

PERFORMANCE ASSESSMENT AND EVALUATION OF CURVING MACHINE OPERATOR AT PT.XYZ USING ANALYTICAL HIERARCHY PROCESS(AHP) AND RATING SCALE

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Abstract PT. XYZ is a company engaged in manufacturing the defense and security products for military and commercial, which consists of 20% of military products and 80% of commercial products. This study aims to determine the performance assessment of the curving machine operators in PT.XYZ. Previously, the system of operator's performance assessment has an incomplete criterion that is less likely to reflect actual operator performance and the absence of reference data for annual bonus sharing. To get an accurate operator performance, then conducted an assessment based on the Spencer competency owned by each operator. The dimensions of this assessment are based on objective and subjective judgments. Research data were collected by observation and filling out the questionnaire. Then, data were analyzed using Expert Choice software. The method of Analytic Hierarchy Process (AHP) was chosen in accordance with the research problems and objectives. After obtaining the final result of weight of Analytic Hierarchy Process (AHP), the next performance assessment was done by integration with Rating Scale method. The results show that there is a difference in the measurement of performance evaluation of the prior and new method, this is due to additional criteria taken into the new assessment, including absenteeism (presence), quantity of work, work quality, work safety, teamwork, and so forth.

Keywords: Performance assessment of plant operator, Spencer competency, Analytical Hierarchy Process (AHP), Rating Scale

1. Introduction

Generally, there are three factors or obstacles that often faced by manufacturing companies, including human factor, machine, and environment. Human resource is an important factor that determines the success of achieving the company's goals, both as the executor and the decision making. Existing human resources must first be processed and developed so that it can be a potential that supports the development of the company, especially in creating skilled and qualified human resources. Therefore, it is necessary to evaluate the performance of the company to determine the competence of existing resources.

PT. XYZ is a company engaged in manufacturing defense and security products for military and commercial purposes, which consists of 20% of military products and 80% commercial products. In the implementation of high production, PT. XYZ strives to

maintain the quality of products to provide satisfactory service for customers. Currently, PT. XYZ has a problem related to the assessment of plant operator performance. The current performance assessment has incomplete assessment criteria so that it is less able to reflect the actual operator performance and the absence of reference data for annual bonus sharing for the operator with exceeds expectations. Operators with the assessment result of meets expectations, and improvement desired and unsatisfactory performance equally get the annual bonus. The assessment is subjective based on the superior's assessment only. In addition, the objective criteria are not described in detail, the operating and maintenance criteria, these criteria become general for all machines, whereas each machine has different operating and maintenance methods. The assessment becomes ambiguous since it is not focused on the operator's ability to maintain the machine, especially when it is specified to a particular machine type. This will affect the

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determination of appropriate actions to improve the operator's performance. Furthermore, there is no assessment of quantity and quality of work, hence this requires more objective assessment with some appropriate criteria. If the performance standards or calculations have nothing to do with the work, the evaluation can lead to inaccuracies or regular results, triggering unhealthy relationship between operators, and minimize the same good job opportunities.

This research was conducted in the production department of the curving machine at PT. XYZ. The following table provides the data comparison between the operators and the machines.

Table 1. The Number Of Operator And Production Machine

| No | Position | Number of Operator | Number of Machines |
|-------|--------------------|--------------------|--------------------|
| 1 | Stretching Machine | 30 | 5 |
| 2 | Cutting Machine | 18 | 3 |
| 3 | Curving machine | 38 | 8 |
| 4 | Boring Machine | 18 | 3 |
| 5 | Lathe Machine | 24 | 4 |
| 7 | Washing Machine | 18 | 2 |
| 8 | Burning Machine | 18 | 2 |
| 8 | Visual Machine | 9 | 3 |
| Total | | 169 | 30 |

The selection of the curving machine operator is based on several reasons, including the whole process in production, the ability in operating the curving machine, accuracy in the reading of the specification, and considering the long duration required for bending process compared to the other processes.



Fig. 1 Curving machine

There are two criteria of performance assessment, namely the objective measures which include a quantity of work, quality of work, attendance and safety [1], and assessment criteria based on subjective measures described in *Spencer* competency. *Spencer* competency is chosen because it is in accordance with the competencies shown by PT. XYZ in assessing operator performance, and in accordance with the criteria listed on the subjective size (table 1). The subjective measures are used in performance assessment because there are some things in a person that can not be measured by numbers, such as skill, initiative, leadership, and so forth. Therefore, the complete combination of objective and subjective measures is expected to establish the better performance assessment, especially when there are unexpected circumstances that can not be controlled by the company. The score determination in PT. XYZ is described in the table 2.

