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Abstract :

MARDI developed the RiceFert formulation to assist in fertilizer recommendation rate for optimal paddy growth. The formulation followed an adjustable soil test–target yield equation (ST-TY) into dedicated software. The output from the RiceFert software includes a total rate of N, P2O5, and K2O fertilizer (kg/ha) and split application or straight fertilizer rate (kg/ha). Additionally, the output from RiceFert was integrated to GIS to produce maps according to the specific fertilizer recommendation rates. With interpolation techniques, thematic maps added more information, such as total area coverage according to individual classification classes. This paper discusses the overall process of fertilizer recommendation rate for paddy fields, starting with the RiceFert formulation, followed by map production using interpolation techniques according to the fertilizer recommendation output. The RiceFert strategy is expected to benefit local authorities because it offers vital information to farmers for optimal rice growth and output.

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Title : ANALYSIS OF FLUID TYPES AND MINERAL FUNCTION CLUSTERS IN THE GEOTHERMAL MANIFESTATION AREA OF GEOTHERMAL SPRINGS, TOLOK I VILLAGE, TOMPASO DISTRICT, MINAHASA REGENCY

Abstract :

Geothermal manifes-tations of hot springs are formed due to the flow of hot fluid that comes from rock fractures that are below the surface. The nature of various rocks and the heat produced from below the surface makes the characteristics of each geothermal system different. One of them has an impact on each chemical content of the fluid that appears on the surface varies. The purpose of this research was to find out more about the condition of existing hot springs as the object of study in determining the type of fluid and functional groups manifestation geothermal hot

springs of Tolok I village, Tompaso, Minahasa Regency. For determining the type of fluid laboratory tests were carried out and the results of these laboratory tests were conducted by Liquid Chemistry Plotting on the ternary plot diagram. To analyze fluid functional groups, water samples were tested using FTIR spectroscopy. The measurement of physical parameters was also carried out to support this research. The results showed that the type of fluid in the study area was chloride type with a percentage of 51% and the functional groups obtained were functional groups of amides, ketenes and carbonates.

Full article

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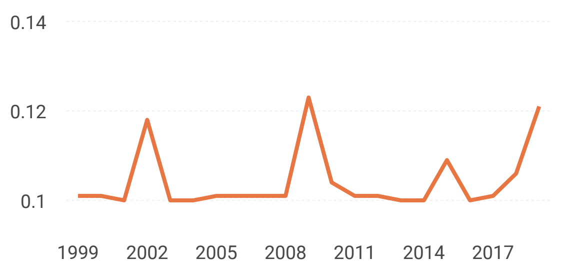

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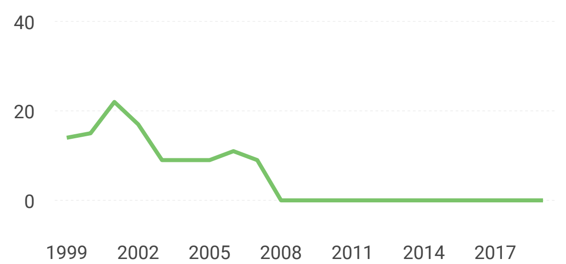

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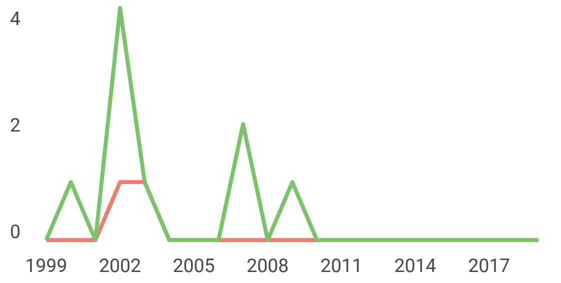

