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Application of Repairing Agitator Mixer Tank in Watertreatment Technology as an Effort to Improve the Quality of Processing River Water to Make it Clean

Aris Puja Widikda[1], Farid Mujayyin[2], Rizkiyah Nur Putri[3]
[1,2,3] Program Studi Teknologi Mesin Politeknik Semen Indonesia-Gresik,

Email :widikda@gmail.com, faridmujayyin@gmail.com, dosen.putri@gmail.com

Abstract

Water is a source of our daily lives, both to meet the needs of society and industry. We all agree that there is an opinion that states that water is a necessity that cannot be replaced by other goods. In reality, currently the real conditions are at an alarming stage if not critical, both in terms of water quantity and quality. If this condition is left untreated and not anticipated from now on, it will become a potential conflict and disaster for industrial society in particular. The limited supply of water resources and the challenges of managing water in accordance with sustainability are very necessary. Handling problems in the water resources sector, such as reservoir or dam infrastructure for water sources, river water management, water purification, in the future, if not done immediately, could have an impact on disrupting human activities and welfare, so that in the future it requires comprehensive handling.

Problems with river water processing in the water treatment area are based on observations of brownish water color, pH values above 9 mg/l, water quality not in accordance with established standards. Based on interviews with water treatment duty officers, the turbidity of the water is caused by particles suspended in the water which causes the water to look cloudy, dirty, even as if there is mud deposits. According to the procedure for the purification storage tank, chemical mixing has been added to the chemical tank. After being identified in the field, the electric motor driving force as the energy source and the gearbox used to reduce the rotation speed to only 60 (Rpm) experienced a slowdown in stirring in the mixer agitator so that the coagulation process was slow so that the solid particles in the water content formed less than perfect flocs. Method of solving problems in water treatment with efforts to improve component settings with the aim of improving the standard operational performance of water treatment procedures and maintenance procedures such as setting speed and improving the stirring power of the agitator mixer by rotating the impeller which was initially not mixed

evenly, it is hoped that the chemicals and water will react perfectly so that the water becomes clear. The results of improvements and settings on the water treatment components show that the water pH level has increased and the quality of water clarity has reached 7.71 NTUs.

Keywords: Maintenance, Watertreatment, Agitator

1 INTRODUCTION

In fact, Indonesia has an abundance of water, but its management seems still not optimal. As a tropical country, our country is fed by large rivers, abundant springs from the mountains, lakes, groundwater and heavy rainfall (Dea Argita et al 2020) . In fact, Indonesia together with 5 other countries (Brazil, Russia, Canada, China and Colombia) control 50 percent of the world's fresh water reserves. To build a sustainable water management and wastewater management system, bold steps are needed to overcome problems, including polluted water quality caused by the behavior of residents who throw rubbish carelessly into rivers and industrial waste disposal that does not meet environmental quality standards (Karapanagioti, (2016). The importance of clean water treatment is a process carried out with the aim of destroying substances and particles whether chemical, physical or biological in nature which are considered to be harmful to the water used by the community.

Water treatment in industry is a processing process to improve water quality so that it is more acceptable for final use under certain conditions. The intended end use is drinking, industrial water supply such as for cooling, irrigation, river flow maintenance, water recreation or many other uses including safely returning it to the environment. The current standard for clean water needs according to the world body UNESCO is 49.5 liters/capita/day (Farid Mujayyin and Dea Argita Gunarso, 2020). However, the agency stipulates that the basic human right to water is 60 liters/person/day. Meanwhile, the need for clean water in the city is moderate, according to the directorate general of creative works, the department of public works, the need is 110 liters/per capita/day. River water in urban areas, even though its condition is murky, can still be used for daily needs if utilized, but it requires a process to be carried out to improve the water quality so that it can be accepted or used for final use with clear water quality conditions. A water treatment installation system is needed to treat water in raw or contaminated form which will then receive special treatment. So it can produce water that can be consumed and meets appropriate quality standards.