Table 2. Score determination

| Type | Score Class | Interpretation |
|------|-------------|----------------------------|
| A | 80-100 | Exceed Expectation |
| B | 70-79 | Meets Expectation |
| C | 65- 69 | Improvement Desired |
| D | < 65 | Unsatisfactory Performance |

The criteria for each assessment has a different level of interest, therefore, the researchers implemented the *Analytic Hierarchy Process* (AHP) method for weighting each criterion. AHP is a method for decision making that develop by Saaty [2, 3, 4]. *Analytic Hierarchy Process* (AHP) is chosen in accordance with research problems and objectives. Some examples of the application of AHP are the determination of an item or equipment that is appropriate in a

construction [5, 6, 7, 8, 9]. The advantage of using the AHP method is that analysis can be carried out systematically and simply on factors that are tangible and intangible [10, 11]. The implementation of the method is expected to solve the complex problem regarding the relationship between objectives, criteria, sub-criteria, and alternatives by structuring the hierarchy of criteria in the assessment. Furthermore, the design of performance assessment with *Rating Scale* method is expected to be a solution in making the right decision based on the results of an objective assessment.

2. Method

The research was conducted at PT.XYZ, especially in the production department of the curving machine. This study focused on the calculation and weighting the competency criteria and designing the performance assessment. The investigation will be obtained on the operators of curving machine at PT. XYZ, which has the number of 38 operators. The procedures of this research are described in the following chart at fig. 2.

The variable in this research is *Spencer* Competency. This study used 2 types of questionnaires; questionnaire for determining the assessment criteria of importance level and questionnaire for weighting the criteria by using *Analytical Hierarchy Process* (AHP) with pairwise comparison scale.

3. Result And Discussion

3.1 Assessment Criteria of Ofcurving Machine Operator Performance

The assessment criteria of the operator's performance refer to some references, discussions and the questionnaires for the company (PT.XYZ). The criteria for the assessment of operator performance are made based on the objective and subjective measures. Objective assessment relates to the operator's work, and subjective assessment relates to the *Spencer* Competency.

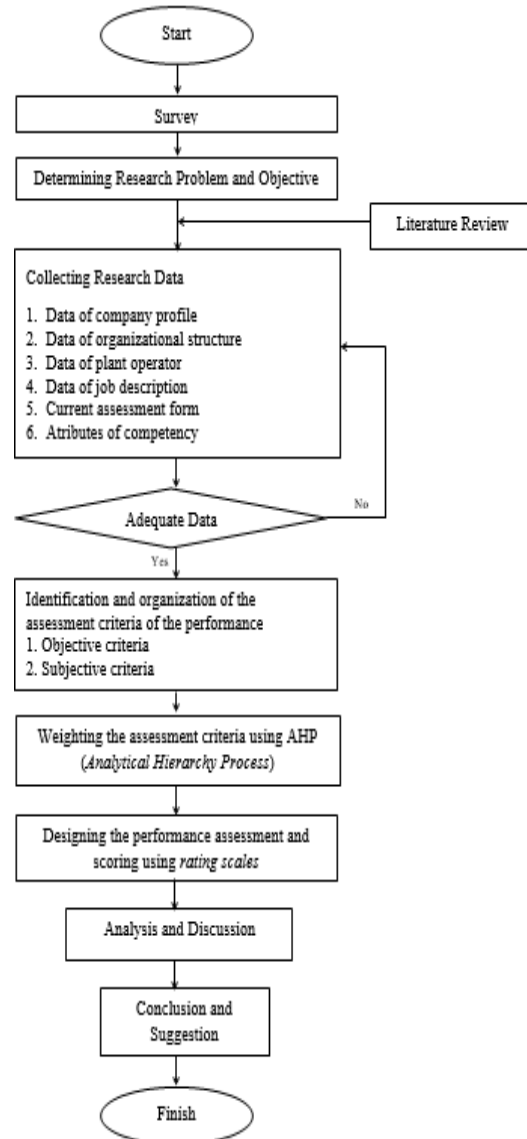


Fig. 2 Research Procedures

3.1.1 Objective Assessment Criteria

The criteria for assessment of the operator performance based on objective measure refers to several criteria [1], including absenteeism (presence), quantity of work, work quality, and work safety. Determination was done by discussion with the Junior General Manager of production department. The objective measures for the assessment are shown in Table 3.

