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Determining Alternative Mechanical Quality of Aluminum for Making Ordered Equipment Using the *Multifactor Evaluation Process* (MFEP) Method

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Abstract

Many various types of industrial companies use aluminum to support their industrial productivity. One of the reasons companies use this aluminum material is because aluminum is a good electrical conductor, light and strong. In determining which aluminum metal is suitable to be used to make ordering equipment, of course the metal with the best quality must be chosen so that the production of aluminum equipment is in demand by many consumers. Multi Factor Evaluation Process (MFEP) method, all criteria which are important factors in making considerations are given weighting. (weighting) is appropriate. Decision making using the Multi Factor Evaluation Process method is carried out subjectively by considering several factors that influence alternatives. While selecting metal, SMEs still record manually, so it takes quite a long time to make decisions. Not only that, determining the quality of aluminum metal also involves visual observations just by looking at the durability and assessing the physical metal. To overcome the problems faced by the old system. then a new system was formed, where the selection process could be carried out by Toko Berkah Qory Siregar Aluminum without waiting a long time . The results obtained based on calculations are Aluminum A, namely Blue Sky Aluminum with a preference value of 100.

Keywords: Aluminum, Multi Factor Evaluation Process, Industry, Metals, Decision Making

1. Introduction

Qory Berkah Siregar is a small and medium enterprise which is engaged in the production of aluminum metal into finished goods, namely custom made items which are usually used as household equipment. In determining which aluminum metal is suitable to be used to make custom made equipment, of course the metal with the best quality must be chosen, During the selection of metal, SMEs still record manually, make visual observations by looking at the durability and assessing the physical metal. Of course this process is not effective and efficient. In order to be able to choose the best aluminum metal to use as ordering equipment, here the author will create a decision support system. (SPK), which functions to help the public make decisions and determine the appropriate aluminum metal. This decision support system is made based on criteria that have been determined by Qory Berkah Siregar to determine the type of aluminum metal. With these criteria in place, the author uses the MFEP (Multifactor Evaluation Process) method in the decision support system. Based on this description, it can be explained that:

Decision support systems (DSS) are interactive computer-based systems, which help decision makers utilize data and models to solve unstructured and semi-structured problems [1].

A system is a collection of interrelated elements that process input to produce output [2]. Meanwhile, information is the processing of data that is interpreted and classified which is used in the process of making decisions [3]. Information has quality which depends on 3 (three) things, namely: information must be accurate (accurate), timely (timelines), and relevant (relevance) [4]. From this description it can be concluded that an information system is a unity of interconnected components of people, hardware, software, communication networks and data resources that can collect, transform and disseminate this information within an organization [5].

DSS is a model-based system that consists of procedures for processing data and considerations to assist managers in making decisions [6].

The Multi Factor Evaluation Process (MFEP) method is a quantitative method that uses a weighting system in decision making [7]. The Multi Factor Evaluation Process (MFEP) method means that all criteria which are important factors in making considerations are given appropriate weighting, likewise each alternative will be given a score against the important factors that exist, then an evaluation of each alternative will be carried out in relation to these factors. these consideration factors.

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design tools are devices used to create information displays that describe information related to the framework. One of these system design tools is UML (Unified Modeling Language) [8]. UML consists of various kinds of diagrams which are categorized into 3 diagrams, namely: structure diagrams , behavior diagrams, interaction diagrams [9], [10]. UML helps software architects in getting the "big picture" of a system by providing a balance between natural language (which is too imprecise) and code (which is too detailed) [11].

A website is a document written in hype text markup language (HTML) which can be accessed via the hype text transfer protocol (HTTP) protocol which is a protocol for conveying information from a central website [12] .

PHP is a server-side language specifically designed for web applications. PHP can be inserted between the HTML language and because it is a server side language, the PIP language will be executed on the server, so that what is sent to the browser is the "finished result" in HTML form, and your PHP code will not be visible [2]. PHP is a programming language that popular to the point that imi beat several other programming languages, including ASP.NET [13].

MySQL, which stands for My Structured Query Language, is a database server program that is capable of receiving and sending data very quickly and with multiple users [14].

From the description above, it can be seen that this research was carried out because to overcome the selection of aluminum metal which was done manually and required quite a long time by creating an application system that included SPK, PHP, MySQL and so on. So the researchers raised the theme, namely determining alternative mechanical qualities of aluminum for making custom equipment using the Multifactor Evaluation Process (MFEP) method.

2. Research methodology

In preparing research, it is necessary to have a framework with clear stages , this framework is used to solve a problem that is being discussed by the researcher, the framework is in Figure 1.