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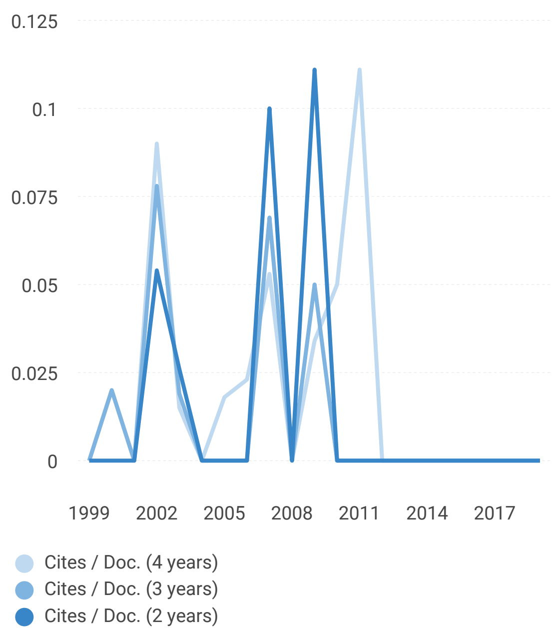

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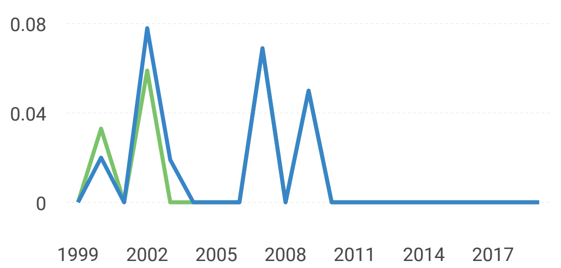

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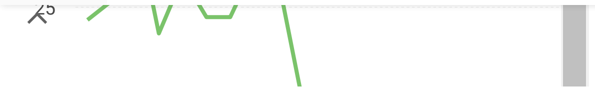

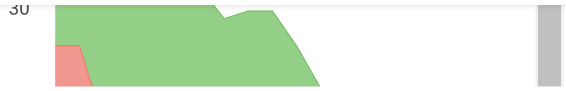

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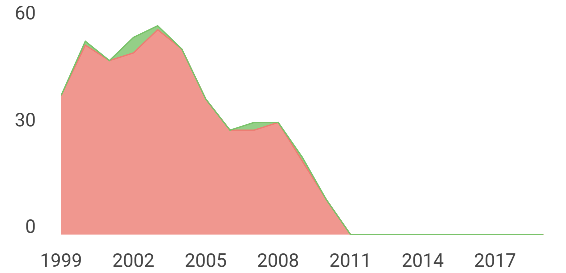

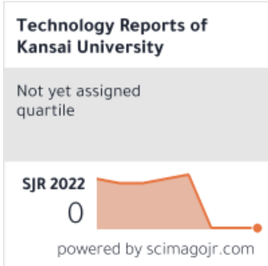

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A Study of Archimedes Screw Turbine Scheme of Pico-Hydro Power Plant Using the Utilized Irrigation Water

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Abstract— One completion in complying the energy needs is to utilize Renewable Energy that is as the alternative to encounter the decreasing fossil-energy. Hydro Power Plant is the one that utilizes hydro as the source. Technically, there are three main components of Hydro Power Plant, namely kinetic energy, turbine, and generator. The turbine aims to convert the water-flow to kinetic energy through the rotor shaft. Archimedes Screw Turbine has used for this research hence it performs at each different for the low-head and zero-head stage. The flowrate that has the certain head stage can spin the turbine using generator to produce electricity. The concern of this research is to know how the scheming turbine can utilize hydro energy that is in reservoir and this aims to scheme the turbine. The research finding shows that the higher flowrate, the higher electrical power can be produced. The calculation results receive 9,4435watt for the lowest electric potential applying to 0,0030 m^3/s for the flowrate, and 203,4246watt for the highest electric potential applying to 0,0641 m^3/s for the flowrate. Thereafter, the scheming of the turbine specifically has a 0,1955 m for the diameter, 0,0586 m for the rotor blade and 0,2346 m for the pitch.