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Figure 1. Watertreatment Technology

The identification results of initial observations have found standard procedures for cement factory water treatment plants as follows; First, the river water is sucked using a pump in Gunungsari, then put into a booster tank, then pumped into a reservoir, which will then go through various processes, starting from an aerator, then ozone with alum, reverse osmosis, high filter water filtration, UF filter or ultrafiltration. The separation process uses a membrane with pore sizes ranging from 0.1 to 0.001 microns. Usually the UF membrane will remove impurities from substances that have high molecular weight, colloidal materials, as well as organic or inorganic polymer molecules in the settling tank. In the tank there is an agitator whose function is to stir the river water content which has been given chemicals in the form of alum or chlorine which function to purifies the water, it's just that the mixing machine experiences a slowdown in rotation. The next stage then goes to carbon filter 1, 2, 3, 4, which is a machine for filtering dirt in clean water, this tool can also absorb organic content contained in clean water. Next, the results of this stage will be entered into the ozone so that it can be checked whether everything is in accordance with water quality standards or not. If so, then in the second process the water is moved through the sedimentation, clarifier, aeration, custom bacteria and equalization processes. After that, the results will enter the water reservoir which is often referred to as primary. Only then does the final stage enter, namely the bar screen process on the reservoir tank so that the water will then be pumped to various industrial buildings and community housing (Joao Matias et.al , 2015)

2. METODOLOGY

The research method is qualitative descriptive, in accordance with the resolution of facts in the field, how efforts to make the water processing production process clean and

optimal require improvements in water treatment technology for industry, which is expected to prevent corrosion, sludge scale or dirt deposits as well as chemical particles that should be mixed together. To minimize the accumulation of dirt, it can be removed separately and while chemicals are applied, however these chemicals easily melt into all the water content, a well-functioning water treatment equipment infrastructure is needed. The purpose of maintenance or repairing is to set water treatment components that experience system failure that does not function optimally, which can occur when the industrial water treatment process becomes unbalanced and important components are exposed to dangerous corrosive substances. It is necessary to increase the speed of stirring and mixing chemicals according to the minimum limit in water. Appropriate stirring operations create movement within the stirred material to cause mixing. Mixing operations aim to reduce differences in conditions, temperatures or other properties contained in a material. The results of the mixing are expected to produce homogeneity, togetherness at every point in the mixing. The impact of the mixing results is that the situation is completely the same, a chemical reaction occurs in the water content in accordance with community use standards (Mutairah, 2020)

The research premises and equipment are located at the Gresik Water Treatment Factory, the types of equipment used include; water pump, mud pump, settling tank, reservoir, mixer agitator, water piping, pump electrical power components, water pressure automation sensor, pH meter, TDS meter, and alum chemicals, as well as chlorine if needed. Based on Minister of Health Regulation 32 of 2017, the standard operational procedures for processing river water or liquid waste in the water treatment system are as follows;

1. ozone process

This ozone process has various stages that the contaminated water must go through. The various stages in the form of disinfection are the process of adding/adding the chemical chlorine at a dose of 100 ppm, 150 ppm, up to 200 ppm, which aims to kill pathogenic bacteria contained in the water, detoxify the water to make it fresh and finally deodorize the provision of alum as a water purifier and remove unpleasant smell and aroma in the water

2. Reverse Osmosis Process

Reverse osmosis or RO is a process of filtering large molecules and ions in a solution by applying pressure when the solution is on one side of the selection membrane (filter layer).

3. UF Filter or Ultrafiltration process

The next process is a filtering method known as UF Filter or Ultrafiltration which functions to separate small particles and some dissolved substances from water.

4. Carbon Filter

Furthermore, carbon filter is a process used to purify water and also remove odors. This process is one of the most important so that the water is not only safe but also comfortable to consume.

5. Sedimentation Process

The sedimentation process is a step taken to separate two different media, namely clear water and sediment in the form of sand and various other particles. This process is an important process.

6. Aeration process

Aeration is a process used to reduce organic substances. This stage is equipped with a tool that can help with aeration in the form of an air blower so that waste water can be blown into the air. The final stage of this process will break down the pollutant compounds in the waste water.