Table 3 Assessment Criteria of Operator Performance Based on Objective Measures

| No | Criteria | Assessment |
|----|-----------------------|---|
| 1 | Abseenteism(Presence) | 1.Work 2.Permit 3.Sick 4.Absent |
| 2 | Work environment | Average percentage of monthly production of machinery per month with monthly production target during the period of assessment. |
| 3 | Work quality | Average percentage of the number of defects in machinery products per month during the appraisal period. |
| 4 | Work safety | Injury severity. |

3.1.2 Subjective Assessment Criteria

The criteria for assessment of operator performance based on subjective measures [12], which is tailored to the needs and conditions in PT. XYZ. Identification of assessment criteria was conducted by discussing and filling questionnaires by Junior Manager. The result was the determination of 16 performance criteria that is achievement orientation, concern for order, initiative, information seeking, interpersonal understanding, customer service orientation, relationship building, developing others, teamwork, analytical thinking, conceptual thinking, expertise, self-control, self-confidence, flexibility, and organizational commitment

3.2 Data Analysis

Data processing and analysis are including three stages. The first stage is to weight each objective and subjective criterion with *Analytical Hierarchy Process* (AHP) method. The second stage is to determine the scale of assessment for each objective and subjective criterion for making the new performance assessment system. Finally, the last step is to compare the result of the prior and the new performance assessment.

3.2.1 Weighting the Assessment Criteria

The weighting of assessment criteria was done by using *Analytical Hierarchy Process* (AHP) method to determine the priority of both objective and subjective criteria.

3.2.1.1 Weighting the Criteria of Objective Assessment

Objective measures include four criteria; the absenteeism, the quantity of work, the quality of work, and workplace accidents. The weighting criteria are based on the *Analytical Hierarchy Process* (AHP) method by performing pairwise comparison between each criterion using Expert Choice program.

Table 4 The Result of Paired Assessment Comparison on the Objective Measures

| No. | Comparison Between Objective Measures | Assessment Result |
|-----|---------------------------------------|-------------------|
| 1 | <i>Absenteeism</i> : quantity | Work 8 |
| 2 | <i>Absenteeism</i> : quality | Work 7 |
| 3 | <i>Absenteeism</i> : Work safety | 1/8 |
| 4 | Work quantity: Work quality | 8 |
| 5 | Work safety: Work quantity | 1/8 |
| 6 | Work quality: Work safety | 1/8 |

The weight of each criterion serves to determine the priority order of each criterion that influences the operator performance assessment. In determining the priority, weights are distributed between the sum of all relative weights by the number of criteria in the objective measures.

Table 5. Weighting priority on each criteria

| Objective Measures | Weighting Result |
|----------------------|------------------|
| Abseenteism | 0,085 |
| Work Safety | 0,029 |
| Work Quantity | 0,237 |
| Work Quality | 0,650 |

Table 5 shows that the quality of work has the greatest weight of 0.650, followed by

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the quantity of work (0.237), absenteeism (0.085), and work safety (0.029).

3.2.1.2 Weighting the Criteria of Objective Assessment

Subjective measures include 16 of the *Spencer* competency, the criterion is weighted based on the method of *Analytical Hierarchy Process* (AHP) by performing a pairwise comparison between each criterion using the Expert Choice program.

The matrix of pairwise comparison of the subjective measure can be seen in Figure 4. It is known that three criteria with the greatest weight are Expertise, Customer Service Orientation, and Organizational Commitment, with the score of 0.148, 0.127 and 0.090, respectively. The criteria with the lowest weight were Flexibility, which showed by the score 0.022. Therefore,

expertise is the most important competence and flexibility is the competence with the lowest interest in assessing operator performance.

3.2.1.3 Comparison of Objective and Subjective Criteria

The Junior Manager of production department considered that the objective measures have a weight of 0.5 and the subjective size has 0.5. The same weight between objective and subjective measures is due to both sizes having the same importance in assessing one's performance. The method of *Analytical Hierarchy Process* (AHP) is used only for weighting each criterion in objective and subjective criteria.