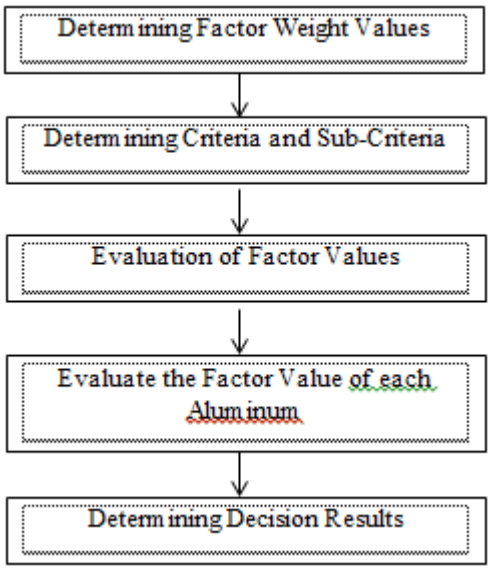

Figure 1. Research Framework

The calculation process using the MFEP method is: Determining factors and factor weights where the total weighting must be equal to 1 (Σ weighting = 1), namely factor weight. Fill in a value for each factor that influences decision making from the data to be processed . The value entered in the decision making process is an objective value, which is definitely an evaluation factor whose value is between 0 -1. The weight evaluation calculation process is the process of calculating the weight between the weight factor and the evaluation factor by adding up all the results of the weight evaluations to obtain the total evaluation results.

Calculation of evaluation weight values:

$$Nbe = Nbf \; x \; Nef$$

Information :
Nbe = Evaluation Weight Value
Nef = Factor Evaluation Value
Nbf = Factor Weight Value

Calculation of the total evaluation value

$$Tne = Nbe1 + Nbe2 + Nbe3$$

Information :
Tnb = Total evaluation value
Nbe = Evaluation weight value

3. Results and Discussion

3.1 System analysis

is an activity to look at the system that is already running, see which parts are quality and which are not quality, and then document the needs that will be met in the new system. The analysis and design processes

often go together, so during analysis activities, design activities are also carried out. System analysis is carried out with the aim of finding out problems that occur in the decision making system, as a basis for developing the system from data that has been obtained from the theory that has been studied.

3.2 MFEP Method Calculation

1. Factor Weight Value

The weight values for each assessment factor are as follows:

Table 1. Factor Weight Value

Factor	**Factor Weights**	***Weight***
Aluminum Price	30%	00.30
Aluminum Thickness	30%	00.30
Work Process	20%	00.20
Color Attraction	20%	00.20

2. Sub Criteria

The Sub Criteria values are as follows:

Table 2 . Sub Criteria

Criteria	**SubCriteria**	**SubCriteria Value**
Aluminum Price	Cheap	100
	Normal	75
	Expensive	50
Aluminum Thickness	Thick	100
	Enough	75
	Thin	50
Work Process	Easy	100
	Difficult	50
Color Attraction	Interesting	100
	Enough	75
	Not enough	50
	Cheap	100

3. Evaluation of Factor Values

The Factor Value Evaluation is as follows:

Table 3 . Evaluation of Factor Values

Factor	**Aluminum A**	**Aluminum B**	**Aluminum C**	**Aluminum D**
Aluminum price	100	75	75	100
Aluminum Thickness	100	75	75	75
Work Process	100	100	100	100
Determine Color Attraction	100	100	100	75

4. Evaluation for Aluminum A (Blue Sky)

The evaluation for Aluminum A is as follows:

Table 4 . Evaluation for Aluminum A (Blue Sky)

Factor	**Factor Weights**		**Factor Evaluation**	**Evaluation Weight**
Aluminum price	00.30	X	100	30
Aluminum Thickness	00.30	X	100	30
Work Process	00.20	X	100	20
Color Attraction	00.20	X	100	20
Total	**1**			**100**

5. Evaluation for Aluminum B (Dekon)

The evaluation for Aluminum B is as follows:

Table 5 . Evaluation For Aluminum B (Decon)

Factor	**Factor Weights**		**Factor Evaluation**	**Evaluation Weight**
Aluminum price	00.30	X	75	22.05
Aluminum Thickness	00.30	X	75	22.05
Work Process	00.20	X	100	20
Color Attraction	00.20	X	100	20
Total	**1**	X		**85**

6. Evaluation for Aluminum C (Alexindo)

The evaluation for Aluminum C is as follows:

Table 6 . Evaluation for Aluminum C (Alexindo)

Factor	**Factor Weights**		**Factor Evaluation**	**Evaluation Weight**
Aluminum price	00.30	X	75	22.05
Aluminum Thickness	00.30	X	75	22.05
Work Process	00.20	X	100	20
Color Attraction	00.20	X	100	20
Total	**1**			**85**

7. Evaluation for Aluminum D (Ykk)

The evaluation for Aluminum D is as follows:

Table 7 . Evaluation For Aluminum D (Ykk)