7. Custom Bacteria

The next process is custom bacteria which functions to reduce the general concentration of bacteria. This step will also eliminate pathogenic bacteria that can cause disease.

8. Equalization process

Equalization is a process used to equalize the water flow in terms of wastewater quality which usually uses a tool like the previous process, namely a blower.

9. Process bar screen

The final process in the water treatment plant is a bar screen which functions to filter objects that are flooded in the water. So the final result will be very good and can be used immediately. The following is a flow diagram of the research.

The achievement indicators targeted in the research are as follows;

a. Determine standard watertreatment operational procedures
b. Carrying out an inspection to identify damage to water treatment components and detecting the cause
c. Determine the optimal settings for the settling tank mixer agitator component
d. carry out repairs and replacements of watertreatment components and results
e. The results of checking the pH of the water after repairing are expected to be below nine
f. As a result of processing river water, the water will be clearer and cleaner so that the water can become more sterile and can be used for activities

3 RESULT

Standardization of main components before operational watertreatment technology with the condition of machine elements;

1. Building chlorine, chlorine, PAC, parking area and generator with standard conditions:
- clean, the room is free from sawangs, floors, doors, windows, reservoirs, tubs, mixer processes, tools, clean from dust.
- water tank tank window door, mixer tools are in good condition/not damaged
- no unnecessary equipment is in the room
- the surrounding environment is in good clean and safe/comfortable condition

2. Transfer pump & water tank with standard conditions;
- Motor units, pumps, pipe lines, water hose valves are clean/not dirty
- bolts fastening the pump motor, pipe flange, junction box, not loose, neat cables, pump equipped with protection
- all pump indicators are in normal condition, and the power cable connection is tight
- Lube pump motor & water tank in good condition

3. Watertreatment office with standard conditions
- clean the room, doors, windows, furniture, tools, lines, pipes, valves and clean aerator tubes and sawang dust
- building rooms, doors, windows, furniture, pipe line equipment, valves & aerator tubes are in good condition/not damaged
- no items, equipment, furniture, that are not needed are in the room
- the surrounding environment is in good clean and safe/comfortable condition

4. Prayer room / toilet with standard conditions
- clean the room, the water scoop door, the floor and the toiletries and prayer equipment are clean from dust/sawang
- the building of the water tank door for bathing and prayer equipment is clean from dust/moss
- no unnecessary equipment is in the room
- the surrounding environment is in good clean and safe, comfortable condition

Reactive maintenance strategy is maintenance where the machine is run until damage occurs without any action or planning. In general, reactive maintenance does not require any upfront costs or need to carry out repair planning. However, looking further, this strategy will cost more because the machine will suddenly stop working time, the availability and ordering of urgent spare parts, member safety, and members who need to work overtime. Reactive maintenance will drain time and factory operational costs in the long term. Reactive maintenance is also known as breakdown maintenance which focuses on equipment that is

damaged and then returning it to normal operation by repairing or replacing damaged components and tools.

The problem with the agitator mixer is the main thing because the machine can be used to regulate the process of stirring and mixing chemicals in the chemical tank so that it is optimal, apart from increasing the stirring in the coagulation and flocculation processes in the primary deposition system, the results are predicted to be even. Improving the agitator settings is one way to ensure that installation and performance at stable engine speed do not decrease. Inspection of the propeller for fast mixing and non-slipping at small chemical doses, the results of standard construction material inspections depend on the condition requirements, there is no corrosion of chemicals or water content that can interfere with the mixing blade (Seyed Mostafa Hallaji et al, 2022). The procedure for setting the tank mixer agitator in water treatment technology essentially returns to the working system as stirring in the chemical mixing tank for the coagulation and flocculation processes in the primary deposition system. The working principle is to rotate the impeller so that the water can interact and then a perfect mixing process occurs. The agitator components include a motor drive, a gearbox to reduce motor speed (rpm), an axle or shaft and an impeller blade as a stirring component which is positioned downwards in the sediment tank. The setting is by turning off the connected electric motor panel, then adjusting and improving the performance of the agitator by tightening the coupling shaft connection of the driving motor with the impeller.