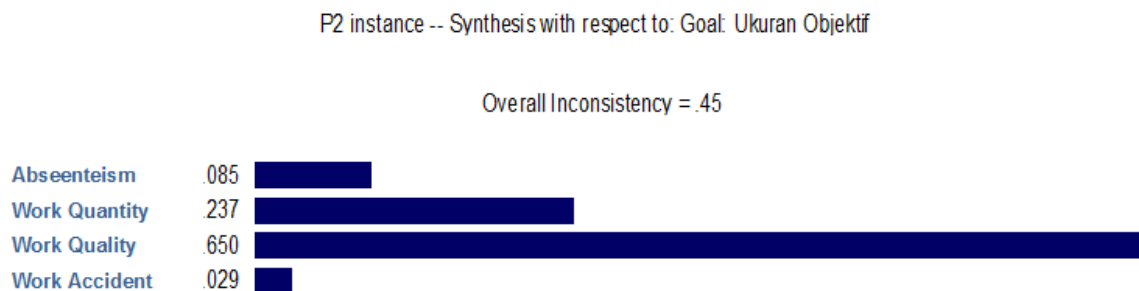


Fig. 3 Result of weighting the criteria of objective assessment using Expert Choice

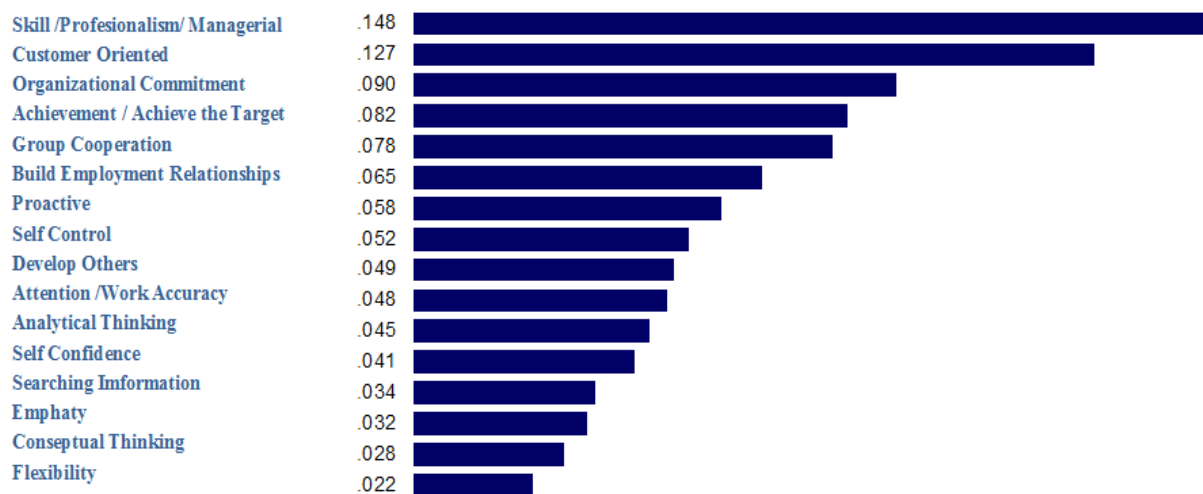


Fig. 4 The matrix of paired comparison of subjective measures

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Based on the table 4 and table 5, it is known that the objective criteria with the highest score are Work Quality (0.650). Meanwhile, the subjective criteria with the highest score were Expertise (0.148). The weight of each criterion that has been obtained will be used for scoring. The score will be multiplied by the weight of each criterion in order to determine the difference between the results of the criteria. The addition of the weight of each criterion is expected to make the performance assessment more objective.

3.2.2 Determining the Assessment Scale

The scoring stage of the performance appraisal refers to a Rating Scales Rating model with five rating scales. The size of the appraisal is adjusted according to how the company judges the operator. The assessment scale for objective and subjective measures is useful in the creation of a new performance appraisal system as a guideline for assessment measures. With a clear assessment scale, it is expected that Junior Manager's assessment of the operator will refer to the size guidelines so that the results are more objective.

3.2.2.1 Determining the Scale of Objective Measures

1. Absenteeism (Presence)

The value of absenteeism is obtained from absentee recaps that have been done by the personnel department. The Company determines that the attendance of all employees and operators is only calculated on the basis of attendance or absence. Operators with personal permission, sickness, loss to follow-up, and delays of more than 15 minutes without notice will be counted not present.

