Evaluation of The Leading Work Culture 5S in Industry

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Abstract. At the moment the changes in the industrial world are getting faster, work demands increase based on the company wants. To support work it can be done easier and more comfortably, a effective and efficient work culture must be built. The effect of not succeeding in implementing an effective and efficient work culture is a work environment that is not clean and not neatly arranged. This paper will illustrate efforts to evaluate the application of the 5S (Five-S) work culture in the pine resin industry. 5S is applied to get a safe and comfortable working atmosphere. 5S stands for Seiri (sort), Seiton (Straighten), Seiso (Shine), Seiketsu (Standardize) and Shitsuke (sustain). The result of 5S evaluation is carried out in the pine gum industry produced a total score of 47, which 5S implementation was below the average, and a review was needed to increase the implementation of very weak 5S component. The values of each 5S component are Seiri, Seiton, Seiso, Seiketsu and Shitsuke, respectively 17, 11, 7, 7, and 5. So the improvements are focused on Seiton, Seiso, Seiketsu and Shitsuke.

1. Introduction
Company performance cannot be separated from human factors can be observed, researched, analysed and corrected [1]. This condition done as an effort to get alternative ways of working are good, effective, and efficient. Effectively related to the right way of working to provide a short time for work completion. Efficiency is related to efforts to minimize the costs of work completion. Work effectiveness and efficiency must not ignore the quality of the products produced [2].

A good work culture within a company is also much needed for the company development in the future. In order to create a good work culture, a lot of effort is needed to achieve it. 5S is known as an effort to create a good work culture in an organization [3,4]. 5S is needed to implement Kaizen (Continuous Improvement) having a high commitment to every job, the implementation and work completion on time and on schedule, working without causing waste [5]. 5S (Seiri, Seiton, Seiso, Seiketsu and Shitsuke) is a "Digest for Kaizen" [6]. Kaizen is a Japanese term for the concept of Continuous Incremental Improvement. Kai means change and Zen means good. Kaizen means continuous improvement that involves everyone [7]. Kaizen is basically a comprehensive and integrated view that aims to carry out continuous improvement [8].

The 5S concept is the concept of utilizing the workplaces including equipment, materials, documents, and others to create a neat work environment and improve work discipline [9]. 5S implementation is able to overcome the problem of unwanted material, improper space utilization, work environment, more time to search documents, equipment, and stationary [10]. 5-S is a determination to organize, clean, maintain a stable condition and maintain the habits needed to do a good job. 5S is a process and method for creating and maintaining a safe, orderly, clean and high-performance workplace. Studies on the implementation of 5S have been carried out by many previous researchers, both in the manufacturing
and service industries. The 5S manufacturing industry is capable to reduce waste and performance improvement [11,12]. 5S also be implemented in small and medium scale industries [13].

This paper describes the assessment of 5S implementation and design improvements for 5S implementation. This research is important to provide an evaluation overview of 5S implementation. Evaluation of 5S implementation is important to ensure the achievement of work culture improvement in 5S companies are not monitored and evaluated will cause failure in an effective and efficient work culture. Besides that, no specific study has been found regarding 5S implementation in industries that process pine gum.

2. Method
This research was conducted at one of the companies producing gondorukem and turpentine from pine gum. This research was conducted by following 5 steps. The first step is observation to see the current conditions of the application of 5S. The second step is evaluating the application of 5S in the pine resin industry by comparing the actual conditions and ideal conditions of 5S application. Measurements were made by distributing questionnaires to several workers and management to assess 5S implementation in their work area. The third step is to draw conclusions based on the evaluation that has been done. The fourth step is to provide improvement suggestions for improvements in the framework of implementing 5S to build a kaizen work culture.

5S measurements are carried out at each constituent components, namely seiri, seiton, seiso, seiketsu, shitsuke. Seiri is the first step in carrying out 5S culture, which is throwing / sorting / getting rid of items, files are not used anymore to the disposal site [14]. All items are on the job site, only items are really needed for work activities. Seiri aims to make the workplace look neater and not messy.

Seiton is the process of sorting all items or files are not used anymore, making sure everything must be placed according to the position specified, and it is always ready for use when needed. Seitons need to be ascertained whether each item has a place, every place has a name, make it organized and systematic, gives a name to each storage place is easy to remember, ensures that it is easily identified when needed, and there is no need to waste time searching for it [15].