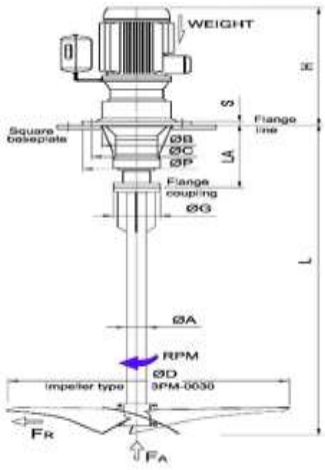


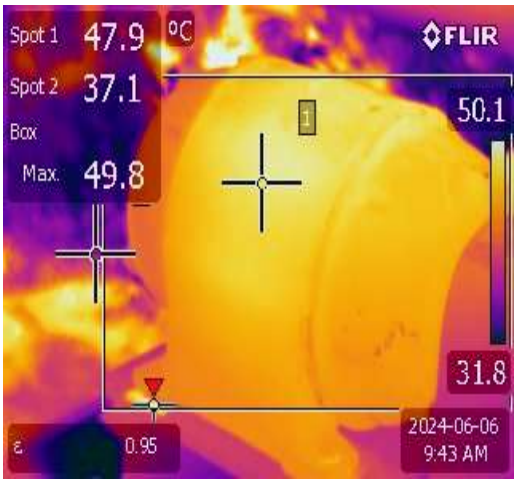
Figure 2. The tank mixer agitator is equipped with a propeller

The results of the identification of the standard manual book specifications for tank

agitators in water treatment in water treatment include a gearbox, marine propeller type, motor power 0.18 -1.5, output speed 900 to 1400 Rpm, impeller Ø 90-160, max shaft length 1500, max Eight 30. After knowing the standard specifications, they will be compared before and after use during water treatment during operation until breakdown maintenance occurs (Khalid Kaddoura et al , 2019(Seyed Mostafa Hallaji, et al 2022)

The real results of checking rpm using a laser analyzer tool are in the explanation below which shows the measurement results of agitator one with a rotation condition of 1470 rpm, agitator two is low, agitator three is 2245 rpm, while agitator four is closed. Based on the study, based on monitoring, the performance of the agitator is still in the decent category even though the mixing of the water and chemical mixture is very high in 3 hours, providing 3 buckets of chlorine, so repairs on agitators three and four are needed.

The general monitoring checklist results for agitator components and vertical and horizontal pumps for water treatment technology using a tool analyzer, tachometer are as follows. Untuk mendeteksi suhu dan kondisi mesin sebelum terjadinya kerusakan pada komponen mesin seperti downtime produksi, mencegah pemborosan, dan berupaya mesin menjadi efisien. Secara fisik komponen mekanik yang berputar yang bersumber dari listrik berpotensi mengalami keausan atau kerusakan maka dilakukan monitoring secara infrared thermoghraph untuk mendeteksi dan mengidentifikasi secara berkala pada komponen watertreatment ; motor, bearing, couplings, electric cabinet. Terlihat hasil monitoring pada komponen motor pump



Fugure 3. result monitoring thermoghraph motor horizontal pump

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Figure 4. result monitoring sambungan coupling horizontal pump