Based on Table 7, it can be seen that workers with 0 absence will get an assessment scale of 5. If the absence is between 1 to 5 days, then the assessment scale is 4. If between 6 to 10 days, the assessment scale is 3. If 11 to 15 the days, the assessment scale is 2. Finally, if the absence is between 15 and 18 days, the assessment scale will be 1.

Table 6 Weighting Priority Of Each Subjective Criteria

| Criteria of Subjective Measures | Weighting Priority | Criteria of Subjective Measures | Weighting Priority |
|-------------------------------------|--------------------|---------------------------------|--------------------|
| Expertise | 0,148 | Developing Others | 0,049 |
| Customer Service Orientation | 0,127 | Concern For Order | 0,048 |
| Organizational Commitment | 0,090 | Analytical Thinking | 0,045 |
| Achievement Orientation | 0,082 | Self Confidence | 0,041 |
| Team work | 0,078 | Information Seeking | 0,034 |
| Relationship Building | 0,065 | Interpersonal Understanding | 0,032 |
| Initiative | 0,058 | Conceptual Thinking | 0,028 |
| Self control | 0,052 | Flexibility | 0,022 |

2. Quantity of Work

In the quantity of work, the output calculated on the bending process is the component. The process of bending component is using 6 types of machines; 1 unit of 5.56 mm caliber machine (INT), 1 unit of 5.56 mm caliber machine (EXT), 1 unit of 9 mm caliber machine, 1 unit of Caliber 2 TJ Machine, 1 unit of RECT Hall Rooks Machine OP, and 1 unit of Hall Docking Machine D. The company determines the number of components to process every 2 months, in accordance with the total number of units to be produced for both *make to stock* and *make to order* products. The production target per day in the bending process is 650,000 items. The component that has been successfully processed will proceed to the next stages.

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Table 7 Assessment Scale of the Absenteeism

| Assessment Scale | Number of Absenteeism (Days) | Description |
|------------------|------------------------------|--|
| 5 | 0 | Very Good. Discipline in compliance with high attendance order. |
| 4 | 1 s.d 5 | Good. The attendance amount is within reasonable limits. |
| 3 | 6 s.d 10 | Enough. The number of absences is due to illness and permission. |
| 2 | (11 s.d 15) | Poor. Total absenteeism is due to illness, consent, and loss to follow-up. It needs action from superiors. |
| 1 | 15 s.d ≥ 18 | Very Poor. Total absenteeism is due to illness, consent, and loss to follow-up. It needs action from superiors. |

Table 8 Calculation of Work Quantity

| Month | Target | Output | % Achieve ment | % Annual Achieve ment |
|----------|--------|--------|----------------|-----------------------|
| Januari | 14.500 | 14.300 | 98.6 | 98.909 |
| Februari | 12.500 | 12.350 | 98.8 | |
| Maret | 14.000 | 13.650 | 97.5 | |
| April | 13.750 | 13.650 | 99.27 | |
| Mei | 13.000 | 13.000 | 100 | |
| Juni | 10.000 | 9.750 | 97.5 | |
| Juli | 14.500 | 14.300 | 98.62 | |
| Agustus | 14.500 | 14.350 | 98.96 | |
| Sept | 13.000 | 13.000 | 100 | |

| Month | Target | Output | % Achieve ment | % Annual Achieve ment |
|-------|--------|--------|----------------|-----------------------|
| mber | .000 | .000 | | |
| Oktob | 15.000 | 14.950 | 99.66 | |
| er | .000 | .000 | | |
| Novem | 15.000 | 14.700 | 98 | |
| ber | .000 | .000 | | |
| Desem | 15.000 | 15.000 | 100 | |
| ber | .000 | .000 | | |

Example of the calculation percentage of achievement for January to December, for 12 months (Year) is:

$$\% \text{ Achievement of the team in January} = \frac{\text{Output}}{\text{Target}} \times 100 = \frac{14.300.000}{14.500.000} \times 100 = 98.6\%$$

$$\% \text{ Achievement of the team in a year (January–December)} = \frac{98.6+98.8+97.5+99.27+100+97.5+98.62+98.96+100+99.66+98+100}{12} = 98.909\%$$

After determining the quantity of work calculation, then get the rating scale by using interpolation. The Company determines the minimum production of 90%. Here are the scales for the assessment of work quantity criteria.