Factor	**Factor Weights**		**Factor Evaluation**	**Evaluation Weight**
Aluminum price	00.30	X	100	30
Aluminum Thickness	00.30	X	75	22.05
Work Process	00.20	X	100	20
Color Attraction	00.20	X	75	15
Total	**1**			87.5

8. Decision

The Decision Results are as follows:

Table 8 . Decision

Alternative name	Average MFEP	Rank
Aluminum A	100	1
Aluminum B	85	3
Aluminum C	85	4
Aluminum D	87.5	2

9. Conclusion

It can be concluded that the results of the highest quality alternative aluminum based on the questionnaire results data are **Aluminum A** , namely **Aluminum Blue Sky** with a preference value of **100.**

3.3 System Implementation

System implementation is a system that is ready to be used by the user. Before implementing the system, it is tested first, testing is carried out with the aim of finding out whether the system is running correctly and well. The following is the implementation of the system in the application for Determining Aluminum Alternatives at the Qory Berkah Siregar Store:

1. Login Page

The following is the appearance of the Login Page on the Aluminum application:

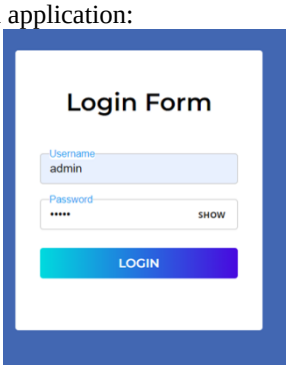

Figure 2 . Login Page

2. Criteria Data Input Page

The following is the display of the Criteria Data Input in the Aluminum application:

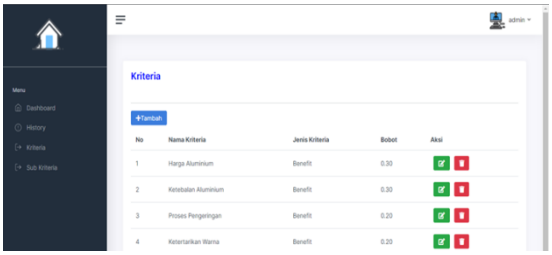

Figure 3 . Data Input Page

3. Sub Criteria Admin Page

The following is the Admin Sub Criteria display in the Aluminum application:

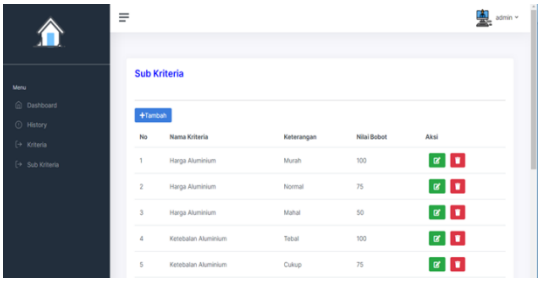

Figure 4 . Sub Criteria Admin Page

4. MFEP Process Admin Page

The following is the MFEP Process Admin view on Aluminum applications

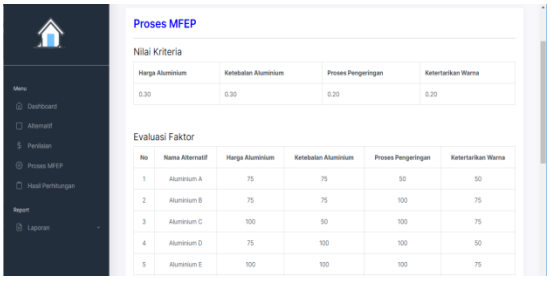

Figure 5 . MFEP Process Admin Page

5. Admin Page Manages Decision Results

The following is the Admin display for Managing Decision Results in the Aluminum application:

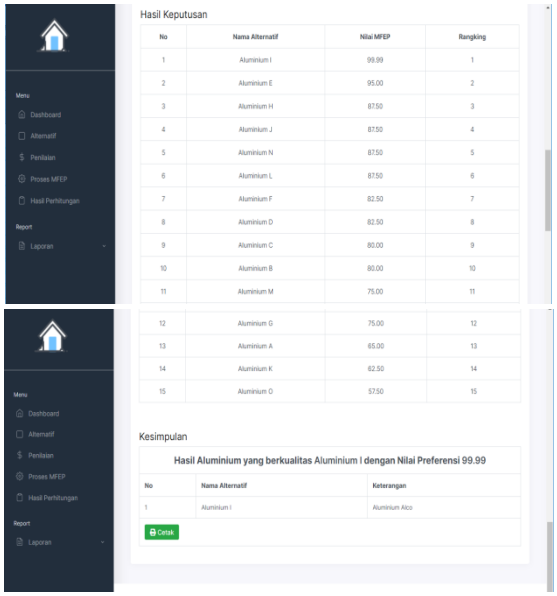

Figure 6 . Admin Page Manages Decision Results

6. Decision Result Report

The following is the appearance of the Decision Result Report on the Aluminum application:

Figure 7. Decision Result Report

4. Conclusion

After the existence of a decision support system for selecting aluminum alternatives using the Multifactor Evaluation Process (MFEP) method, this has helped the company in speeding up the process of making the right decision at the Qory Berkah Siregar Store. It is hoped that for further research, more varied input will be added to the application such as biodata input so that The output provided becomes more complex and it is hoped that the results of system testing at the Qory Berkah Siregar Shop can be more effective and efficient.

