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APPLYING THE WEIGHTED PRODUCT METHOD FOR THE BEST SELECTION OF PERSONAL QUALITY CONTROL IN PT. PACIFIC EQUINOX SURABAYA

[1]M. MAHAPUTRA HIDAYAT, [2]EKO PRASETYO, [3]SONA AHMAD SUSANTO

Informatics Engineering Study Program, Bhayangkara University, Surabaya

Jl. Ahmad Yani Surabaya

E-mail:mahaputra@ubhara.ac.id

ABSTRACT

The aim of this research is to design and implement a decision support system software for the selection of the best quality control at PT. Pacific Equinox Surabaya. The intent and purpose of this research is to study the process of selecting the best employees who have been working on a manual system into a computerized system and use the Weighted Product method as an algorithm to facilitate the process of selecting the best employees. This system also has the advantage of helping the management process data and values of PT. Pacific Equinox Surabaya employees. In addition, more efficient time efficiency and also helps in the process of making reports required by management.The results of this study are applications that can make it easier to analyze a number of data, in order to help provide information as a result of the best employee decision making. But this system also still has weaknesses in terms of facilities and program appearance so that it still needs improvement

Keywords : Decision Support System, SPK selection of quality control personnel The best.

1. INTRODUCTION

Pacific Equinox presents various global, regional and local brands in Southeast Asia that produce tubes, cosmetic packaging, and good management in carrying out its projects. Pacific Equinox always strives to provide health safety guarantees to 700 employees in running production for perfect results for their customers . As a form of appreciation to its employees, especially the quality control division of Pt. Pacific Equinox also gives special appreciation to employees who excel. To find out employees (quality control) who are performing still use the manual selection process and have not used the system. The process is still using input suggestions from people around who have worked for a long time. Therefore, a decision support system application is needed to help the process of selecting the best quality control personnel. Multi Attribute Decision Making (MADM) is a method used to find optimal alternatives from a number of optimal alternatives with certain criteria. There are several methods that can be used to solve MADM problems, including the Weighted Product (WP) method, which will be used by the author in completing the selection of the best employees using the method Weighted Product at Pt.Pacific Equinox.

1.1 Formulation of the problem

From the above background it can be concluded that the formulation of the problem is How to design a decision support system that can be used in selecting the best quality control personnel at Pt. Pacific Equinox Surabaya.

1.2 Scope of problem

The limitation problems in making this Final Project are:

a) The process is focused on the process of processing data supporting criteria for the selection of the best quality control personnel at Pt. Pacific Equinox Surabaya.
b) The system is only a tool for the Assessment Team in making decisions for qualified quality control personnel to be awarded as the best quality control personnel.
c) Variables that are taken into account in making decisions are Work Behavior / Morals include (Teamwork / team work, Diligent / diligent work, Obedience & carrying out supervisor's instructions, Initiative / willingness to work), Skills at Work include (Understanding of duties & responsibilities, Mastery in the field of work, work achievement towards targets / quality, work speed towards quality standards, Multi Skills), and Attendance / Attendance / Work Discipline include (Attendance, Late / early return, Not often leaving the workplace, Compliance with rules / regulations).
d) This application includes the selection of the best quality control personnel at Pt.pacific Equinox Surabaya, by taking 28 assessment samples from members of the quality control personnel submitted to personnel.
e) The method used is the Weight Product (WP) method.

The purpose of this research is:

a) The availability of an application for Decision Support System Selection of the best quality control personnel in Pt. Pacific Equinox Surabaya so that the Assessment Team can make decisions more quickly and accurately.
b) Testing the user to get an assessment of the application of the Relational Database Management System on aspects of the interface, usage, and application calculation results.
c) Assisting the Employment Agency of PT. Pacific Equinox Surabaya in making decisions on the selection of the best quality control personnel.

1.3 Research Methodology

The methodology used in writing this final project proposal uses waterfall software, which includes several processes including:

a) Analysis
At the analysis stage is the stage where the researcher analyzes the existing problems namely tube selection criteria based on the needs of the buyer and makes calculations.
b) The design
At the design stage is the stage where researchers design the initial appearance or interface of the application to be built. Interface display will be designed through data that has been obtained during the analysis phase.
c) Coding
At the coding stage that is translating applications into languages predetermined programming is the PHP programming language.
d) Test
It is a testing phase of a SPK application that has been made into a ready-to-use system with the aim of finding out whether the system has been made as expected.
e) Maintenance
At the maintenance stage is the stage where making corrections from various errors that were not found in the previous stages so that improvements are made, in order to produce a better system than before.

