



Optimize effort oil collection in fat pit palm oil factory tanjung seumantoh

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Abstract

The fat pit is a reservoir and deposition pond of sludge that still contains oil from the condensate disposal of boiling stations and clarification stations that flow through the trenches in gravity. Separation method is done biologically, ie separated oil because of the breaking of oil molecules as a result of fermentation, heating process and deposition process, then the oil will be seen floating on the upper surface because it has a smaller density. The quoted oil is pumped back to the clarification station through a tool called skimmer and oil comb. If the oil con-tent in the mud 0.30% will be pumped into effluent treatment and will be streamed into the river.

Keywords: The Fat Pit; Crude Palm Oil; Oil Losses.

1. Introduction

The whole process of palm oil processing required a tub of settling and deposition called the fat pit tub. The fat pit serves to cite the oil as much as possible in the sludge and water derived from the residual discharge of condensate, the waste water from the clarification station that is continuous settling tank, oil purifier, sludge separator, pre cleaner, brush strainer, sand trap tanks and decanters so that the oil losses are wasted into the waste becomes small. Bak fat pit is given steam heater that serves to separate oil and sludge so that the oil quotation is more optimal[1], [2].

Table 1: Norms% Oil Loss

No	Description	Norma % Losing Example	TBS
1.	Empty bunches	2,50 – 3,00	0,66
2.	Waste press	≤ 4,50	0,50
3.	Seed	0,80 max	0,10
4.	Solid decanter	2,50 – 3,00	0,09
5.	Fat pit	0,60 max	0,30

The working principle of the fat pit is as a sludge shelter and the deposition of water through the bottom of the tub of the end of the pipe underflow, gravity sludge and water at the bottom will come out and continue to be pumped into the waste pool. While the oil will be seen floating on the upper surface because it has a smaller density[3], [4]. Then do the quotation of oil using skimmer and oil comb [5]. Oil quoted with skimmer and oil comb will be accommodated in the reservoir and kept pumped to the clarification station.

2. Methods

Writing this paper seeks to optimize oil palm quotation or Crude Palm Oil (CPO) which is still included in sludge on fat pit at Palm Seed Factory (PKS) Tanjung Seumantoh. The goal to be achieved for writing this paper is to accelerate the process of quoting Crude

Palm Oil (CPO), sludge not mixed again in tub fat pit by reducing the optimum processing time of Crude Palm Oil (CPO), so as to get Crude Palm Oil (CPO) probably with no increase in Free Fatty Acids (ALB).

The fat pit tub is a sludge shelter and sludge deposition, oil spill, and factory laundry water. Fat pit basin was not originally a processing device, but lately after a lot of imbalance between processing units that cause a lot of spilled oil and cannot be cited in the processing unit, then the fat pit tub is included as a processing tool[6][7][8]. In terms of function and capacity of the fat pit tub is not feasible to accommodate condensate water containing less oil (0.15% of the sample) than the final wastewater content (0.30% of the sample). The use of a fat pit tub as a condensate water reservoir will cause the occurrence of oil emulsions and complicate the separation in a fat pit tube. Therefore, the fat pit tub should not be used as a condensate water container. Fat pit tub is made with the ability to accommodate sludge equivalent to retention time 20 hours. If the overall water usage is 600 liters/ton of FFB, then for a capacity of 30 tons of FFB/hour requires the volume of fat pit 20 x 600 liters/ton of TBS x 30 ton = 360 m³. And the quoted oil is pumped every hour to prevent the decline of oil quality[9]–[11]. Retention time on short fat pit tub will cause higher oil loss. It is important to note that the oil coming out of the sludge separator is very difficult to separate because it is an emulsifier, it is evident that the oil losses found in the last waste water (tub fat pit) are higher than the wastewater oil content coming out of the sludge separator. In the tub of fat pit must be provided steam heating pipes, so easy to process oil separation.

The problems contained in PKS Tanjung are as follows:

- 1) All the sludge mixed from the factory waste water and the oil in the deposited water condensate flows into the fat pit tube, so the process of quoting oil takes a long time.
- 2) To compensate the work of the recycle pump, then the process of quoting oil is too fast to do.
- 3) The oil from the process of extracting from the fat pit tubes pumped to the clarification station is still mixed with water and mud, thus increasing the volume in the Continuous Settling Tank (CST).

- 4) Frequent blockage of pipeline transfers to the clarification station because the oil quoted is still mixed with sludge and chaff (frozen sludge) [7] [10] [11].