Keywords— Hydroelectric Power Plant, Archimedes Screw Turbine, Flowrate, Electrical Power.

1. Introduction

One completion in complying the energy needs is to utilize Renewable Energy that is as the alternative to encounter the decreasing fossil-energy. Renewable Energy utilizes the energy sources that is environmental-friendly. Indonesia has the high potential for the water- sources, hence it can be utilized to comply the electric needs throughout the country. Hydro Power Plant is one of Renewable Energy sources that utilizes water sources. Hydro Power Plant is one of the Converted-Renewable Energy sources that is net and environmental-friendly. This power plant utilizes the flowrate to produce the electricity and it is developed to the area that hasn't yet had the access for the electricity. Hydro Power Plant has its advantages and disadvantages. The advantages of this power plant are having simplified construction, not causing pollutants and integrated to other programs as irrigation. The disadvantages are the continual discharge-water and fluctuated [2][3][10].

Hence, the scheming of the power plant should be done to produce the optimum electricity using the low-flowrate. Technically, Hydro Power Plant has three main components, namely, kinetic energy, turbine, and generator. Turbine is one of main components that is the one generates the electricity. Turbine converts the energy of the discharge-water to kinetic energy through the rotor shaft, its rotation can rotate the generator therefore producing the electricity. The driving force of turbine is from the waterfall, the river or the irrigation rate using the use of head and flowrate of its waterfall [3][7][16].

Archimedes Screw Turbine is the one chosen to be used. This turbine can be efficient to perform technically at the low-head elevation and the zero-head stage. In fact, the low-head of the discharge-water can rotate the turbine which links to the generator to produce electricity [1][4].

This research has been done at the area of paddy field in Desa Tanjung Raja. Desa Tanjung Raja, the district of Muara Enim, is one of the areas that has the most populace as farmers [18]. Desa Tanjung Raja has 12hectar of rainfed lowland rice area. The watering systems employ not only the raindrops but also the water-contained in 29 m^3 reservoir. The valve is opened to paddy field area due to the different stage of elevation [18]. In watering system, the outlet-water is employed to Hydro Power Plant. In this research, it shows the result of the potential of water sources as the consideration in scheming the turbine. The concern of this research is to know how the scheming turbine can utilize hydro energy that is in reservoir and this aims to scheme the turbine.

2. Review Of Literature

2.1 Hydro Power Plant

Hydro Power Plant is the one that utilizes the potential kinetic energy of the hydro to drive the turbine in producing the electricity. The higher water is fallen, the higher potential energy that is converted to the electricity. Hydro Power Plant is one of Renewable Energy that is environmental-friendly. This power plant has been chosen because of the simplified construction, can be easily operated and maintained, and easily prepared for its spares. Due to the uncommon location, the scheming for each hydro power plant needs to be different to be optimum. Based on the output, there are six types of Hydro Power Plant [6][8]:

(1) *Large-hydro* : more than 100MW
(2) *Medium-hydro* : between 15 – 100 MW
(3) *Small-hydro* : between 1 – 15 MW
(4) *Mini-hydro* : up to 100 kW, no more than 1 MW
(5) *Micro-hydro* : between 5 kW – 100 kW
(6) *Pico-hydro* : no more than 5kW

2.2 Water Discharge

Water Discharger is the volumetric flow rate of water that is transported through a given cross-sectional area. It is stated in Indonesian Standard, the discharge can be expressed in cubic meters per seconds (m^3/s). It can be determined using the current meter.

2.3 Head

Head is the altitude different between the inlet and outlet.

2.4 Penstock

Penstock is to connect the head to the turbine.

2.5 Archimedes Screw Turbine

Archimedes Screw Turbine is one that being used in hydro power plant. It is from the ancient-concept of the mathematician and Archimedes physician (287 – 212 AD). It is also called by Archimedes Screw besides the Screw Turbine. Mayrhofer states that this turbine is considerable to use for the low-head stage of its elevation even to zero-head stage [1][4][9][12][17].