Seiso is the process of cleaning the workplace, work space, equipment and work environment. Grow the thought that cleanliness is an important thing in life. Cleaning is carried out on a daily basis at work, and cleaning and hygiene maintenance are carried out [14,15]. Seiketsu is the process of maintaining the three stages have been carried out routinely. This stage also called the stage of care, is the standardization and consistency of each individual to carry out the previous stages. Make standards and all individuals must follow with these standards [14].

Shitsuke is discipline maintenance and it becomes a habit to run the 5S program. Recognizing by implementing practical and concise 5S has an impact on increasing efficiency, good service, working security productivity and profit [14].

3. Result and Discussion

3.1. Existing Condition and Problems Identification
The Pine Gum Industry has implemented 5S in its work area. However, the implementation is still not optimal because there is still waste, there is no need for equipment stored in the work area. The conditions of the work area in the pine gum industry are as follows:

The problem in the pine gum industry is the creation of ineffective and inefficient work culture. Meanwhile, 5S has been implemented but has never been evaluated. The efforts made in creating good work does not get a maximum benefit. Although it has implemented 5S, but there are still unclean and untidy work areas, put the equipment at random, and employees littering, equipment has no storage space, and etc.
Table 1. Existing Condition in Work Area of Pine Gum Industry

| Condition | Explanation | Condition | Explanation |
|-----------|-------------|-----------|-------------|
| Damaged drums are still in the work area and unarranged | | There are items are not needed such as used wood |
| Put the pedicabs are not in the right place | | There is a pile of non-similar items |

3.2. Assessment of 5S
There is a checklist sheet contain questions are arranged based on things must be considered in the 5S concept and adjustments to the conditions of the pine gum industry. The assessment score of the 5S score used 0 is not in accordance with the criteria, 1 to be less in accordance with the criteria, 2 to sufficiently fit the criteria, 3 to fit the criteria, 4 very appropriate with the criteria [8].

Table 2. Sheet Scoring in Existing Condition

| Category | Criteria | Score | Findings Note |
|----------|----------|-------|---------------|
| Seiri    | There are items not needed | ✓ | In some areas there are items not needed such as used wood. |
|          | There is waste catered on the production floor | ✓ | In the work area there is still waste. |
|          | There are items have been damaged are uncontrol | ✓ | In the area of the damaged drum is uncontrol |
|          | All unused items are easily identified | ✓ | Unused items are of medium size and they are easily identified. |
|          | There are written procedures for elimination or disposal of items are not needed | ✓ | There are already a written procedure for removing items are not needed |
| Sub Total | 17 | | |
| Category | Criteria                                                                 | Score | Findings Note                                                                                     |
|----------|--------------------------------------------------------------------------|-------|---------------------------------------------------------------------------------------------------|
| Seiton   | Items have been stored in place according to the classification         | 3     | Some equipment / items are stored in the right place                                              |
|          | Drum storage has been determined and has been given a clear boundary     | 3     | Gondorukem drum storage has no clear boundary area                                                  |
|          | There are objects that do not have a storage area                        | 3     | There are still objects that do not have a storage area.                                           |
|          | There is no material handling area                                       | 3     | Material Handling does not have its place.                                                        |
|          | There is a neat bulletin board                                           | 3     | Notification boards neatly arranged                                                                |
|          | **Sub Total Seiton**                                                    | 11    |                                                                                                  |
| Seiso    | Cleaning the work area has been done regularly and scheduled according to the provisions | 3     | Collaborating on the cleaning of the work area has been carried out routinely                      |
|          | All items are not used are always clean and shiny                        | 3     | The equipment / machine still looks unclean after it has been used                                 |
|          | Cleaning is always done based on the activity checklist                  | 3     | There is no checklist activity in cleaning                                                        |
|          | Cleaning facilities / tools are available                                | 3     | Unavailable of cleaning equipment                                                                |
|          | There is a rotation of cleaning responsibilities within the specified work area | 3     | There is no rotation of cleaning responsibilities in the work area                                  |
|          | **Sub Total Seiso**                                                     | 7     |                                                                                                  |
| Seiketsu | Staff understood the 5S procedure                                       | 3     | There are still many staff who do not understand 5S procedures.                                   |
|          | There is a visual display about 5S                                       | 3     | Visual displays about 5S already in the work area.                                                 |
|          | Cleanliness and neatness are carried out by each worker daily.           | 3     | Cleanliness and neatness are carried out by workers only when needed.                             |
|          | There are regular audits, checks or assessments of 5S application        | 3     | There is no periodic inspection of 5S implementation.                                              |
|          | Staff understood the previous 3S                                         | 3     | Staff only know the previous 3S                                                                   |
|          | **Sub Total Seiketsu**                                                   | 7     |                                                                                                  |
| Shitsuke | Everyone is involved in activities improvement                           | 3     | Employees have not been involved in 5S implementation                                               |
|          | Written procedures are implemented and communicated by each employee     | 3     | There is no communication within the employees regarding 5S implementation                         |
|          | Written rules and procedures for 5S are recognized and followed by all employees | 3     | There is no written procedure about 5S that is followed by employees                               |
|          | Staffs have discipline in previous 4S implementation                     | 3     | Staff are disciplined in the previous 4S implementation                                             |
|          | Motivation from the company on the 5S implementation.                    | 3     | The company don’t give the motivation to 5S implementation.                                        |
|          | **Sub Total Shitsuke**                                                   | 5     |                                                                                                  |
|          | **Total 5S Score**                                                      | 47    | It is in the range of 31-50, which means the application of 5S below the average, must review the checklist with the lowest value |
If the assessment results of the existing condition are in the range of 0-30, which means they are not satisfactory, you must return to step 1, which is checklist fill. If it is in the range of 31-50 means below the average, you should review the checklist with the lowest score. In the range 51-70, it means that on average, reinforcement needs to be done on the part is still weak. In the 71-90 range it means above average, set a higher target and in the range of 91-100 which means very satisfying, must be maintained.

