Representation of Affecting Factors for Kernel Quality at Inti Indosawit Subur Company by Fishbone Diagram

Representasi Faktor-Faktor yang Mempengaruhi Kualitas Kernel di PT Inti Indosawit Subur dengan Menggunakan Diagram Tulang Ikan

Novrianti[1*], Noverina Alfiany[2] , Rindo Pratama[1]

[1]Industrial Engineering Sekolah Tinggi Teknologi Nasional Jambi, Jl. Lintas Timur Mendalo Darat, Jambi Luar Kota, Jambi Province, Indonesia, 36361.

[2]Departement of Mathematics and Data Science, Faculty of Mathematics and Natural Sciences, Andalas University, Limau Manis, Padang City, West Sumatera, Indonesia, 25175.

*Corresponding author, e-mail: novrianti@stiteknas.ac.id

ABSTRACT

Kernel is a second main products in palm management company. The processing of kernel production from palm tree needs to be controlled due to the high-quality kernel obtained. By using fishbone diagram, the cause and effect of kernel quality (dirt, shell, and moisturize) at Inti Indosawit palm management company will be analyzed. The result shows that there are several factors such as machine, human, environment factors, raw materials, and incorrect method which occured in this company processes. The subfactors also presented at branches bone in fishbone diagram.

Keyword: Factors, fishbone diagram, kernel, palm.

ABSTRAK

Kernel adalah produk utama yang kedua dari perusahaan pengolahan kelapa sawit. Dalam proses pengolahan kelapa sawit hingga dihasilkan kernel membutuhkan pengontrolan sehingga dihasilkan kernel yang berkualitas tinggi. Dengan menggunakan diagram fishbone, sebab dan akibat dari kualitas kernel yang dihasilkan (kadar kotoran dan kelembaban) di perusahaan pengolahan kelapa sawit Inti Indosawit dianalisa. Hasil yang diperoleh menunjukan bahwa banyak faktor di perusahaan ini seperti mesin, manusia, faktor lingkungan, bahan mentah, dan metode yang salah yang ditemukan di perusahaan ini. Subfaktor yang ditemukan juga dirincikan dalam diagram fishbone.

Kata kunci: Faktor, diagram *fishbone*, kernel, kelapa sawit.

INTRODUCTION

The developing of palm production industry in Indonesia has touched the big level, and it can be said that the palm management company become the deposit of country devises. After Malaysia and Nigeria, Indonesia followed as the third rank of the biggest producer in palm field. Moreover, Indonesia and Malaysia are major suppliers that contributing about 85% of world palm oil.

Both countries ensuring hold important role as well as the competeting in international trade of oil (Arsyad: 2020).

As the 3rd largest producer and the exporter of palm oil in the world, Indonesia has cluster of port of palm (Raharja: 2021). Two of third port are at Sumatera Island, listed in North Sumatera and Riau. Jambi is the nearest province that connected into Riau, which has several palm oils companies. Inti Indosawit Subur company, a member of Asian Agri Group of companies, is a company that

focused on plantation company includes both nucleus and plasma estates in Riau and Jambi provinces. One of this company located in Tungkal Ulu, Jambi, Indonesia.

In June 2005, the environmental management system certificated of Inti Indosawit Subur company was awarded to some of the estates, and oil palm mills in compliance with ISO 14001:2004 standard (Profile Company: Access at 2022). However, for the distance since the last year of activity, such a long time of years, it is being the consideration about the condition for problem about the quality of the product. Nowadays, is the product still satisfying the high-quality standard, the based standard, or low standard of quality?

The management of palm companies commonly has two main products from palm plants, listed as crude palm oil, and the nucleus of palm, written as the kernel. The main pursuit of all palm companies is giving a big effort to enhance the quality of palm products for the sake of the product can be competitive in the market, especially in Indonesia, and in the world for the future.

Seriously, the problems have been found in (Pratama: 2023) that 50% kernel was not good condition (defective), and 35% kernel out of control chart. For 5 months during the research yields that the company need to be serious in several station, and this research doing for the further analyze of the condition.

The competition of palm production in industrial is very strict, especially in kernel production. One of the efforts from the company to get the best product with high quality is controlling the quality of kernel at every production proccesses. In this research, that took place at PT. Inti Indosawit Subur PMKS Tungkal ulu, Jambi, Indonesia, we analyze the kernel production by taking data of dirt and shell, also besides we observe at the moisture of kernel. The abnormal of kernel, will be analyze, moreover the factors are presented on fishbone diagram.