If the worker fulfills more than 100% of production target, the worker will get the rating scale 5, if between 96.25% -99.99%, workers will get the rating scale of 4, if between 92.5% -96.24% workers will get a rating scale of 3, if between 88.75% - 92.49%, workers will get a scale of 2, and if between 88.74% to less than 85%, workers will get a rating scale of 1.

Table 9 Assessment Scale Kriteria Kuantitas Kerja

| Measurement Scale | Assessment Calculation (%) | Interpretation |
|-------------------|----------------------------|--------------------|
| 5 | ≥100 | Very Good |
| 4 | 96.25 s.d 99.99 | Good |
| 3 | 92.5 s.d 96.24 | Poor |
| 2 | 88.75 s.d 92.49 | Very Poor |
| 1 | ≥ 85 s.d 88.74 | Intolerable |

3. Quality of Work

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The calculation of the work quality is obtained from the recap of defective components from the curving process. Defects caused by an operator will be the responsibility of the team, hence the assessment will be the same for each member of the team. The data of target and defects obtained per 2 months of machining. The following table showed the calculation of work quality from January to December 2017.

Here is the example of the calculations of achievements from January to December 2017 (one year):.

$$\% \text{ defectin January dan February} = \frac{\text{cacat}}{\text{target}} \times 100 = \frac{11111}{1.500.000} \times 100 = 0.741\%$$

$$\% \text{ defectin 12months (1 Year)} = \frac{0.741+0.541+1.086+1.206+0.178+0.999}{6} = 0.791\%$$

After determining the quality of work, then continue the information scale by using interpolation. Maximum defect per workstation is 10%. Here are the scales for the assessment of work quality.

Based on Table 11, workers will get a scale of 5 if the defect is 0%. The score is 4 if the defect is only 0-2.5%. Furthermore, between 2.5% to 5% of defects, workers will get the 3, and between 5% sd 7.5% of defects, the score is 2. Finally, defect ranging from 7.5 to more than 10% will cause the workers to get 1.

Table 10 Work Quality Calculation

| Month | Target | Number of Defects | % Defect | % Defect in a Year |
|--|-----------|-------------------|----------|--------------------|
| January-February (Curving machine Calliber 5,56 mm (INT)) | 1.500.000 | 11111 | 0,741 | 0,791 |
| March-April (Curving machine Calliber 5,56 mm (EXT)) | 1.541.666 | 8333 | 0,541 | 1 |
| May-June (Curving machine Calliber 5,56 mm (EXT)) | 1.277.777 | 13888 | 1,086 | 1,086 |

| Month | Target | Number of Defects | % Defect | % Defect in a Year |
|--|-----------|-------------------|----------|--------------------|
| July-August (Curving machine Riksa Hall OP) | 1.611.111 | 19444 | 1,206 | 1,206 |
| September-October (Curving machine Calliber 9 mm) | 1.555.555 | 2777 | 0,178 | 0,178 |
| November-December (Curving machine Calliber 2 TJ) | 1.666.666 | 16666 | 0,999 | 0,999 |

Table 11 Assessment scale of work performance criteria

| Assessment Scale | Assessment Unit (%) | Interpretation |
|------------------|---------------------|------------------|
| 5 | 0 | Very Good |
| 4 | 0.01 s.d 2.5 | Good |
| 3 | 2.51 s.d 5 | Enough |
| 2 | 5.01 s.d 7.5 | Poor |
| 1 | 7.51 s.d >10 | Very Poor |

4. Safety of Work

The data on safety was obtained from the record of accidents in the work environment. Frequent work accidents are including hand pinched or scratched due to lack of focus during the process. The accident is categorized in the type of minor accident if there is no injuries occur. Otherwise, if the accident cause injury, then it is categorized in moderate accident. In addition, it is important to investigate whether the accident is caused by the engine error or human error. Operators who often experience work accidents due to human error will get supervision and further action from companies, such as training about machinery and training of occupational safety and health.