3.3. Recommendation

Based on 5S assessment, we found 4S components from 5S that didn't work well. There are seitzon, seiso, seiketsu and shitsuke. The assessment results can be presented in a spider web diagram to facilitate the analysis. 5S assessment result in spider web diagram can be presented in figure 1.

If we seen from the total score in table 2 shows the number 52, which means that on average, it is necessary to improve weaker parts, namely seitzon, seiso, seiketsu, and shitsuke. To improve the implementation of 5S, a serious handler is needed by the company. The condition of an unorganized work area causes irregular work areas that result in a time waste, energy and material.

![Figure 1. The Evaluation of 5S Achievement](image)

a. **Seiton** (Straighten)

Seiton is an activity that aims to make the item neatly arranged, and it is easy to find or use. The 5S application has not been implemented well, this is can be seen from the score of the 5S average of 11. In addition, there is no place arrangement for the running of humans and material handling. This resulted in unable to operate material handling effectively which is would cause a delay in the transfer of goods. Recommendations can be given are (1) make sure that items are needed has a storage area in the department, (2) goods and equipment storage in accordance with the place provided, and (3) provide clear boundaries on material handling and equipment in the right place of canning department and does not disturb the production process.

b. **Seiso** (Shine)

Seiso is an activity aims to maintain the cleanliness of the work environment, both the workplace and the goods or materials contained in it. The 5S application has not been implemented well, this can be seen from the seiso score of 7. The recommendations that can be given are (1) clean the equipment after it is used, (2) determine responsibilities of cleaning for each area, (3) determine the list of cleaning equipment needed based on the number

c. **Seiketsu** (Standardize)

Seiketsu is an activity that has a purpose, namely the activities of sorting, arranging, and cleaning have been carried out are still carried out continuously. One step taken is to make standardization.
The application on 5S is not well implemented, this can be seen from the seiketsu score of 7. The recommendations given in this process are (1) make clear rules about things might and might not done in the work environment. This regulation can be in the form of visual controls such as the prohibition of littering, not smoking, and the obligation to use personal protective equipment while in the work environment, and (2) Implement reward and punishment to maintain clean and neat conditions.

d. Shitsuke (Sustain)
Shitsuke aims to familiarize 5S culture as an effort to create a better work environment. Shitsuke score of 5 means it has not been implemented properly. The improvement recommendation that can be given is to carry out regular audits. Audit can be conducted once a year or according to company policy. In carrying out audits, auditors must have predetermined assessment criteria and it will facilitate the audit process. Audit can be done by going directly to each department and making an assessment. Another effort was carried out, namely socialization of 5S material to employees. This socialization contains self-awareness of work ethics, such as discipline of standards, mutual respect, shame in committing violations, and others. Because in the end the most important thing remains the commitment of the workers.

4. Conclusion
Based on 5S assessment of the canning department, the values for each category are seiri, seiton, seiso, seiketsu and shitsuke, which are 17, 11, 7, 7, and 5 with a total score of 47 which is in the range of 31-50 and means 5S below the average, must review the checklist with the lowest score. Improvements are made to parts are still weak, namely seito, seiso, seiketsu, and shitsuke.

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