METHOD

The raw data of this research was collected from Indosawit Subur company. Data of moisture and dirt and shel of palm fruits in the company collected for five months in every production. Data was cultivated for yielding several main results that mentioning in this paper.

In this research, we studied the quality of the kernel in the company, especially at Inti Indosawit Subur company. Quality control such kind of tool for analysis is used to yield the best result. Quality control is a kind of verification system and the guardian level of any product or any service which is commonly willing carefully, and the utilization of any suitable equipment, continuously of inspection also beside the corrective action when it's needed. The materials used and the work carried out are
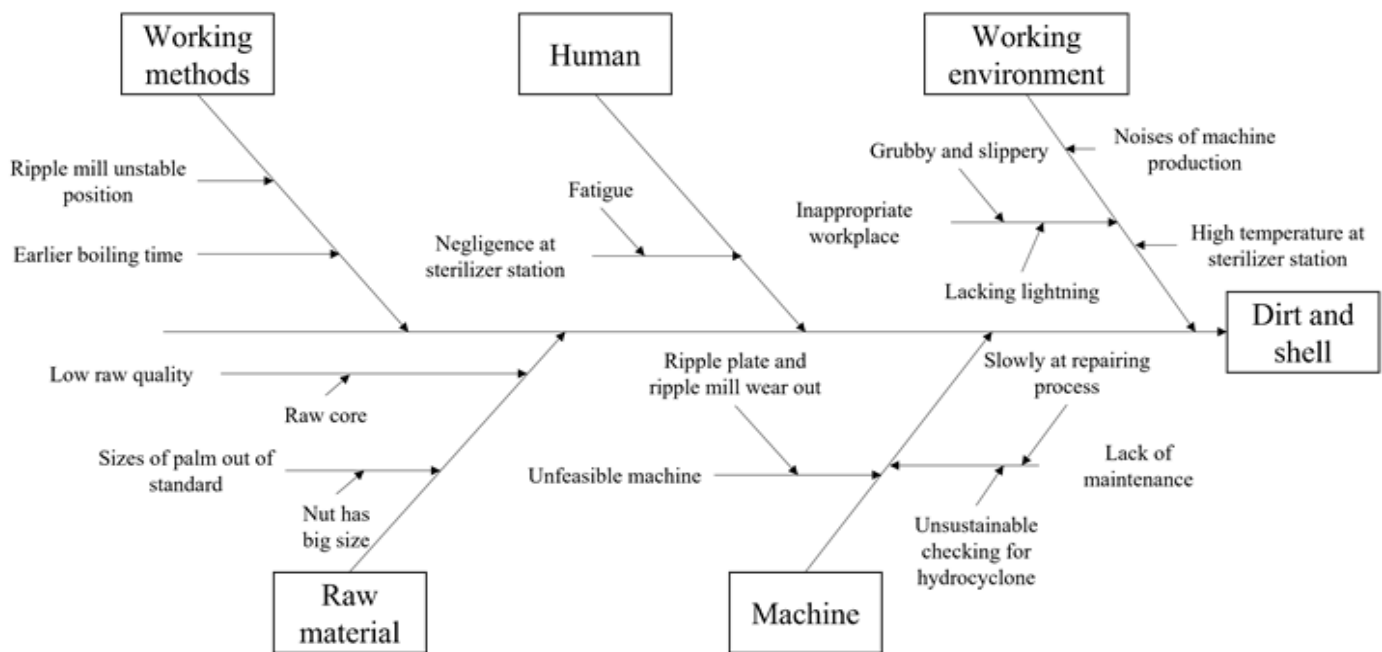

Figure 1. Fishbone diagram of dirt and shell in kernel production

described in detail, including the statistical tests used. The workings are written by providing sufficient information and allowing the research to be repeated successfully.

Purposing for getting the best quality and the highest productivity, so did to know the cause of failure product for improvement and protection for loops of the failure. In the previous research, Pratama (Pratama: 2023) presented that quality control is represented by a run chart, control chart, and Pareto diagram. These charts are utilized to identify the trend of data, by mapping data due to a certain period, and utilizing for classification the trend of even by figuring data due to a certain period (Mediowaty, Nasution: 2005, 2006).

Further, the cause-and-effect diagram (fishbone diagram) is utilizing for identification and analyses the process or condition, and then finding the causes of problems (Nasution: 2006). The possibility of problem and looking for correlation or the deviation caused (from human or work environment), machine, or another equipment, will be presented from cause-and-effect diagram.