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Table 12 Assessment scale of work safety

| Assessment Scale | Injury Severity | Work Days |
|------------------|--|-----------------------------------|
| 5 | Not significant. Events do not cause harm or injury to humans. Accuracy and caution when working high. | Not causing lost workdays. |
| 4 | Small. It results in minor injuries, minor losses and no serious impact on production continuity. | Can still work on the same day. |
| 3 | Medium. Moderate injuries and hospitalization, no permanent disability, moderate financial loss. | Lost working days under 3 days. |
| 2 | Serious. Causes severe injuries and permanent disabilities and large financial losses and has a serious impact on production continuity. | Lost working days 3 days or more. |
| 1 | Disaster. Causing the death toll and severe loss can even stop the business forever. | Losing the working day forever. |

Based on Table 3.10 ,if the accident does not cause injury, the operator will get 5.If it is a minor injury, the operator will get 4.If the accident causes moderate injury, operator will get a scale of 3. Furthermore, severe injuries and permanent disability will get a rating scale of 2, and if the accident causes death, the operator will get the score of 1.

3.2.2.2 Determining the Assessment Scale of Subjective Measures

The assessment of operator performance was based on subjective measures using *Spencer* competency that included 16 competencies. The assessment of the rating scale refers to the assessment dimension of *Spencer's* competencies but with few changes based on the discussions with the personnel and Junior Manager. In the prior assessment,

there are five criteria that will be converted to the criteria from *Spencer* competency. Table 13 converts the prior criteria into the new criteria.

Table 13 The conversion of subjective criteria

| No | New criteria | No | Old criteria |
|----|------------------------------|----|---|
| 1 | Expertise | 1 | Ability to maintain the machine and operation |
| 2 | Customer Service Orientation | 2 | Ability to instruct the work process |
| 3 | Organizational Commitment | 3 | Quality standard in the area |
| 4 | Achievement Orientation | 4 | Loyalty and dedication for the work |
| 5 | Team work | 5 | Initiative and will |
| 6 | Relationship Building | | |
| 7 | Initiative | | |
| 8 | Self-control | | |
| 9 | Developing Others | | |
| 10 | Concern For Order | | |
| 11 | Analytical Thinking | | |
| 12 | Self Confidence | | |
| 13 | Information Seeking | | |
| 14 | Interpersonal Understanding | | |
| 15 | Conceptual Thinking | | |
| 16 | Flexibility | | |

Some criteria from the old assessment are aligned with the criteria on *Spencer* competency. Thus the design does not eliminate the criteria that have been used before but improve it with the criteria from *Spencer* competency. Table 3.14 shows the scale of the subjective assessment. Especially for expertise competency, there is an addition of criteria for the type of curving machine. This is due to expertise competency assessment is done based on the operator's ability or expertise about the machine. This merger serves to make the new scoring model in more detail.

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3.2.2.3 Differences in Results of Prior Performance Assessment and the New Assessment Using AHP and Rating Scales

The difference is not only in the number of criteria but also the scoring scale. The prior scoring system had 4 types of assessment scales for each category, namely, Exceed Expectation, Meets Expectation, Improvement Desired, and Unsatisfactory Performance. Meanwhile, the new performance assessment has 5 types of rating scale for each category and category classification. This amount corresponds to the *Rating Scales* method of Outstanding Performance, Exceed Expectation, Meets Expectation, Improvement Desired, and Unsatisfactory Performance.

Table 14 Differences in scale category of the prior and new assessment

| Scale | New Category | Output (Annual Bonus) | Scale | Prior category |
|-------|--------------|-----------------------|-------|----------------------------|
| A | Very Good | 100% | A | Exceed Expectation |
| B | Good | 85% | B | Meets Expectation |
| C | Enough | 60% | C | Improvement Desired |
| D | Poor | 40% | D | Unsatisfactory Performance |
| E | Very Poor | 0% | | |

The table shows that the indicators are different. The prior system had no criteria for each criterion, but using only one scale that was previously created. There was no provision from an appraiser, and this will provide an appropriate score for non-technical ability, as the scale created is more suitable for technical skills. Meanwhile, the new score has the criteria for each criterion, and the criteria are tailored to that criterion. The addition of this arena will make it easier and clearer, also more objective as it is not only based on the assessors only.

3.2.2.4 The Differences of Prior and New Performance Assessment

The last difference lies in the results of both types of scoring systems.