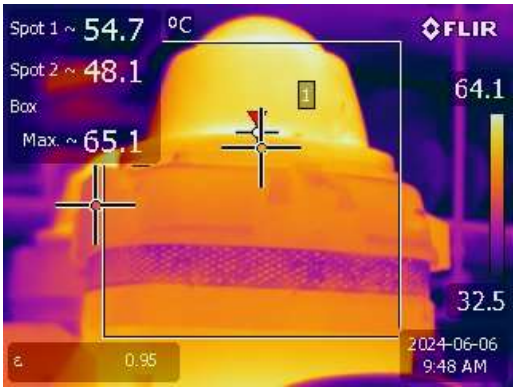

Figure 5. result monitoring thermograph motor vertical pump

Figure 6. result monitoring gearbox agitator 4

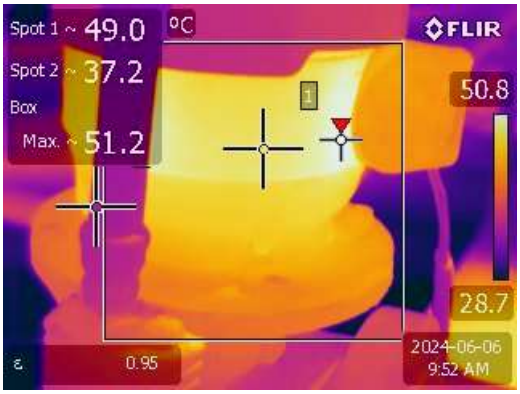

Figure 7. result monitoring motor agitator 2

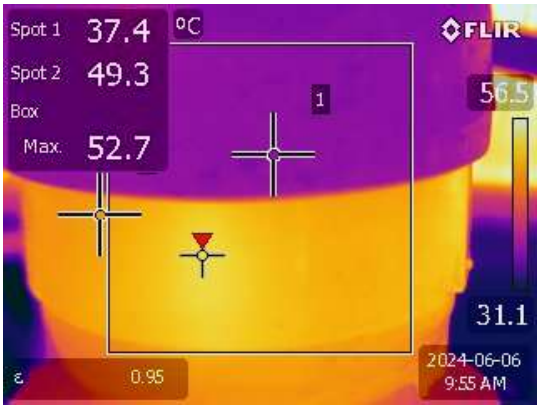

Figure 8. result monitoring thermograph agitator 3

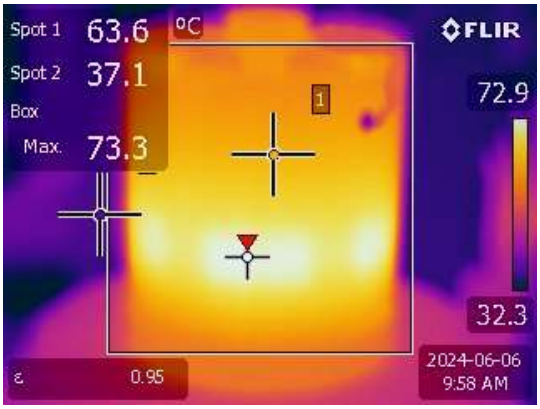

Figure 9. result monitoring thermoghraph motor agitator 1

Table 1. Results of monitoring temperature and component rotation

No	Component machine	Temperature	Rpm
1	Horizontal Pump	50,1 / 31,8	1472
2	Coupling horizontal pump	45,7 / 30,6	1020
2	Vertical Pump	64,2 / 32,5	1482
3	Motor Agitator 1	72,9 / 32,3	1470
4	Motor Agitator 2	50,8 / 28,7	Low
5	Agitator 3	56,2 / 31,1	2245
6	Gear box Agitator 4	45,8 / 30,6	Close

Meanwhile, the results of inspections on the pump and four agitators for water treatment technology tank mixers are outlined in the visual inspection results table. Agitator one only experienced leaks in the oil compartment and gearbox. The two-surface agitator experiences corrosion, leaks in the gear box, wear on the drive belt, the surface experiences dust and hardened dirt, the gearbox fasteners crack or break, the transmission components require oil and grease lubrication. Based on the results of visual monitoring, agitator three experienced corrosion on the surface, wear occurred in the transmission part due to lack of lubrication on rubbing components and cracks. Agitator four experienced corrosion on the outer surface, and lack of lubrication on internal components such as transmission and gears.