Table.2: Oil Losses at Fat Pit Tub

Year of 2011	Average % Losses every month
August	0,28 %
September	0,29 %
October	0,30 %
Total Losses	0,87 %
Average Losses	0,29 %

The level of oil losses in the fat pit at PKS Tanjung has reached below 0.30%. Means already below the percentage percentage of permitted oil losses. However, PKS Tanjung Seumantoh continually strives to minimize losses, in order to achieve maximum oil yields in accordance with the expectations of the management. Although the oil has been done as much as possible, but on the remaining mud and water that flowed into the waste pool, there is still oil that is included. The oil that goes to this waste pool is calculated as an average losses of 0.29%.

a) Causes

- 1) There is no installed skimmer tool in the trench towards the fat pit tub.
- 2) Tub collection of oil quotations is too small and not installed steam heating pipes.
- 3) Oil quote in tub of fat pit done repeatedly done.
- 4) Pumps used for 2 (two) units.

b) Plans to Overcome Causes

- 1) Reusing old old fat pit tubes in cooling ponds as a cauldron of oil cultivation equipped with steam heating pipes.
- 2) Make galvanized pipeline Ø 6 "from deoling pond to oil reservoir.
- 3) Make skimmer equipment and oil pipelines into reservoirs in ditches before condensate water and factory waste water goes to tub fat pit.
- 4) Make an oil comb tool on deoling pond/fat pit
- 5) Install the partition from the plate in the trench so that the oil does not pass to the deoling pond.

c) Difficulty Factor

Completion of skimmer and oil comb tools no difficulty because the management of PKS Tanjung Seumantoh PT. Perkebunan Nusantara I (Persero) strongly supports the implementation of the citation tools, only at the time of installation of these tools have to wait for the factory in a state of not operating

3. Results and discussion

The fat pit tub is a sludge shelter and sludge deposition coming from the condensate of the boiling station and the clarification station. Sludge is a liquid containing oil, water and impurities. In an effort to minimize oil losses, an effort to extract the Crude Palm Oil (CPO) as much as possible from sludge that still contains oil. For the process of quoting Crude Palm Oil (CPO) required cite tool in the form of skimmer and oil comb. Skimmer is a funnel-shaped tool that can be rotated up and down, while the oil comb is a pulley pull tool that is run back and forth. In this case, an improvement effort commencing on Monday 17 October 2017 to Monday 31 October 2017.

a) Work Series

The series of repair work that has been done is as follows:

- 1) Propose and coordinate with the management to make improvements to the fat pit tub by adding skimmer and oil comb tool
- 2) After approval then ask the management to use the used goods
- 3) Finding used items that can still be used for the completeness of the installation of skimmer and oil comb tool
- 4) Purchase of goods not obtained from the use of used goods
- 5) Conducting the skimmer and oil comb assembly
- 6) Installing skimmer and oil comb

After the series of repair works completed, then starting on November 1, 2017 carried out the sampling phase of fluid contained in a fat pit tub which is then analyzed in the laboratory of PKS Tanjung Seumantoh. Data analysis is conducted from November 1, 2011 to December 31, 2017.

b) Work Documentation

The following is a documentation of the work sequences that have been carried out from assembling to the installation of oil capping devices on a fat pit tub.



Fig. 1: Assembling Tools.



Fig. 2: Skimmer.



Fig. 3: Condition Before Repair.

After the entire series of repair works has been completed, what is expected is a contribution that can be given to the company. There are 2 (two) forms of contribution received by the company, namely technical contribution and financial contribution. A. Technical Contributions. In the implementation of the improvements that have been made, there are some technical contributions that have been obtained by the company, namely:

- 1) The pump operates 1 (one) unit
- 2) Oil quote has not been done in haste
- 3) Oil at the pump to the clarification station is not much contain mud and water
- 4) Oil excerpts from condensate water and clarification stations are not required to enter the deoling pond first, but can be directly quoted to a reservoir
- 5) There is no more blockage of the pipe because the oil in the reservoir has been given steam heating pipes
- 6) Sand does not go directly into the deoling pond, so it does not cause siltation

c) Contribution Financially

To know the financial contribution of course we must make observations on the existing oil losses on the fat pit tub by comparing the losses before and losses after the repair.