2. BASIC THEORY

a. Decision Support System

DSS is The system is a collection of interrelated elements that are responsible for processing input (input) so as to produce output (output). [4]. DSS is usually built to support a solution or a problem to evaluate an opportunity. SPK as it is called the SPK application. SPK application is used in decision making. The SPK application uses a flexible, interactive and adaptable CBIS (Computer Based Information System) that was developed to support solutions to specific unstructured management problems. Decision support system is a combination of individual intelligence sources with the ability of components to improve the quality of decisions. Decision support systems are also information systems for decision-making management that deal with semi-structural problems.

Based on the above understanding, information is obtained that the SPK is not a decision making tool, but rather a system that helps decision makers by equipping them with information from data that has been processed relevantly

and is needed to make decisions about an issue more quickly and accurately. So this system is not intended to replace decision making in the decision making process.

b. Selection of Quality Control

Election is a series of steps that are carried out to decide whether an employee is worthy / not worthy of receiving an award in a particular institution after undergoing a series of assessments carried out.

Quality Control isa Rule whose purposeguarantee the quality of the finished product. The role of Quality Control is verysupervision is needed in the implementation of a work, so that if deviations occur can be immediately known and can be corrected, so that it can run according to a predetermined plan. The company must always strive to obtain and assess the quality of quality control performance in the work so that the goods to be sent in accordance with predetermined standards.

c. Method Weighted Product

Weighted Product (WP) is one of the methods used to solve the Multi Attribute Decision Making (MADM) problem. The Weighted Product (WP) method uses multiplication to connect attribute values (criteria), where the value of each attribute (criterion) must be raised first with the corresponding attribute weight (criterion).

d. Weight Product Method Algorithm

The following are the steps in completing the calculation using the Weight Product method:

1. Rating score.
2. Attribute Weighting.
3. Calculation of Weight Product Method.

Weight Product calculations are shown using the formula below:

$$S_i = \Pi_{j=1}^{n} x_{ij}{}^{wj}$$

Information:

S_i : score from each alternative

X_{ij} : alternative value i to the attribute

j

W_j : the weight of each attribute

Where ∑ wj = 1 is a positive value for the profit attribute and a negative value for the cost attribute. For ranking / finding the best alternative is done with the following formula:

$$V_i = \frac{\Pi_{j=1}^{n} (X_{ij})^{W_j}}{\Pi_{j=1}^{n} (X_j *)^{W_j}}$$

The greatest value of Vi states that the alternative Ai was chosen.

3. SYSTEM ANALYSIS AND DESCISSION

The study was conducted at PT. Pacific Equinox which is located at Jl. Rungkut industri IV no 3 Surabaya. The process of selecting the best quality control using the Weight Product method using criteria, namely,Teamwork / team work, Diligent / diligent work, Obedient & carry out superior instructions, Initiative / willingness to work, Understanding of the duties & responsibilities, Mastery of the field of work, Achievement of work against targets / quality, Speed of work towards quality standards, Multi Skills , Attendance, Late / early leave Do not often leave the workplace, Obey the rules / regulations. Output in the form of the highest to lowest employee values obtained from the calculation of the profile matching method. The following is a calculation of the value of choosing the best Quality Control Personnel using the Weight Product method with several criteria that must be met by Quality Control.

The following is the Employee criteria table.