Then the result of this research presented in two fishbone diagrams. Fishbone diagram is a kind of method which has the utilization to determine the global risk of an event with multiple relevant causes, will be figuring as the last method of this research. In the company, commonly the main factors of the deviation of quality are human as the employee at that company, the using methods, machine or the equipment, raw material, and the environment. Step by step for making these diagrams are finding the characteristic of quality, determine the causes that influence the character of product, further determine the second causes that influence the first cause, and so forth such that the arrange factors can be written at the fishbone by the big effect as the main bone, the others as middle, and the lowest as the small bone (Ilie: 2010).

RESULT AND DISCUSSION

As usual, the company has the standard value of their product. The common standard values at Inti Indosawit Subur company are 7% and 5% for dirt and shell, and moisture, respectively. However, Pratama in (Pratama: 2023) wrote that the cause of dirt and shell of the nucleus of palm such that the score values of quality 50% out of control line. Instead of this case, the moisturize Quality was 35% running from upper and lower control line. Instead of the analyzing by using both of control chart and Pareto diagram, the several main factors for dirt and shell of the nucleus of palm (kernel) as the product at Inti Indosawit Subur company are listed as follow. There are There are several main factors that influence in the production house of kernel where spread at various station
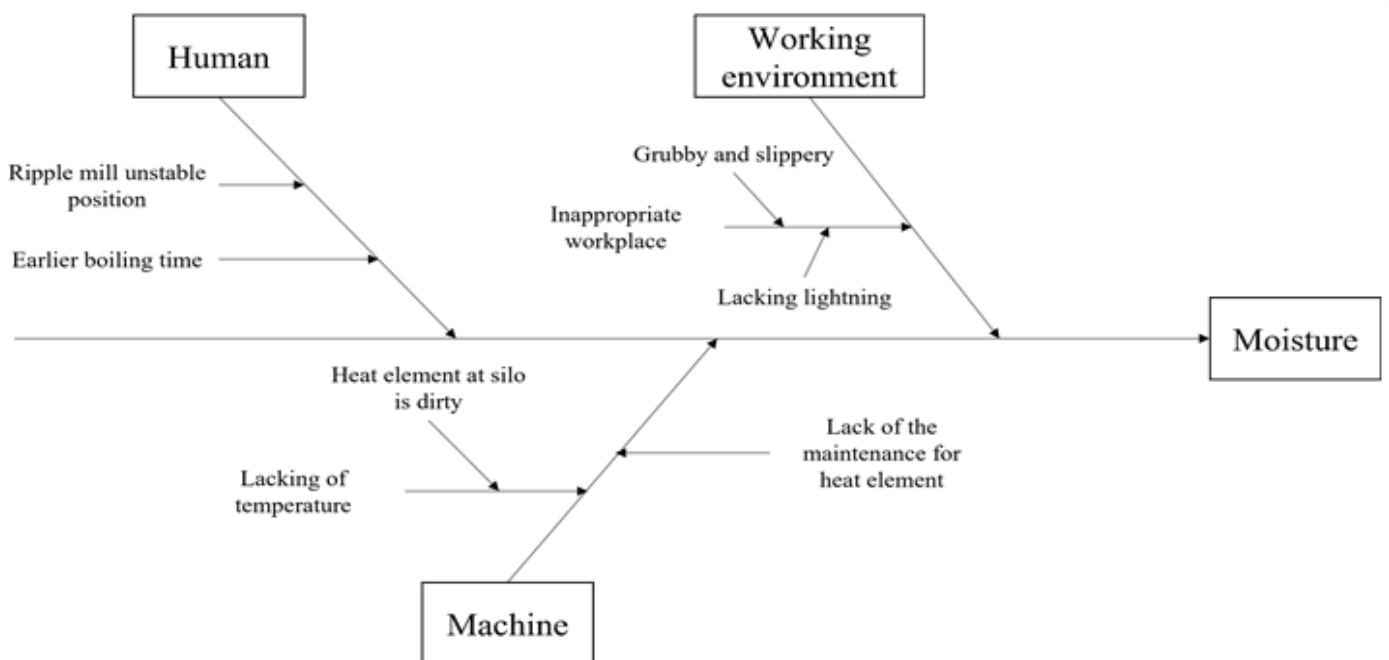

Figure 2 Fishbone diagram of the kernel's moisture

at the company. Its presented at fishbone diagram in Figure 1. The diagram shows us the involving matter that yield the dirt and shell in the kernel, called as the main factors, presented at main bone of diagram, and others (factors and station) scetch at the branch of bone. Listed as working methods, human, working environment, raw material, and machine, are being the main factors of dirt and shell of kernel. Subfactors of each factor being the branch of the main bone. Ripple mill and the timing at boiling station involved the working method such that the employer need more energy to do their job. As the effect, the fatigue appears and the negligence at certain station, especially sterilizer station, occurred. Further-more, broken machine made the machine work-ing out of the purpose. Machine can't separate the nucleus from shell, moreover the worn-out machines have no capabilities to moving out the nut effectively such that nut has imperfectly appearance. Ensure, the maintenance of tools also needs more consideration because it caused most of the dirty of kernel.