Table 3: Percentage Losses Pat Fit after Improvements

Year 2017	Average % Losses every month
November	0,27 %
December	0,25 %
Total Losses	0,52 %
Average Losses	0,26 %

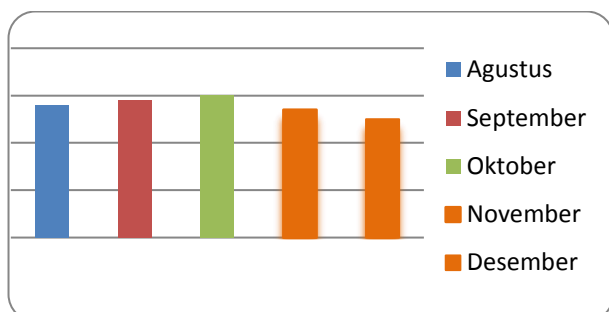


Fig. 3: Average Percentage of Oil Losses before and After Repair.

1) Plan calculation

Average target of oil quotes

= Before repair - After repair

= 0.29% - 0.26% = 0.03%

Of the target obtained by 0.03% will get an oil increase of = Oil

quote after repair x Ton TBS

= 0.03% x 1,000 Kg = 0.3 Kg

Target contribution per Ton TBS

= Weight of CPO x CPO Price

= 0.3 Kg x Rp 7.500, = Rp 2.250, -/Ton TBS

2) Calculation of Realization

a) November 2017

TBS if = 13.697.640 Kg

Losses of oil on a fat pit tuber = 0.27%

Target earned by 0.02% additional oil after the repair, when compared with the average losses in previous 3 months fat pit

= Oil quote after x TBS innovation though

= 0.02% per day x 13,697,640 Kg

= 2,739,528 Kg

Contribution to the company

= Weight of CPO x CPO Price

= 2,739,528 Kg x Rp 7,500, -

= Rp 20,546,460, -

b) December 2017

TBS if = 16,133,490 Kg

Losses of oil on a fat pit tuber = 0.25%

Targets obtained by 0.04% additional oil after the improvement, when compared with the average losses in the previous 3 months fat pit

= Oil quote after x TBS innovation though

= 0.04% per day x 16,133,490 Kg

= 6,453,396 Kg

Contribution to the company

= Weight of CPO x CPO Price

= 6.453,396 Kg x Rp 7.500 = Rp 48.400.470,-

After various improvements to the fat pit within 2 (two) months ie November and December 2017, the company has received a contribution of = Rp 20.546.460,- + Rp 48.400.470,- = Rp 68.946.930,-

3) Break Event Point (BEP)

To Break Event Point (BEP) from repair work in an effort to optimize oil quote on PKS Tanjung Seumantoh fat pit as follows:

Contribution of month I (November 2017) = Rp 20.546.460,- Material requirement = Rp 7.441.000,-

Amount of excess = Rp 13.105.460,-

From the results that have been obtained within a period of 1 (one) month has been able to restore the capital needs of materials for the manufacture of skimmer and oil comb in the fat pit tube. This means that for the next month the company has benefited from the improvements made.

4. Conclusion

The processing of palm oil into Crude Palm Oil (CPO) at the palm oil mill consists of a series of processing processes ranging from fruit acceptance, boiling, pepper/tuning, lubrication, forging, separation and stockpiling. Of all the processing of oil palm is needed a sink and settling tub called a fat pit tub. Fat pit is a sludge shelter and settling originating from condensate of boiler station and clarification station. Sludge is a liquid consisting of oil, water and impurities. Sludge shelter and sedimentation on a fat pit tub aims to accumulate as much oil as still contained in sludge.

Crude Palm Oil (CPO) can be separated due to the process of breaking oil molecules as a result of fermentation, heating process and deposition, the oil will be seen floating on the upper surface because it has a smaller density which can then be cited. For the process of quoting Crude Palm Oil (CPO) required cite tool in the form of skimmer and oil comb. Skimmer is a funnel-shaped tool that can be rotated up and down, while the oil comb is a pulley pull tool that is run back and forth. The quotation result of Crude Palm Oil (CPO) will be channeled to the recycle pump which will then be pumped back to the clarification station.

A series of improvements have been made then observed the oil losses contained in the fat pit tube. From result of improvement and analysis of data obtained 2 (two) form of contribution received by company, that is technically contribution and contribution financially.

The general technical contribution has made it easier to quote Crude Palm Oil (CPO) in the fat pit, while the financial contribution in the 2 (two) months period of November and December 2011, the company has contributed Rp 68.946.930,-. Where Break Event Point (BEP) has been obtained within a period of 1 (one) month, then the company has benefited from the improvements that have been made.

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