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CONTENT CONTROL MANAGEMENT IN OIL WATER SEPARATOR WASTE WATER

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ABSTRACT

Maritime world Oil Water Separator (OWS) adalah pesawat yang mampu memisahkan air dari air buangan yang mengandung minyak sampai hasil pemisahannya mencapai kurang dari 15 ppm. Tujuan dari penelitian ini yakni untuk mengetahui penyebab oil water separator tidak dapat bekerja dengan maksimal, dampak dari kandungan minyak pada air buangan oil water separator lebih dari 15 PPM serta upaya mengatasi kandungan minyak pada air buangan Oil Water Separator lebih dari 15 PPM di kapal Yong Xing Shun Hang. Penelitian ini merupakan penelitian kualitatif ekploratif. Based on the discussion in the previous chapter, the author can draw conclusions, namely the factors causing the high oil content in wastewater resulting from the *Oil water separator process,* namely the implementation of maintenance schedules are not on time, dirty *coalesscer filters*, *bilge well* contains a lot of dirt. The impact caused by factors that cause high oil content in wastewater from the oil water separator process consists of the *impact caused by the implementation of the maintenance schedule is not on time is the hampering of the operation of* the oil water separator, sudden damage to the oil water separator components, *less than optimal performance of* the oil water separator And the impact caused by dirty *coalesscer filters* is less than optimal filtering of dirt / filtering process

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1. INTRODUCTION

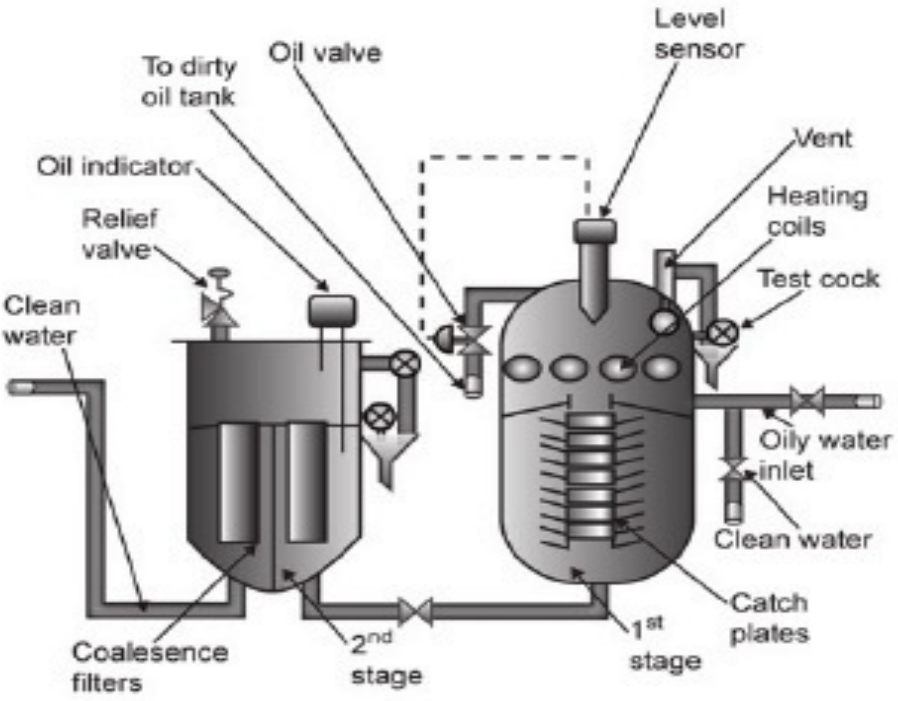
MARPOL stands for Marine Pollution which actually stands for International Convention for The Prevention of Pollution from ships. And hereinafter also known by the term (MARPOL 1973/1978). This is an international convention that contains provisions to regulate the means of preventing and controlling pollution at sea originating from ships internationally.

MARPOL (Marine Polution) is an international regulation that aims to prevent pollution in the sea. Every system and equipment on board that supports this regulation must be certified by the class

Seawater will experience pollution if sewage disposal is directly discharged into the sea without going through the separation process between oil and water first as determined by MARPOL 73 / 78, many factors that cause seawater pollution due to irregular ship operations appear regulations to prevent seawater pollution in order to maintain the sustainability and balance of the seawater environment and its ecosystem. The biggest

pollution that often occurs on ships is oil pollution through the disposal of sewage waste on ships. Therefore, there are regulations that require the installation of aircraft equipped with a water separation device with oil called an oil water separator.