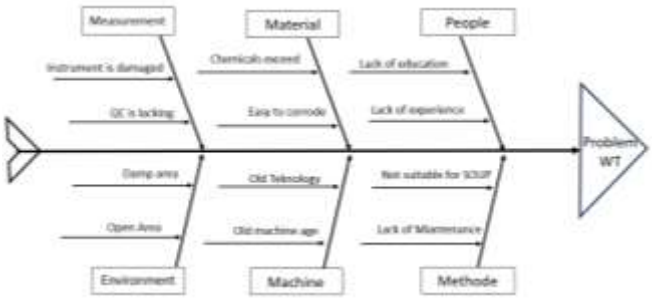

Figure 10. fishbone diagram problem watertreatment

The cause of damage to the agitator and errors in water treatment-based water treatment is the human factor, lack of education because the employees are only vocational/high school graduates and have no experience in managing water treatment. At the very least, employees are advised to take part in training, because the method is not appropriate to the operating procedures so that chemical levels can be reduced. Perfect filtration in the agitator mixing tank, and lack of maintenance during operation, from the

material factor of excessive use of chemicals so that the dosage needs to be reduced, piping materials and tank components that are prone to corrosion are recommended routinely once a year. Errors in engine factors and the appearance of the technology are relatively old so they require special attention and require a stock of spare parts for replacement if there is damage. Errors include the absence of measuring tools to check machine components to find out before damage occurs, weak quality control so that the results of clean water treatment are not optimal. Watertreatment errors are also caused by environmental factors, namely all the main components of the watertreatment are open so it is very prone to dust or dirt entering the water treatment system, secondly, namely the damp area because of course there is liquid that is wasted so that some of the environment becomes damp.

Meanwhile, the conditions in horizontal pumps and vertical pumps experience vibrations but are still in normal condition. These vibrations are caused by worn bearings, pressure and friction that exceed limits, high heat temperatures due to friction, the presence of cavities or gaps in the connection components of pump parts, and misalignment of misalignment between the shaft coupling connection and the drive motor coupling. The method used to detect damage is by using visual inspection and direct measurements using tools. The results are as follows.

Table 2. Vibration Measurement Before repair

No	Component	Time	Vel, Rms (RMS)
1	Motor Agitator 1	10.41.19	0,10
2	Motor Agitator 1	10.41.43	4,13
3	Motor Agitator 1	10.42.08	1,91
4	Gear Box Agitator 1	10.42.43	1,26
5	Gear Box Agitator 1	10.43.15	0,77
6	Motor pump horizontal	10.31.12	2,06
7	Motor Pump horizontal	10.31.43	2,42
8	Horizontal pump	10.32.17	1,55
9	Horizontal pump	10.32.52	1,13
10	Motor Agitator 2	10.44.52	0,95
11	Motor Agitator 2	10.46.03	0,57
12	Gear box Agitator 2	10.46.47	1,14
13	Gear box Agitator 2	10.47.14	1,51
14	Motor Agitator 3	10.49.04	0,43
15	Motor Agitator 3	10.49.39	0,42

No	Component	Time	Vel, Rms (RMS)
16	Gear box agitator 3	10.50.17	0,41
17	Gear box agitator 3	10.50.49	0,40
18	Motor Agitator 4	10.52.09	4,76
19	Motor Agitator 4	10.52.38	1,09
20	Gear box agitator 4	10.53.05	1,58
21	Gear box agitator 4	10.53.34	1,09
22	Motor pump vertical 2	10.36.58	2,46
23	Motor pump vertical 2	10.37.26	1,88
24	Vertical pump 2	10.38.01	0,27
25	Pompa Vertical 2	10.38.57	0,49

Based on measurement data, it shows that the highest vibration occurs in the agitator motor 1, followed by the horizontal pump and the vertical pump. The cause is the influence of different working principles on each agitator. Based on the study of the working mechanism, direct contact between the driving motor and the shaft components does not pass through. transmission causes vibrations, but the vibrations are still categorized as normal.

After repairs and settings were carried out on each component of the water treatment technology, there were several changes, including the following.