Table 3.1 Employee Criteria Table

Tabel 4.17 Nilai Altenatif

No	Nama	Nilai Alternatif												
		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13
1.	Nada Nafisah	3	3	3	2	3	2	3	3	4	3	3	3	3
2.	Mahmud santoso	3	3	4	4	4	4	2	3	3	3	4	2	3
3.	Betris wahluyo	3	4	2	2	4	3	3	2	3	3	3	2	4
4.	Choirul Huda	2	2	3	3	4	2	4	4	3	3	3	4	4
5.	Nanang yuli	3	3	3	3	2	2	3	4	3	4	3	2	1
6.	Ikhsan ahmad	3	4	4	3	3	4	2	3	1	3	4	4	2
7.	Yono gunardi	2	2	3	4	3	4	2	2	4	1	1	3	3
8.	Farid afandi	3	3	3	1	2	2	4	4	4	3	3	2	2
9.	triono munawar	3	4	4	4	1	3	4	4	1	3	2	2	2
10.	denny riski	4	2	2	2	4	3	3	3	4	4	4	1	1
11.	Agung ahmad	3	1	3	1	4	3	1	2	4	3	3	3	3
12.	Eko Ari	4	2	2	3	4	2	2	1	4	4	3	4	3
13.	imam Maliki	4	4	3	1	4	3	2	3	3	4	3	3	3
14.	Farida meiliana	2	3	2	4	2	3	3	3	4	1	3	3	2
15.	Sunarto	1	4	2	2	3	3	3	3	3	4	4	3	3
16.	Novi putri valenia	3	4	3	4	4	4	4	4	3	4	4	2	3
17.	iwan wahyu	3	4	4	4	1	3	4	4	1	3	2	2	2
18.	niken wahyu rosana	2	2	3	4	3	4	2	2	4	1	1	3	3
19.	riszki adi rahman	3	4	4	2	3	3	4	4	3	4	3	4	4
20.	Ikcwan yoga	4	2	2	3	4	2	2	1	4	4	3	4	3
21.	Yanuar	3	3	3	4	3	4	2	2	4	2	4	3	3
22.	tegar brahmanta	2	2	3	4	3	4	2	2	4	1	1	3	3
23.	muhammad ajiz	4	2	2	3	4	2	2	1	4	4	3	4	3
24.	arnold yoga	3	3	4	4	1	3	4	4	1	3	2	2	2
25.	Sulaiman	2	2	3	2	3	4	2	2	4	1	1	3	3
26.	rahmad basuki	4	2	3	3	4	2	2	1	4	4	3	4	3
27.	gunawan riyadi	2	2	3	4	3	4	2	2	4	1	1	3	3
28.	ani puji lestari	3	4	4	4	1	3	4	4	1	3	2	2	2

Information :

C1 = Teamwork / team work
C2 = Diligent / diligent work
C3 = Obey & carry out superior instructions
C4 = Initiative / willingness to work
C5 = Understanding of assignments &
its responsibilities
C6 = Mastery of the field of work
C7 = Job performance against targets /
quality
C8 = Working speed to standard
quality
C9 = Multi Skill
C10 = Presence
C11 = Late / early return
C12 = Do not leave the place often
work
C13 = Comply with rules / regulations

Table 3.2 Determination of the weight value

Tabel 4.15 Kriteria Penilaian Bobot

No.	Kriteria Penilaian	Bobot
1.	Kerja sama tim / team work	3
2.	Rajin / tekun bekerja	3
3.	Taat & melaksanakan instruksi atasan	3
4.	Inisiatif / kemauan bekerja	3
5.	Pemahaman terhadap tugas & tanggung jawabnya	6
6.	Penguasaan terhadap bidang kerjanya	6
7.	Pencapaian kerja terhadap target / kualitas	6
8.	Kecepatan kerja terhadap standart kualitas	6
9.	Multi Skill	6
10.	Kehadiran	1
11.	Keterlambatan / pulang awal	1
12.	Tidak sering meninggalkan tempat kerja	1
13.	Taat peraturan / tata tertib	1

Table 3.3 Determination of Weighting Normalization Value

Tabel 4.16 Nilai Kriteria Perbaikan Bobot

No.	Kriteria Penilaian	bobot	Perbaikan Bobot (W)
1.	Kerja sama tim / team work	3	0,065217
2.	Rajin / tekun bekerja	3	0,065217
3.	Taat & melaksanakan instruksi atasan	3	0,065217
4.	Inisiatif / kemauan bekerja	3	0,065217
5.	Pemahaman terhadap tugas & tanggung jawabnya	6	0,130434
6.	Penguasaan terhadap bidang kerjanya	6	0,130434
7.	Pencapaian kerja terhadap target / kualitas	6	0,130434
8.	Kecepatan kerja terhadap standart kualitas	6	0,130434
9.	Multi Skill	6	0,130434
10.	Kehadiran	1	0,02173
11.	Keterlambatan / pulang awal	1	0,02173
12.	Tidak sering meninggalkan tempat kerja	1	0,02173
13.	Taat peraturan / tata tertib	1	0,02173

In table 2 above is the weight value to be used and in table 3 above is the value of the weighting results from table 2 explained that the weighting normalization value is obtained from the weight value input so that it will produce a weight normalization value as in table 3.
Weight Normalization Calculation:

$$W_1 = \frac{3}{3+3+3+3+6+6+6+6+6+1+1+1+1} = \frac{3}{46} = 0{,}065217$$

$$W_2 = \frac{3}{3+3+3+3+6+6+6+6+6+1+1+1+1} = \frac{3}{46} = 0{,}065217$$

$$W_3 = \frac{3}{3+3+3+3+6+6+6+6+6+1+1+1+1} = \frac{3}{46} = 0{,}065217$$

Weighting Result Value = 1.