General understanding according to Maritime World Oil Water Separator (OWS) is an aircraft that is able to separate water from wastewater containing oil until the separation results reach less than 15 ppm. The basic principle used by oil water separator is to separate oil from sewage water or waste water mixed with oil from sewage tanks based on specific gravity or specifications (Trinata et al., 2021). The separation is based on the specific gravity of the elements contained in the processed sewer water where the specific gravity of the water heavier than the oil will be under the oil in the separation chamber, so that the oil on the surface will flow into the Waste Oil Tank while the water that has gone through the second filtration process will come out of the oil water separator with an oil content level below 15 ppm(Tazani & Wanto, 2020).



Gambar 1. *Oil Water Separator*

OWS is a ship tool where insoluble fluids are separated from each other due to differences in density (density), in this case the fluid in question is water and oil, where the specific gravity of water is greater than the specific gravity of oil so that when the separation process occurs water will be at the bottom and oil will be at the top (Nizam & Syahrizal, 2018). The working principle of Oil Water Separator separation is done by changing the speed and direction of the fluid from the well (well), so that the fluid can be separated According to SOP 11 (2013) An oil/water separator (OWS), also known as a gas/oil separator, is a structural device intended to provide pretreatment of floor drainage water from industrial facilities and garages (Tazani & Wanto, 2020). OWS allows oil (and substances lighter than water) to be intercepted and removed for disposal before entering the sewer system sanitation. Substances heavier than water settle to the bottom of the unit(Ziliwu et al., 2021).

Related to the explanation above, when the author carried out research at Yong Xing Shun Hang when the ship sailed from Palembang to Balongan, there was a problem with the oil water separator (OWS) where the oil water separator could not work optimally, namely

during the operation process (disposal) of dirty water into the sea as much as 8.00 M3 but in the middle of the operation process the oil content produced always exceeded 15 ppm and the Oil Content Meter provided Alarm signal continuously and cause Oil Water Separator peoses not to run normally, then from the problems to be discussed, it is expected that the maintenance carried out must be consistent, according to the instruction manual book.

According to the great dictionary Indonesian "Analysis is the decomposition of a subject for its various parts and the study of the parts themselves and the relationships between the parts in order to obtain a proper understanding and understanding of the meaning of the whole". Analysis is an effort to sort an integrity into elements or parts so that the hierarchy and / or arrangement are clear (FIRDAUS, 2020).

Analysis is (the ability to decipher) is to decompose units into separate units, divide units into sub-subs or parts, distinguish between the same two, choose and about differences (among several in one unit) (Pongkessu et al., 2018). From some of the opinions above, it can be concluded that analysis is an activity to find new findings on objects to be researched or observed by researchers by finding accurate evidence on these objects. In addition, every machinist must be able to identify quickly and precisely any abnormalities that occur. So that fatal damage to the aircraft does not occur. When that happens, it will disrupt operations and cause work efficiency to decrease.

2. METHOD

In this study, the method used by the author to analyze the data in this scientific paper is a descriptive analysis method. Descriptive method is an analytical technique used to describe an event that occurred on a ship, which is related to oil water separator On the basis of the author's observation by looking at existing data, using existing techniques, the author hopes to produce good problem solving in the preparation of this study. The data sources that the author uses consist of:

1) Primary Data
   Primary data is data obtained directly from the ship by conducting direct interviews with machinists and heads of engine rooms as well as technicians about the benefits of maintenance on the performance of the main engine on the ship with maintenance, in this case the author obtained primary data based on the *instruction Manual Book* and direct observations when maintaining the performance of the main engine on board.
2) Secondary Data
   This data is data obtained from literature – literature and articles that have to do with the problem

3. RESULTS AND DISCUSSION

A. Factors that cause oil water separators cannot work optimally on the Yong Xing Shun Hang ship

The factors causing the oil water separator cannot work optimally are as follows:

1) Dirty coalesscer filter
   The coalesscer filter is the most important part contained in the oil water separator system*, it can be said that the main element of the* oil water separator system *is* the *coanescer filter*. Basically, the filtration in the *oil water separator* system is a *fine filter* (*coalesscer*).
   In *the Oil Water Separator the oil will go above the surface because of the difference in specific gravity between water and oil where the oil is always above the water as it*

happens in the Oil Water Separator aircraft . But the dirt carried by the water mixed with oil will stick to the *coalesscer filter*.