In utilizing this turbine, it depends on the position of its head. The forming of the turbine can be seen in Figure 1.

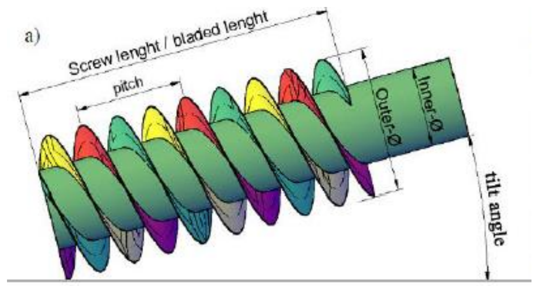

Figure 1. Parametric Screw Turbine

The scheme of the hydro power plant using the screw turbine can be seen in Figure 2. The concept of this turbine is the flows of water weight presses down onto the blades of the turbine which in turn forces the turbine to turn to perform the generator [11][14][15].

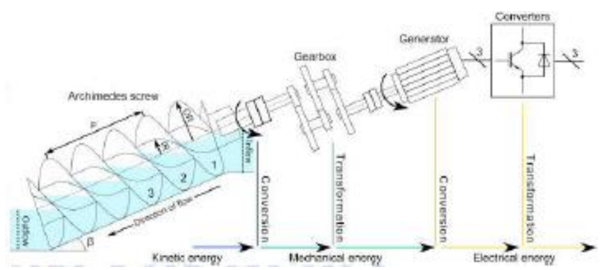

Figure 2. The Scheme of The Hydro Power Plant using Screw Turbine

There are two types of the Screw Turbine, namely Steel Trough and Closed Compact Installation. Steel Trough Turbine is the one with the opened-blade hence the water flows only as sized as the bucket. Whereas, Closed Compact Installation Turbine is the one with the full-closed installation, therefore the water flows fully covered the installation [13].

2.6 Water Potential

The elevation of its flowing water is one possibility to have the potential of its hydro. The water flows with the discharge Q (m^3/s) turns into the blade has rotated the turbine to produce the electricity.

3. Reseacrh Methodology

3.1 Location

This research had been done in Reservoir Area as the irrigation source in Desa Tanjung Raja, the district of Muara Enim, about 190km far from Palembang, province of South Sumatera [18].

Figure 3. The Location in Desa Tanjung Raja

3.2 The Object

Hydro Power Plant was used as the object using the hydro source of the reservoir in Desa Tanjung Raja, the district of Muara Enim.

3.3 Structural Design Approaches

Manufacturing the screw turbine of this study utilized the water of the reservoir that was linked to 6inch of PVC penstock. Turbine was moved by the reservoir water through the penstock. There were some components in scheming the Hydro Power Plant, namely penstock, screw turbine, and generator as it has seen in Figure 4.

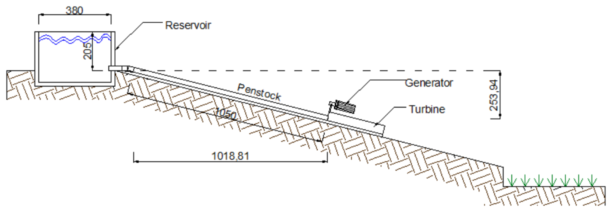

Figure 4. The Scheming of Hydro Power Plant

3.4 The Angle of Elevation of The Penstock Calculation

A position inclined of the penstock affected the water velocity to move the turbine. The form of the angle of elevation of the penstock is as follows:

$$sin\ \alpha = \frac{B}{Lp} \qquad (1)$$

$$\alpha = sin^{-1}\left(\frac{B}{Lp}\right) \qquad (2)$$

Where:

α = the angle of elevation of the penstock

B = potential *head* (m)

Lp = the length of the penstock (m)

3.5 The Cross-Sectional Area of the Penstock

The penstock was used in 6inch with the circular shaped. The form of the area of the circle is as follows:

$$A = \frac{1}{4}.\pi.d^2 \qquad (3)$$

Where:

A = the cross-sectional area of the penstock (m^2)

d = inner diameter (m)

3.6 The Water Velocity

In this research, the water velocity was calculated by current meter, this calculation was done by the various of the reservoir opening-valves, the result can be seen in Table 1.