References

[1] Aminudin, N., & Sari, IAP (2017). Decision Support System (Dss) for Beneficiaries of the Family Hope Program (Pkh) in Bangun Rejo Village, Kec. Punduh Pesawaran's Speech Using the Analytical Hierarchy Process (AHP) Method. TAM (Technology Acceptance Model) Journal, 5, 66-72. https://doi.org/ 10.56327/jurnaltam.v5i0.50

[2] Nisa, K., Wulandari, A., & Rahayu, R.L. (2020). The influence of income inequality on poverty in the Bangka Belitung Islands Province in 2009-2018. SPOTLIGHT, 15(1), 55-63. http://dx.doi.org/10.31258/sorot.15.1.55-63

[3] Purwanto, SA, Sumartono, S., & Makmur, M. (2013). Implementation of the Family Hope Program (PKH) Policy in Breaking the Chain of Poverty (Study in Mojosari District, Mojokerto Regency). Discourse Journal of Social and Humanity Studies, 16(2), 79-96.

[4] Jibran, RI (2023). Village Government Efforts to Overcome Poverty in Batuah Village. Nomos: Legal Research Journal, 3(2), 42-51. https://doi.org/10.56393/nomos.v1i9.913

[5] Elwan, M., & Ode, L. (2018). Implementation of the Family Hope Program (PKH) in Binongko District, Wakatobi Regency. Publicuho Journal, 1(2), 1-17.

[6] Hidayatulloh, AN (2019). Improving the Quality of Life of Beneficiary Families in the Study of the Family Hope Program: Empirical Review of the Impact of Welfare and Quality of Life of Beneficiaries. Social Welfare Research Information Media, 43(2), 97-116. https://doi.org/10.31105/mipks.v43i2.2142

[7] Hoerunni'mati, S. (2020). COMMUNITY EMPOWERMENT THROUGH THE FAMILY HOPE PROGRAM (PKH) IN IMPROVING THE ECONOMY (Case Study in Karangnangka Village, Kedungbanteng District, Banyumas Regency) (Doctoral dissertation, IAIN Purwokerto).

[8] Ruskan, EL, Ibrahim, A., & Hartini, DC (2013). Decision Support System for Hotel Selection in Palembang City Using the Simple Additive Weighting (SAW) Method. JSI: Journal of Information Systems (E-Journal), 5(1). https://doi.org/10.36706/jsi.v5i1.874

[9] Safitri, K., Waruwu, FT, & Mesran, M. (2017). Decision support system for selecting outstanding employees using the analytical hierarchy process method (case study: Pt. Capella Dynamic Nusantara Takengon). Budidarma Media Informatics Journal, 1(1). http://dx.doi.org/10.30865/mib.v1i1.317

[10] Mufid, R. (2017). Selection Decision Support System for Head Election of Perum Damri Surabaya. IT Literacy: Information Technology Journal, 3(2), 35-40. https://doi.org/10.30742/melekitjournal.v3i2.98

[11] Priyanto, FS, Harijanto, B., & Watequlis, Y. (2017). Decision Support System for Selecting Outstanding Teachers Using the Promethee Method (Case Study: Malang City Education Office). Polinema Informatics Journal, 3(4), 23-23. https://doi.org/10.33795/jip.v3i4.39

[12] Anjasmaya, R., & Andayani, S. (2018). Decision Support System for Determining Vegetable Commodities Based on Land Characteristics Using the PROMETHEE Method. JUITA: Journal of Informatics, 6(2), 127-135. . https://doi.org/10.30595/juita.v6i2.3505

[13] Safrizal, S., & Tanti, L. (2015, October). Application of the Promethee Method in Selection of New Students (Airlines Staff) at LPP Aviation. In National Conference on Systems and Informatics 2015. STMIK STIKOM Bali.

[14] Mohani, CS, & Ristian, U. (2020). IMPLEMENTATION OF THE PROMETHEE METHOD IN DETERMINING PROSPECTIVE RECIPIENTS OF WEB-BASED PKH AID (CASE STUDY: TENGGULI VILLAGE, SAJAD DISTRICT). Journal of Computer Coding and Applications, 8(2). http://dx.doi.org/10.26418/coding.v8i2.41496