In *the coalesscer filter there is a very small and fine filter hole very different from the filter contained in the filter used to filter sewage water before entering* the Oil Water Separator *and increasingly causes the accumulation of dirt* in the coalesscer filter resulting in high water pressure in the *coalesscer* tank, *resulting in water pressure in the tank coalesscer* high because more dirt clogs the *coalesscer filter*.

Gambar 1.1 : *filter coalesscer*

2) The bilge tank is dirty

Bilge Well is a place with a certain size that has been determined to accommodate various impurities or in the form of liquid substances on board. The number of bilge wells *is a minimum of two pieces for left and right pairs and balanced, depending on the number of ballast tanks,* plus several *bilge* wells located under the Bilge tank engine room that contain too much dirty oil. The amount of dirty oil contained in the *bilge tank* of the engine room. Especially bilge found near the flywheel.

3) The setting on the *Oil Content Meter is* not in accordance with the regulations of IMO, which is 15 ppm

Regulations on the prevention of oil pollution in the sea have stipulated that the threshold value of oil contained in water that can be discharged into the sea is 15 ppm. For this reason, machinists as operators before running *the Oil Water Separator* should be more careful to check whether the settings on the *Oil Content Meter* are right or not, because this will actually cause marine pollution if the oil content in the discharged water is still high enough. The separation process has been running as it should, but the water will still be discharged into the sea even though it is still in high oil content.

4) Untimely implementation of the treatment schedule

Maintenance is a function that monitors and maintains ship facilities, equipment, and work facilities by designing, organizing, handling, and inspecting work to ensure the function of the unit during operation time and minimize stopping intervals caused by damage or repair. Irregular maintenance can bring unexpected problems experienced by a machine. As a result of the untimely maintenance carried out, the age of the oil water separator *has been reduced and the readiness of this auxiliary aircraft in carrying out its duties will also be disrupted*, the work of the oil water separator is not optimal, and damage to the auxiliary aircraft is sudden. Then the efforts made to overcome this are to repair and run the maintenance plan listed in the HRS-1 manual book No. 51959 so

that the *oil water separator* is always in top condition and ready to work at any time when it will be used.

B. The impact of the oil content on the oil *water separator wastewater separator* is more than 15 PPM on the Yong Xing Shun Hang ship

The impact of the factors causing the high oil content in wastewater resulting from the *oil water separator* process, these impacts are as follows:

1. Inhibition of oil *water separator operation*
2. Sudden damage to *oil water separator* components
3. Less than optimal oil *water separator performance*
4. Less optimal filtration of dirt
5. Inhibition of oil *water separator operation*

Some of the impacts caused if the *bilge well* contains a lot of dirt, including:

1. The impact caused by the implementation of the maintenance schedule is not on time is the hampering of the operation of the oil water separator, sudden damage to the oil water separator components, less than optimal performance of the oil water separator. This resulted in *Oil water separator* experiencing interference and damage. Interference with damage that occurs in the aircraft will result in abnormal operation of the aircraft in accordance with the desired aircraft work. The success of a planned treatment requires discipline from all parties but what is experienced on board, not all operators / crew understand and understand the importance of planned maintenance.
2. The impact caused by dirty coalesscer filters is less than optimal filtration of dirt / filtering process.
3. The impact caused by bilge well containing a lot of impurities is the process of suction of old sewage water, hampered operation of oil water separator, then the waste oil filtration system does not function properly so that the oil content in the water reaches above the threshold (exceeding 15 ppm) of these results can cause pollution.
4. The impact caused by lack of knowledge is delays in handling problems and poor handling of problems.
5. The process of suction of old sewage water
6. Inhibition of oil *water separator operation*
7. The lack of skills of the ship crew has an impact on the operation of the *Oil Water Separator*, namely the hampering of the operation of *the oil water separator and the delay in repair activities on the* oil water separator.