Table 1. The Water Velocity

No.	The Reservoir Opening Valves	Water Velocity	Unit
1	¼	2,2970	m/s
2	½	4,1330	m/s
3	¾	6,0990	m/s
4	full	7,1210	m/s

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3.7 Water-Discharge

The form of water discharge is as follows:

$$Q = A.v \qquad \text{(4)}$$

Where:

Q = flowrate in volume per time
A = the cross-sectional area
v = water velocity

3.8 Screw Turbine Scheme

The screw turbine was used in this research since the low-head and zero-head stage each different. Scheming the turbine was considered by using the various materials that can be found in marketplace.

3.8.1 Dimension of Screw Turbine Calculation

The form of Archimedes Screw using the flowrate Q (m^3/s) is as follows:

$$Q = k.n.D^3 \qquad \text{(5)}$$

Where:

Q = flowrate in volume per time
k = screw threads
n = screw rotates (rpm)
D = diameter of blade (m)
The screw threads (k) can be seen in Table 2.

Table 2. The Screw Threads

d/D	**22º**		**26 º**			**30 º**	
	1,0 D	**1,2 D**	**0,8 D**	**1,0 D**	**1,2 D**	**0,8 D**	**1,0 D**
0,3	0,331	0,335	0,274	0,287	0,286	0,246	0,245
0,4	0,350	0,378	0,285	0,317	0,323	0,262	0,271
0,5	0,345	0,380	0,281	0,317	0,343	0,319	0,287
0,6	0,315	0,351	-	0,300	0,327	-	0,273

Where:

d/D = the comparability the diameter shaft and blade of the turbine
22º, 26º, 30º = thread angles (α)

If the thread angle ≤ 30º, then S = 1,2 . D
If the thread angle = 30º, then S = 1,0 . D
If the thread angle ≥ 30º, then S = 0,8 . D
S = turbine *pitch* (m)

For the screw turbine rotates (n) were chosen in Table 3, the turbine blade rotates were chosen for the fast of 30 rpm.

Table 3. The Screw Turbine Blade Rotates

Speed	Turbine revolution per minute (rpm)
Slow	20-23
Medium	25-26
Fast	29-31

3.8.2 Turbine Diameter

$$D = \sqrt[3]{\frac{Q}{k.n}} \qquad (6)$$

Where:
k = the screw thread value
n = the screw turbine rotates (rpm)
D = the shaft rotates (m)
Q = flowrate in volume per time

3.8.3 The Shaft Turbine Diameter

Once calculating the blade diameter, therefore it was used for the comparability between the blade diameter and the shaft diameter, the form is as follows:

$$\frac{d}{D} = 0,3 \qquad (7)$$

Where:
d = the shaft diameter (m)
D = the blade diameter (m)

3.8.4 The Length of Turbine

$$\sin\theta = \frac{H}{L} \qquad (8)$$

Where:
θ = turbine angle (°)
H = turbine *Head* (m)
L = the length of turbine

3.8.5 Number of Threads

$$N = \frac{L}{S} \qquad (9)$$

Where:
S = turbine *pitch*
L = the length of turbine

The illustration of Archimedes Screw Turbine parameter [15] can be seen in Figure 5.