Table 3.4 Calculation of Employee Ranking

Tabel 3 Nilai Altenatif

No.	Nama	Nilai Alternatif											
		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13
1.	Mahmud santoso	3	3	4	4	4	4	2	3	3	3	4	2	3
2.	Betris wahluyo	3	4	2	2	4	3	3	2	3	3	3	2	4
3.	Choirul Huda	2	2	3	3	4	2	4	4	3	3	3	4	4

In this stage, data from alternative values will be multiplied, but prior to the appointment, the weight value is improved:

a. S1 (Mahmud santoso)

$= ((3^{0.065217})(3^{0.065217})(4^{0.065217})(4^{0.065217})(4^{0.130434})(4^{0.130434})(2^{0.130434})(3^{0.130434})$
$(3^{0.130434})(3^{0.02173})(4^{0.02173})(2^{0.02173})(3^{0.02173}))$

$= 1,074277 \times 1,074277 \times 1,094623 \times 1,094623 \times 1,198199 \times$
$1,198199 \times 1,094623 \times 1,154072 \times 1,154072 \times 1,02416 \times$
$1,030583 \times 1,015176 \times 1,02416$

$= 3,176361249$

b. S2 (Betris wahluyo)

$= ((3^{0.065217})(4^{0.065217})(2^{0.065217})(2^{0.065217})(4^{0.130434})(3^{0.130434})(3^{0.130434})(2^{0.130434})$
$(3^{0.130434})(3^{0.02173})(3^{0.02173})(2^{0.02173})(4^{0.02173}))$

$= 1,074277 \times 1,094623 \times 1,046242 \times 1,046242 \times 1,198199$
$\times 1,154072 \times 1,154072 \times 1,094623 \times 1,154072 \times 1,02416$
$\times 1,02416 \times 1,015176 \times 1,030583$
$= 2,847848806$

c. S3 (Choirul Huda)

$= ((2^{0.065217})(2^{0.065217})(3^{0.065217})(3^{0.065217})(4^{0.130434})(2^{0.130434})(4^{0.130434})(4^{0.130434})$
$(3^{0.130434})(3^{0.02173})(3^{0.02173})(4^{0.02173})(4^{0.02173}))$

$= 1,046242 \times 1,046242 \times 1,074277 \times 1,074277 \times 1,198199$
$\times 1,094623 \times 1,198199 \times 1,198199 \times 1,154072 \times 1,02416$
$\times 1,02416 \times 1,030583 \times 1,030583$
$= 3,058479644$

After the vector S value is obtained, then the next is to add all S to calculate V. The calculation is as follows:

a. V1 (Mahmud santoso)

$$= \frac{3,176361249}{9,082689699} = 0,349715927$$

b. V2 (Betris wahluyo)

$$= \frac{2,847848806}{9,082689699} = 0,313546857$$

c. V3 (Choirul Huda)

$$= \frac{3,058479644}{9,082689699} = 0,336737216$$

So from the calculation above can be obtained by the largest value obtained by Mahmud Santoso with a value of 0.349715927, then who deserves to be given the title of the best employee is Mahmud Santoso.