Some problems that will be caused when *the coalesscer* filter is dirty that is the operator does not understand so he does not follow the correct operating instructions according to *the Instruction Manual Book* (just operating it), this is because the operating steps are not on OWS. Efforts can be made to overcome this by installing operating steps on the OWS in accordance with the Instruction Manual Book which is short and easy to understand by the operator, so that there are no errors in the operation of *the Oil Water Separator* (OWS).

This operation is common when, the operation of the OWS *Oil Water Separator* is not continuous or rarely operated so that many operators do not pay attention to handling this

aircraft with the scheme. The operator only runs the oil water separator according to its function, namely the separation of wastewater from oil and sludge. This happens if during the initial operation of *the OWS Oil Water Separator is not fully filled with seawater first and when* the OWS Oil Water Separator was last used or when stopped the OWS was not rinsed. For this troubleshooting, before operating the OWS *Oil Water Separator*, perform a filling
seawater with a bilge pump into the separator before *the OWS Oil Water Separator* is operated. And after operating the OWS *Oil Water Separator*, rinse before turning off so that the oil content contained in the remaining sewage water does not stick to the bottom of the separator.

C. Efforts to overcome the oil content in the Oil Water Separator wastewater of more than 15 PPM on the Yong Xing Shun Hang ship,

As for the efforts made to prevent the problems described above, efforts were made to overcome the dirty *coalesscer filter* in the filter tube that needs to be considered, namely the function of the *coalesscer filter* is to filter between oil and water by filtering method*. So that water and oil can be separated. Given the importance of the coalesscer filter* because the sewage water to be separated must go through the coalesscer filter so *that the waste water results are maximized and in this case* the coalesscer filter *must get special care so as not to quickly experience fatal damage.*
Therefore, it is required to carry out routine maintenance and rinse after every operation of the *Oil Water Separator* aircraft should be at the time before and after operation, as for the cleaning methods, namely:

1) Cleaning by rinsing with heating in the separator room

Cleaning by rinsing with heating in the separator room. This method is mild but sometimes often ignored. The method is as follows:

(a) Make sure that the OWS is filled with full seawater.
(b) Open all OWS operating faucets, then run the sewer pump.
(c) Open the existing steam faucet until the indoor temperature reaches 70-80 degrees *Celsius.*
(d) Rinse for about an hour to get maximum results.
(e) When finished, tap the steam faucet and continue to run the pump so that the indoor temperature of OWS returns to normal or cold.
(f) Turn off the pump and close all faucets in the system.

2) Replacement by removing coalesscer

Replacement by removing *the coalesscer* from its place can be done with the following steps:

(a) Make sure all suction faucets and presses are closed, dispose of the water contents in the OWS through the drain hole.
(b) Open the door in rooms I and II
(c) Remove the steel plates in room I then clean with soapy water until clean from sticking oil and other dirt and then dry.
(d) Remove the Coalesscer sieve *from its place, remove the fastening bolts so that the sieve can be lifted out of place.*
(e) If *the filter condition is in severe condition and exceeds the running hours rules set in the manual book, the replacement process is carried out with a new* filter.
(f) is an example of *a coalesscer filter* that has been replaced *Preventive Maintenance* Preventive maintenance is maintenance carried out before engine damage occurs. This policy can quite well prevent unplanned engine stops. The advantages of preventive maintenance policy will mainly ensure the reliability of a system, ensure

safety for users, longer machine life, downtime of the production process can be reduced. While the losses that occur include a lot of operating time will be wasted, it is likely that there will be human error in the assembling process or others. The goal is to maximize availability, and minimize maintenance costs.

3) Predictive Maintenance is also part of preventive maintenance.

This predictive maintenance can be interpreted as a maintenance strategy where the implementation is based on the condition of the machine itself. Predictive maintenance is also called condition-based maintenance or also called machine condition monitoring, which means determining the condition of the machine by checking the machine regularly, so that machine reliability and work safety can be guaranteed.