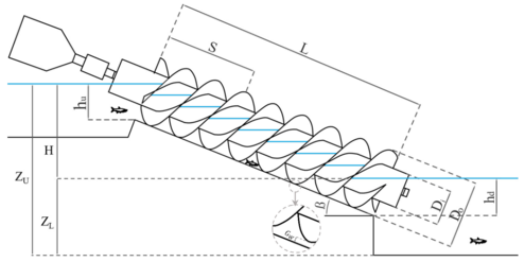

Figure 5. Archimedes Screw Turbine parameter

3.8.6 Electrical Potential Calculation

Hydro that is converted to electricity depends on the flowrate (Q) mashing the blade. The form of the electrical potential using the low-efficiency is as follows:

$$P = \rho . Q . g . H . \eta_p . \eta_t . \eta_g \quad \text{...} (10)$$

Where:
P = electricity (watt)
ρ = water density (kg/m^3)
Q = flowrate (m^3/s)
g = acceleration due to gravity (m/s^2)
H = *head* (m)
η_p = limit of the lowest electrical potential efficiency (0,9)
η_t = turbine efficiency (0,9)
η_g = limit of the lowest generator efficiency (0,8)

4. Result And Discussion

4.1 Water Discharge Analysis

Water discharge (Q) is the volume of water that is transported each second, the form is as follows:
$Q = A . v$
Where:
Q = flowrate in volume per time
A = wet-cross area of waterways
v = water velocity

Water velocity was determined by current meter. Measuring and retrieving the data were done by doing the stage using the reservoir opening valves of ¼, ½, ¾ and fully, hence, there were various of wet-cross area affected to the various of flowrate moving the turbine. The results of the water velocity and flowrate can be seen in Table 4.

Table 4. Water Velocity and Flowrate

Opening Valves	Velocity (v) m/s	Cross-sectional area (m^2)	Wet-cross area (m^2)	Flowrate (m^3/s)
¼	2,2970	0,0180	0,0013	0,0030
½	4,1330	0,0180	0,0035	0,0145
¾	6,0990	0,0180	0,0062	0,0376
full	7,1210	0,0180	0,0090	0,0641

Table 4 shows that the lowest flowrate is m^3/s, and the highest is 0,0641 m^3/s. Once, the reservoir opening valve was opened to ¼, the flowrate was in a low stage. Eventually, there was improvement in flowrate when the opening valves were opened to ½, ¾ and fully, the larger the valves were opened, the larger waterflows were out from reservoir, hence, it also happened to wet-cross area. Therefore, the flowrate affects the velocity and wet-cross area.

4.2 The Electrical Potential Analysis

Water discharge will affect the velocity of the turbine rotates to produce the electricity by moving the generator. The form of the data of electrical potential is as follows:

$$P = \rho . Q . g . H . \eta_p . \eta_t . \eta_g \qquad \text{......} (10)$$

Where, *H* is value of head according to the Archimedes screw turbine parameter and it was 0,5m. the results of electrical potential calculation is shown in Table 5.

Table 5. Electrical Potential

Reservoir opening valve	Velocity (v) m/s	Flowrate (Q) m^3/s	Power (P) watt (generator)
¼	2,2970	0,0030	9.4435
½	4,1330	0,0145	46.1085
¾	6,0990	0,0376	119.3933
full	7,1210	0,0641	203,4246

Once the electrical potential had been counted, the result of it is about 9,4435watt, and the highest is 203,4246watt. The higher flowrate, the higher electrical potential will be, since the flowrate affect the velocity.

4.3 Screw Turbine Scheme

The data of water discharge is one of the points to scheme the screw turbine, since the discharge will push straight the blade hence the turbine moved. The measurements of blade depend on the flowrate that will get through the turbine. The higher flowrate, the bigger blade should be. The highest flowrate that was obtained to this research is about 0,0641 m^3/s using the fully opening valve. The point in using the highest flowrate was because of the ability of the turbine to operate at the fully opening valve.