Table 3. Post-repair vibration measurements

No	Component	Time	Vel, Rms (RMS)
1	Motor Agitator 1	09.41.19	1,40
2	Motor Agitator 1	09.41.43	3,03
3	Motor Agitator 1	09.42.08	1,91
4	Gear Box Agitator 1	09.42.43	1,26
5	Gear Box Agitator 1	09.43.15	0,77
6	Motor horizontal pump	09.31.12	2,06
7	Motor horizontal pump	09.31.43	2,32
8	Horizontal pump	09.32.17	1,55
9	Horizontal pump	09.32.52	1,13
10	Motor Agitator 2	09.44.52	0,95
11	Motor Agitator 2	09.46.03	0,57
12	Gear Box Agitator 2	09.46.47	1,14

No	Component	Time	Vel, Rms (RMS)
13	Gear Box Agitator 2	09.47.14	1,51
14	Motor Agitator 3	09.49.04	0,43
15	Motor Agitator 3	09.49.39	0,42
16	Gear Box Agitator 3	09.50.17	0,41
17	Gear Box Agitator 3	09.50.49	0,40
18	Motor Agitator 4	09.52.09	3,56
19	Motor Agitator 4	09.52.38	1,09
20	Gear box Agitator 4	09.53.05	1,58
21	Gear box Agitator 4	09.53.34	1,09
22	Motor pump vertical 2	09.36.58	2,46
23	Motor Pump vertical 2	09.37.26	1,88
24	Vertical pump 2	09.38.01	0,27
25	Vertical pump 2	09.38.57	0,49

The limited supply of water resources and the importance of sustainability remain challenges for current water management. Building sustainable water and wastewater systems requires bold steps to address turbid water problems in water treatment, including leaks, water quality, customer satisfaction, service disruptions, and energy savings. To meet industry operational standards regarding water issues, industry must design and manufacture industry standard water treatment equipment that can provide high quality water. Technical problems were found to be a decrease in the performance of the agitator, changing speed due to the engine's electrical power and requiring repairs or resetting.

Reactive Maintenance is also known as breakdown maintenance which focuses on equipment that is damaged and then returning it to normal operation by repairing or replacing damaged components and tools. Repairing the maintenance of water treatment components is an activity to maintain and maintain existing facilities as well as repair, make adjustments or replacements necessary to obtain operational conditions for processing river water into clean water in accordance with existing plans. Treatment stages are as follows;

1. Description of watertreatment inspection activities;

- carry out light checks on the drive motor, shaft, shaft sleeve, gland packing, bearing, coupling and stuffing box
- check the oil volume
- clean the oil filter
- measure vibration values in bearings, couplings and pump motors

- check the transmission rotation
- Clean the stuffing box from dirt and dust stuck to it
- measure the engine noise level
- tighten the nuts and fastening bolts, replace them if any are worn
- make a list of defects/damage that need to be considered during the next repair

2. Description of moderate repairs
- check for wear or leaks on the shaft and gland packing
- disassemble 2 to 4 pieces of equipment that are likely to be worn or dirty and clean them, if any parts are damaged, replace them
- check the rubber coupling, replace it if it is damaged
- add or replace lubricant in the bearing
- carry out repairs if necessary or have been recorded on the defect/damage list during the inspection stage. Complete repair

Other treatments in the scope of watertreatment
- remove or, if possible, avoid allowing solid waste such as plastic, stones, sanitation equipment and other non-recyclable objects to enter the water treatment installation system
- especially for water treatment installations, avoid the entry of toxic chemicals that interfere with the proliferation of bacteria whose job is to reduce waste or black water.
- Clean the holding tank at least once a week periodically to remove solid objects that interfere with the processing process

Routine maintenance of wastewater distribution pumps, blowers and circulation pumps
- Especially for water treatment, it is necessary to check vibrations, rotating parts such as gears or bearings, temperature and oil analysis regularly and replace damaged components.