Table 15 The Differences in Results of Prior and New Performance Assessment

| Name | Prior | New | Name | Prior | New |
|--------------------|-------|-----|-----------------|-------|-----|
| Kasiyan | B | A | Khoirul M | B | A |
| Nurul Sihabudin | B | A | Roby Noer | B | A |
| Rochiem | C | A | Agung Yuli P W | C | B |
| Arif Hidayatullo h | C | B | Kukusu | C | A |
| Sesario Aldis | C | B | Yoga Putra P | C | A |
| Faizal Z | C | C | Dwi Afrianto | C | A |
| Rizal Prasetya | C | C | Bagus T | C | B |
| Rizky Bahtiar | D | C | Galih Yoga C | C | B |
| Isman Mahfud | C | A | Rizki Fauzi P | C | A |
| Andi Afrianto | C | A | Saiful Anwar | C | B |
| Moch. Aris M | C | B | M. Muflih H | C | B |
| Rahmanda A.H | C | A | Wisnu Dimas S | C | B |
| Ahmad Saiful H | C | B | Ennan Ristianto | C | C |
| M. Syukron | C | B | Edi Santoso | C | C |
| Riyanto | C | B | Adiyta K | D | C |
| M. Adi Saputro | C | A | Aldiki Yudi S. | C | A |
| Suyadi | C | A | Mufti Haikal | C | A |
| Rizki Brian A | C | B | Khoimar u Z. | B | A |
| Kriswanto | C | A | Doni Pramana | B | A |

Based on Table 3.13, there was an increase that the average operator who got the category better than before is shown on the blue, green and orange lines. Operators who got 2 times better improvement from the previous performance category were 13 people, such as Rochiem from category C to category A. This increase is due to the new assessment includes some new criteria that were not included in the old assessment, such

as absenteeism, work quantity, work quality work, work safety, Teamwork, Developing others, and so forth. On the absenteeism criteria, the operator gets a value of 5, which means the operator never lost any days of work. In addition, operators also scored high on some subjective measure criteria, including Achievement Orientation, Relationship Building, Developing Others, Teamwork, Team Leadership, Analytical Thinking, and Expertise.

These results illustrate that the operator has a high discipline, is responsible for the job, has leadership skills, and has excellent qualities in the operation of the curving machine. However, There are 4 operators that do not show improvement or still get the category C (yellow mark), including operators named Faizal Z, Rizal Prasetya, Enan Ristiano, Edi Santoso. This is due to the low value on the objective measures, such as on the absenteeism criteria. Operators were absent for at least 3 times. When the operator lost 3 days of work, then the value will be 2. The low score on absenteeism criteria is considered the highest priority. In addition, the low value is also found on the subjective measures for the Initiative criterion, which is worth 1. The operator does not perform the task if not prompted. Both of these results show that the discipline and responsibility of the operator to his work are poor, hence the results of the assessment indicate is low or categorized in Improvement Desired. The use of objective and subjective measures allows the assessment to see operators better than others and vice versa so that it can be considered to determine the amount of annual bonus for the operator.

4. Conclusion

The new system of performance assessment is an improvement of the prior scoring system that refers to the objective and subjective measures. The objective measures are including absenteeism (presence), the quantity of work, quality of work, and safety. The measures are used since the assessment results of the operator's performance can be viewed holistically. The subjective measures include 16 *Spencer* competencies (achievement orientation,

concern for order, initiative, information seeking, interpersonal understanding, customer service orientation, relationship building, developing others, teamwork, analytical thinking, conceptual thinking, expertise, self-control, self-confidence, flexibility, and organizational commitment).

The prior scoring system has 4 types of assessment scales for each category; Exceed Expectation, Meets Expectation, Improvement Desired, and Unsatisfactory Performance. Meanwhile, the new performance assessment system has 5 types of rating scale either for each category or for class category determination. This amount corresponds to the Rating Scales method of Outstanding Performance, Exceed Expectation, Meets Expectation, Improvement Desired, and Unsatisfactory Performance.

Based on the results of the work assessment, there is a difference between the assessment results with the prior scoring system and the new assessment system. The prior system showed the result that there were only 2 operators with "B" category, 30 operators with "C" category, and 2 operators with D category. On the other hand, the new assessment system revealed that there were 19 operators with "A" category A, 13 operators in category B, and 6 operators in category C. The result differences are due to the application of additional criteria, such as absenteeism (presence), quantity of work, work quality, work safety, Teamwork, and so forth.

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