Raw material that not in listed of rules also substitute the quality value of kernel. In Inti Indosawit subur company, there are some cases about this. Various of size, hardness, and low quality of palm, such sissy fruit, raw fruit, and mantle fruit, that need concern to be manage, cannot control in the company. All items surely need special treatment. The settle machine is not suitable for so many various of raw materials. On the other hand, from the condition of the lighting in the company also has their own cases. Lighting at the night take their own problem at night production. Whereas the environment like as grubby station and slippery, the noises of machine that disturbing the employee, also the temperature at several station take place as the branch of bone in the fishbone diagram. Furthermore, the moisturize of kernel are caused by machine condition, environment work, and human. The ordered of factors can be shown in the fishbone at Figure 2. Fishbone diagram of the Kernel's moisture.

Moreover, the temperature at the boiler station is not constant and caused the beating occurred when the operator set on the sterilizer machine. So, the maintenance of the heating element that is not optimized, lacking the lighting during midnight production, the slippery and grubby at several stations, and the negligence of employees that caused overwork donated the uncontrolled moisture of the

kernel. For the moistures condition of kernel caused by machine, human, and working environment. The dirty condition of the heating element at the silo station refrains the heating process. Caused of that the moisture is not stable.

CONCLUSION

The maintenance and treatment of Inti Indosawit subur company is not good at all. There are so many factors that caused dirt and shell, and the out-of-control standard of moisture in this company. The main factors listed in machine, human, environment factors, raw materials, and missing method that applied in the company. These factors show that too many causes of ineffective product in the company. The company exactly need to recontrol and reschedule the employee management for the sake of repairing product quality number in the future. The continuous system like previous condition of company will give big risk of this company.

ACKNOWLEDGEMENT

REFERENCES

[1]   Arsyad, M., Amiruddin, A., et all. Competiti-veness of palm oil products in internatio-nal trade: An analysis between Indonesia and Malaysia. Journal of sustainable Agriculture, 2020. DOI:10.2096

[2]   Raharja, S., Djohar, S., Aryanthi, D. Development strategy of Indonesian Palm Oil Industrial cluster based International Trade Connectivity, International Journal of Oil Palm, 2021. DOI:10.35876

[3]   Profil Company at Roundtable On Sustain-able Palm Oil (RSPO), PT. Inti Indosawit Subur, access at 11.45 WIB, April 11th, 2022. intiindosawitsubur

[4] Pratama, R., Subekti, A.T., Novrianti. Analyzing for kernel quality at Inti Indosawit Subur PMKS Tungkal Ulu company by using np-chart method (in Indonesian). JuTMI, Vol. 2 No.1. 2023. DOI:10.55331

[5] Mediowaty, E. M. Quality control analyze as the effort for pressing the failed level at Grey fabric product. University Press, Bandung: Business management faculty, Widyatama University, 2005.

[6] Nasution, A. Hakim. Manajemen Industri. Yogyakarta: Andi, 2006.

[7] Ilie, G and Carmen Nadia Ciocoiu. Application of fishbone diagram to determine the risk of an event with multiple causes. Management research and practice 2 (2010): 1-20. res.pub 46567642

[8] Supardi, Agus. D., Analisis statistical quality control pada pengendalian kualitas produk kuliner, JIMFE, Vol. 6, No. 2, 2020. DOI: 10.34203

[9] Sugara, R., Studying of control quality implementation at process production in Interkemas Flexipack company (Alcan Group) Tanggerang-Banten. University press. Bandung: Business management faculty, Widyatama University. 2005.

[10] Faraz, A., Heuchenne, C., and Saniga, E. The np Chart with guaranteed In-control average run lengths. Quality and reliability engineering international, John Wiley & Sons, Ltd. 2016. DOI: 10.1002

[11] Tjiptono, F., and Diana, A. Total quality management (ed. Revision), Yogyakarta: Andi, 2007.

[12] Ariani, D. W. Statistical for Quality Control, in Indonesian. 2004. reseacrhgatedwa

[13] Wignjosoebroto, S. Introduction for Engineering and Industrial management (in Indonesian), Surabaya: Guna Widya, 2006 Gitosudarmo, Indriyo. "Manajemen Pemasaran", BPFE-UGM, Yogyakarta, 2000.