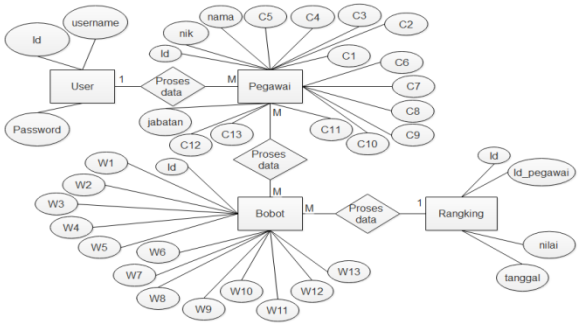

Figure 3.5 ERD SPK Selection of the Best Quality Control

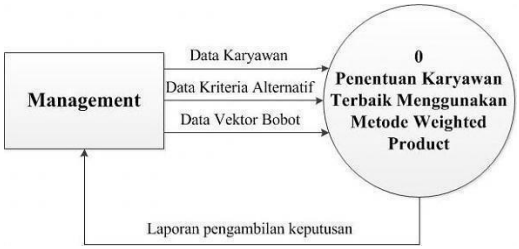

Figure 3.6 DFD Level 0

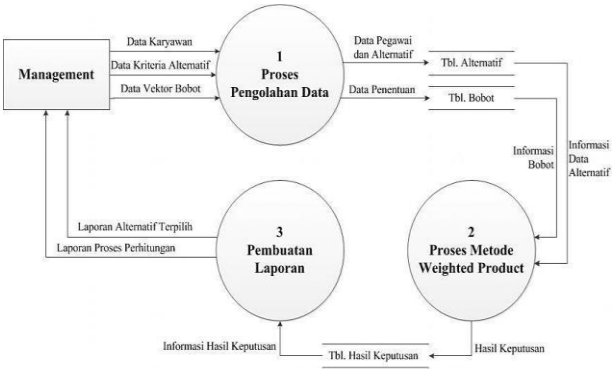

Figure 3.7 DFD Level 1

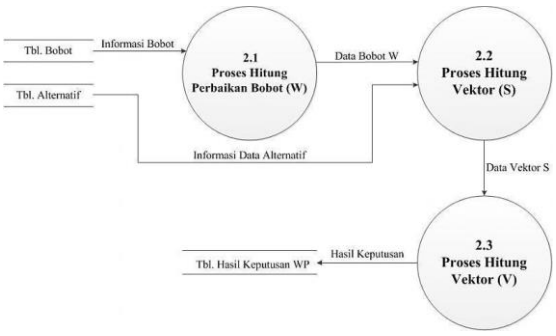

Figure 3.8 DFD Level 2

4. SYSTEM AND IMPLEMENTATION

In the implementation of this application will discuss about the results of the program that has been done in the form of screenshoots for each form and program menu, the following is the program display to be discussed: In the

login form view, it is used by the user or admin to be able to enter the main menu page. Here are the username and password fields. If the username and password do not match, you are required to re-enter your username and password. Following is the login form display which can be seen in Figure 4 below.

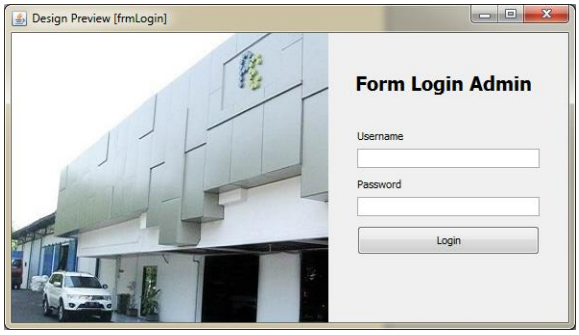

Figure 4.1 Display Login Form

a. Main Menu Display

Figure 4.2 Main Menu

b. Display Form New Employee Data and Alternatives

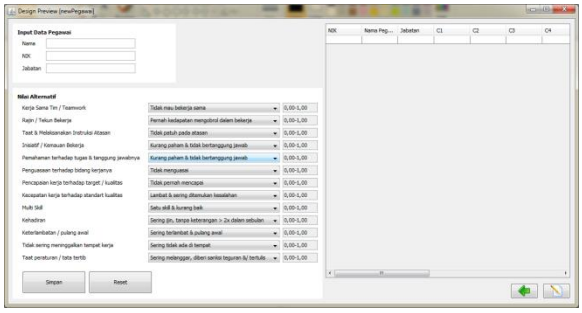

Figure 4.3 New Employee Data and Alternatives

c. Display Edit Alternative Data Form

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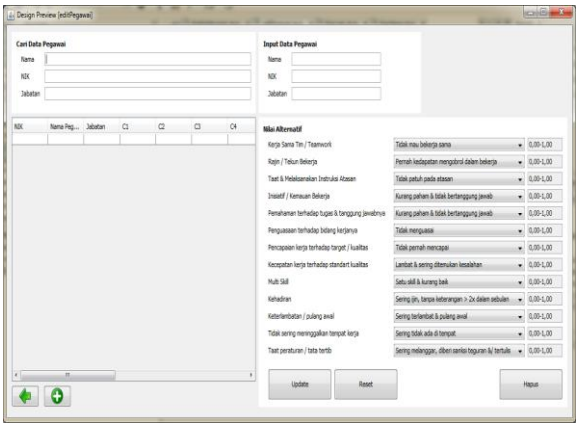