With machine monitoring we can analyze and estimate the conditions that are occurring, signs or symptoms of damage so as to determine when maintenance actions should be carried out and what spare parts should be provided.

a) Maintenance on Oil *Content Meter sensor*

Before and after running the *Oil Water Separator*, of course, you must always rinse with fresh water against the first and second separation chambers and sensors contained in the *Oil Content Meter*. This is in addition to preventing rust can also prevent the attachment of oil particles to the sensor, which if it occurs continuously will cause the sensor to always read high amounts of oil content. If this happens, the performance of the Oil Water Separator *is not achieved because the* Oil Water Separator *will* not carry out the separation process optimally because there will only be sewage water circulation in the engine room. Some ways to maintain the oil content meter include:

1) Routinely at least a week cleaning and testing is carried out on the sensor device.
2) Testing ppm alarms once a week either manually as mentioned above or by setting up the *Oil Content Meter* tool according to the instructions.

b) The existence of checks on the *Oil Content Meter* to comply with regulations from IMO, namely 15 ppm *Oil Discharge Monitor* has an important role in helping the operation of Oil Water Separator *to get results that meet water disposal standards from the processed* Oil Water Separator. Therefore, with scheduled maintenance and checks, the work of the *Oil Discharge Monitor* will run well. Checking the *Oil Sensor Meter* periodically by following the instruction manual or manual *book* is required. Once a week it is emphasized to machinist II to always check the work of the sensor in accordance with its standard, which is 15 ppm correctly.

4. CONCLUSION

Based on the discussion in the previous chapter, the author can draw conclusions, namely the factors causing the high oil content in wastewater resulting from the *Oil water separator process,* namely the implementation of maintenance schedules are not on time, dirty *coalesscer filters*, *bilge well* contains a lot of dirt. The impact caused by factors that cause high oil content in wastewater from the oil water separator process consists of the *impact caused by the implementation of the maintenance schedule is not on time is the hampering of the operation of* the oil water separator, sudden damage to the oil water separator components, *less than optimal performance of* the oil water separator And the impact caused by dirty *coalesscer filters* is less than optimal filtering of dirt / filtering process. Furthermore, efforts made to overcome the factors causing the high oil content in wastewater from the *oil water separator* process and efforts made to overcome the implementation of maintenance schedules that are not on time are to improve and implement existing maintenance plans and increase discipline in checking. Efforts made to overcome

the dirty coalesscer filter *are in* the coalesscer filter to replace *the coalesscer* filter *with a new one.*

REFERENCES

FIRDAUS. (2020). *PENERAPAN INTERNATIONAL SAFETY MANAGEMENT CODE DI KAPAL MT. SINAR MALUKU PT. SAMUDERA ENERGI TANGGUH*.

Nizam, M. J., & Syahrizal, S. (2018). Modifikasi Sistem Pendingin Mesin Diesel Merk Dongfeng Menggunakan Heat Exchanger Untuk Kapal Motor Nelayan. *Inovtek Polbeng*, *8*(1), 80–85.

Pongkessu, P., Pesulima, Y., Nari, H. P., & Sirman, A. M. (2018). Analisis Pengaruh Perubahan Temperatur Air Pendingin Terhadap Kinerja Fresh Water Cooler Pada Mesin Induk Di Kapal MV. Kalla Lines XV. *Jurnal Venus*, *6*(12), 94–109.

Tazani, A. A., & Wanto, K. (2020). Analisis Kandungan Minyak Pada Oil Water Separator Di Mt. Ontari. *Jurnal Sains Dan Teknologi Maritim*, *20*(2), 119–131.

Trinata, M., Arleiny, A., Fatimah, S., & Pangestu, D. D. (2021). EFEKTIFITAS TEKNOLOGI MODERN OIL WATER SEPARATOR (OWS) DI KAPAL DALAM MENANGGULANGI PENCEMARAN MINYAK. *Jurnal 7 Samudra*, *6*(1).

Ziliwu, B. W., Musa, I., Priharanto, Y. E., & Tono, T. (2021). Perawatan dan Pengoperasian Sistem Pendingin (Heat Exchanger) Pada Mesin Induk Kapal Km. Sido Mulyo Santoso Di Ppn Sibolga. *Aurelia Journal*, *2*(2), 93–100.