the table above it can be seen that in Can the highest failure rate occurs in machines that use imprecise rubber shapes and operators who work frequently and are not reliable with an RPN value of 288, in the way it works the failure occurs in the Dalpalt section. cutting process with RPN value 144, at the Balhal factory. . n my bald darling Used if not mixed perfectly with an RPN value of 240.

Table 4 FMEA recap of cloudy/faded color category

No	Process Components	Consequences of Failure	S	O	D	RPN
1	Machine	Soap color not perfect	6	6	3	240
2	Working Method	Soap color not perfect	6	5	7	210
3	Operator	Soap color not perfect	6	6	4	144

(Source: research processing, 2022)

In **Table 4** it can be seen from the highest failure rate that occurred on the machine, the most annoying setting error was, the powder was not perfect with an RPN value of 240, and for the second place an error occurred, the method of workmanship was not always perfect, the way to separate foam from liquid soap with a value RPN 210, while the material for the ink quality is poor with an RPN value of 168, an error occurred in the work method due to the absence of a standard standard for measuring ink with an RPN value of 128.

CONCLUSION

Based on the results of FMEA analysis research at 5W+1H regarding non-precision defect types, the highest RPN value is for non-precision defects with an RPN value of 288. Meanwhile for cloudy/faded color defects the RPN value is the highest with an RPN value of 240.

Factors causing inaccurate defects and cloudy/faded colors which cause the highest defect levels include the following:

1. The No Precision defect is caused by the machine's in temperature setting changing to an RPN value of 288
2. Cloudy/faded color defects caused by changing the engine temperature setting with an RPN value of 240

Improvement of method factors for imprecise defects and cloudy/faded colors aims to reduce product defects caused by method factors. The reason for this reversal is so that there is a method for pouring the liquid soap and also a method for separating the liquid from the excess foam resulting from the mixing process. Improvements are also made by increasing supervision and understanding of operators. Supervision is carried out to avoid errors in working with operators, while increasing understanding is carried out so that operators also know the criteria for defects and things that can result in defects so that later defective products can be minimized. The improvement plan for this method factor is the

responsibility of the Production Division related to methods and Quality Development related to understanding the operator's defect criteria.

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