Monitoring results on the main component of water treatment, namely the centrifugal pump. Centrifugal pumps are used as a tool or machine to move water through pipes from one place to another. In short, centrifugal pumps use mechanical power to produce technical power. So the water will continue to flow without any obstruction. A centrifugal pump consists of a suffing box which functions to prevent leaks, a packing which is used to reduce fluid leakage from the pump, a shaft which is needed to transmit the twisting moment, a shaft sleeve to protect the shaft from erosion and corrosion, and a vane which is a path for the fluid to pass through the impeller and casing which is the outer protector. The internal components of a centrifugal pump, especially the impeller, consist of several parts. The impeller is an object made of several parts. The impeller is a componentImprovement steps for tank mixer agitators in watertreatment technology

1. instructions when repairing, use personal protective equipment (PPE) K3 (occupational health safety) according to its function (helmet, safety shoes, mask, glasses, gloves)
2. The scope of the reconditioning work is calculated to be carried out by 2 people
3. Tools used: bun hammer, tipper, pliers, ring wrench, L key, wrench, paring knife
4. Measuring tools used when reconditioning include calipers, micrometers, steel rulers
5. Consumables for repairing include oil with a viscosity of IHS 460, Greas Evalia, Majun, gaskets, wd cleaning fluid.
6. Clean the oil drip leaks around the agitator reducer 1,2,3,4 using a gun, iron brush, WD fluid
7. Remove the coupling using the L key, fitting ring and hammer
8. Remove the reducer with the L key and fitting ring
9. Tap the oil and clean the oil chamber
10. provide spare parts for replacing seals and bearings if a leak is identified
11. remove the coupling – shaft
12. remove the impaler / stirrer
13. Turning of the shaft-coupling component is carried out if the damaged component undergoes repair, replacement of parts/repair of the surface structure after welding.

The clean water test results after the water treatment equipment repairing process returned to normal and were ready to be operated to improve the quality of clean water production performance. The following are the results of checking clean water after repairs are carried out as follows.

Table 4. Watetreatment clean water test results

Parameter	Unit	Standard	Results
Physics			
temperature	°C	Udaza Ia •c	28.0
color	Pt/Co	SO	0,50
Turbidity	NTU	25	168
TDS	mg/L	1000	316
Smell		Odorless	Odorless
Flavor		Do not feel	Do not feel
Chemistry			
pH		6,5-8,5	7,78

Parameter	Unit	Standard	Results
Iron (Fe)	mg/L		0,129
Flourida {F)	mg/L	1 s	0,44
total hardnes CaCO 1	mg/L	500	228,35
Manganese (Mn)	mg/L	0,5	0.020
Nitrate (NO3-N)	mg/L	10	3,69
Nitrite (NO2-N)	mg/L	1	0.001
Sianida (CN)	mg/L	0,1	0.004
Surfactan anion (MBAS)	mg/L	0,05	0.02
Mercury (Hg)	mg/L	0,001	0.0004
Arsen (As)	mg/L	0,005	0.001
Kadmium CD)	mg/L	0,005	0.0001
Kromium heksavalen (Cr VI)	mg/L	0,05	0.006
Selenium (Se)	mg/L	0,0 1	0.001
Seng (Zn)	mg/L	I5	0,027
Sulfat (SO4)	mg/L	400	40,30
Lead (Pb)	mg/L	0,05	0.001
Food value (KMnO4)	mg/L	10	513
Pesticide Total	mg/L	0,1	0.05
Benzene	mg/L	0,01	0.001
Biology			
Total Coliform	MPN/l OOmL	50	4O
E.Coli	MPN/ 100mL	0	0

The results of testing the quality of clean water after preventive maintenance and repairing on the main components of water treatment technology are divided into 3 parameters, namely physical, chemical and biological based on the table above. Between the measurement results and the quality standards, clean water quality is still of normal standard and suitable for use.

4 CONCLUSİON

Water treatment technology has many components that must be maintained regularly so that the equipment has optimal performance. The main components whose reliability must be considered include pumps, agitators, tanks, pipes, valves and water treatment electrical systems.

Inspection and repair of agitators is an effort to prevent more serious damage, supported by predictive maintenance methods. The working principle of processing river water to make it clean with a pH close to clean water quality standards can be improved.

5 Acknouledgement

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