Figure 4.4 FormEdit Alternative Data

i. Display Form Weight Data

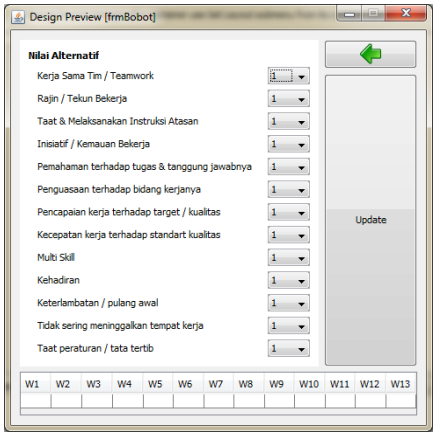


Figure 4.5 Weight Data

d. Display Form WP SPK Calculation

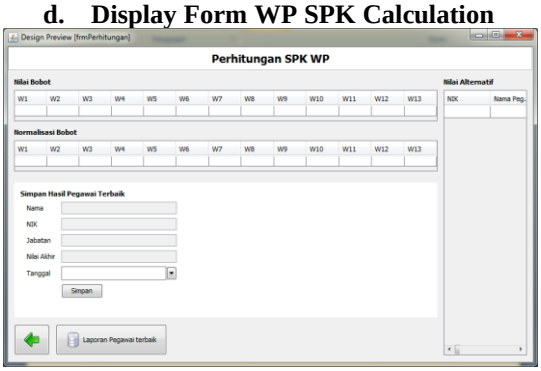
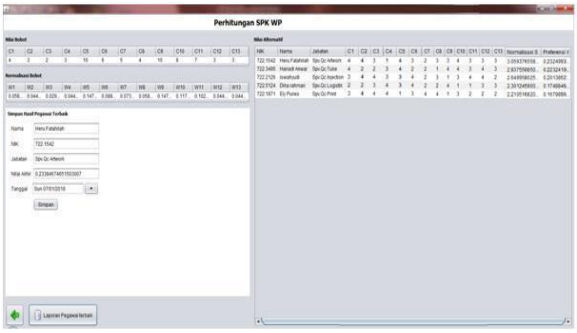


Figure 4.6 Form WP SPK Calculation

e. Display Testing Program



Picture 4.7 Program Testing

Figure 4.8 Best Quality Control Ranking Results

5. TESTING AND RESULTS

From the above calculation it can be seen that in the calculation of profile matching Based on Figure 6.1 it can be explained that the alternative with the largest value is in the name of Heru Fatahilah having a value using the Weighted Product method of 0.23249930558384324. In terms of alternative values in the alternative test table 1, Iswahyudi also has the same number of values from the value of Heru Fatahilah with the score:

Iswahyudi

C1 (3) + C2 (4) + C3 (4) + C4 (3) + C5 (3) + C6 (4) + C7 (3) + C8 (2) + C9 (1) + C10 (3) + C11 (4) + C12 (4) + C13 (2) = 40

Heru Fatahilah

C1 (4) + C2 (4) + C3 (3) + C4 (1) + C5 (4) + C6 (3) + C7 (2) + C8 (3) + C9 (3) + C10 (4) + C11 (3) + C12 (3) + C13 (2) = 40

Although the number of alternative values is the same, the difference is the weight value. The biggest weight value is owned by W9 (Multi skill) = 10 with a large value of Multi skill (C9) Iswahydi = 1 and Heru Fatahilah = 3.

6. Summary

From the results of testing the best employee selection decision support system at PT. Pacific Equinox, several conclusions can be drawn, namely:

a) Applications that have been made regarding the selection of the best quality control personnel using the Weighted Product method at PT. Pacific Equinox Surabaya can be designed from the weight parameters that best suit the case study place.
b) The Weight Product (WP) method can be used to build a decision support system to determine the best employee ratings based on predetermined criteria at PT. Pacific Equinox Surabaya.

c) The more employee data that is entered, the final value of the decision support system resulting from calculations using the Weighted Product method will be smaller.
d) The biggest value of the calculation using the Weighted Product method not only races from the value of each alternative, but the weight value can also affect in each calculation

6.1 Suggestion

Based on the results of the Selection of the Best Employees Using the Weighted Product Method, the suggestions given are as follows:

1. After evaluating the overall system, it is hoped that this thesis can be further developed with development suggestions from the company's management..
2. Making SPK can be improved using the AHP (Analytichierarchy process) method, because the criteria used can be broken down into subcategories so that the results obtained are more detailed.

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