4.3.1 Turbine Diameter

The form of turbine diameter calculation is as follows in equation 6:

$$D = \sqrt[3]{\frac{Q}{k.n}} = \sqrt[3]{\frac{0{,}0641}{0{,}286\ .\ 30}} = 0{,}1955\ m$$

Where:

D = turbine diameter (m)

Q = water discharge (m^3/s)

k = screw thread value from Table 2

n = screw turbine rotates (rpm) from Table 3

4.3.2 The Shaft Diameter of The Turbine

The comparability in diameter between the shaft and the blade was used the equation 7 is as follows:

$$\frac{d}{D} = 0{,}3 \quad then$$

$$d = D\ .0{,}3 = 0{,}1955\ .0{,}3 = 0{,}0586\ m$$

4.3.3 The Length of The Turbine

Equation 8 was used in determining the length of the turbine:

$$\sin\theta = \frac{H}{L} \quad then$$

$$L = \frac{H}{\sin\theta} = \frac{0{,}5}{\sin 14^0} = \frac{0{,}5}{0{,}241} = 2{,}074 \approx 2m$$

The length of the turbine was determined to 2m.

4.3.4 Pitch Turbine

Once finishing to determine of the thread angle of the turbine (α), the pitch turbine can be also determined:
If the thread angle ≤ 30°, then S = 1,2 . D
If the thread angle = 30°, then S = 1,0 . D
If the thread angle ≥ 30°, then S = 0,8 . D
Turbine was attached to the thread angle of 14° in accordance with the available space, hence, = 1,2 D and S = 1,2. 0,1955 = 0,2346 m.

4.3.5 Numbers of Threads

Calculating the numbers of threads were used equation 9:

$$N = \frac{L}{S} = \frac{2}{0{,}2346} = 8{,}5256 \approx 9$$

Where:
N = number of threads
L = length of turbine
S = pitch turbine

4.3.6 Pully Measurement Calculation

The measurement of pully was needed to obtain the optimum rotate of generator, therefore it needed the comparability of the diameter between pully and turbine. The original pully generator was about 4 inch (10,16cm), the maximum generator rotate is about 2.500 rpm to its specification. The optimum turbine rotate was determined to the half of the maximum generator rotate hence it is 1.250 rpm. Therefore, the pully diameter value is as follows:

$$\frac{D_{generator}}{RPM_{generator}} = \frac{D_{turbine}}{RPM_{turbine}} \quad \ldots\ldots (11)$$

$$\frac{10{,}16\ cm}{1250} = \frac{D_{turbine}}{2500}$$

$$D_{turbine} = \frac{(10{,}16).(2500)}{1250} = 20{,}32\ cm = 8\ inch$$

The need of the pully measure was 8inch, whereas there was only the 10inch (25,4 cm) of the size in marketplace, hence this was used for the research.

4.4 Result of Turbine Scheme

From the data and discussion, the data of the result of the turbine scheme can be seen in Table 6, and for the scheme can be seen in Figure 6.

Table 6. Data of Screw Turbine Scheme

No.	Data	Value
1	Thread Angle	30^o
2	Turbine Angle	14^o
3	Diameter of Turbine	0,1955 m
4	Diameter The Shaft	0,0586 m
5	The Length of Turbine	2 m
6	Pitch Turbine	0,2346 m
7	Numbers of Threads	9
8	Pully Size	10inch

Figure 6. Screw Turbine Scheme

5. Conclusion

From the research that had been done and had found the target points in purpose, it may conclude that:

1. The higher water discharge, the higher electrical potential will be obtained. The lowest is 9,4435watt using 0,0030 m^3/s for the flowrate. The highest is 203,4246watt with 0,0641 m^3/s as the flowrate.
2. Turbine that was designed to utilize the hydro in reservoir had been done well with the specification that were 0,1955m for the turbine diameter, 0,0586 m for the shaft diameter and 0,2346 m for the pitch turbine.

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7. References

[1] Kamal Kashyap, Robin Thakur, Sunil Kumar, Rajkumar (2020). *Identification Of Archimedes Screw Turbine For Efficient Conversion Of Traditional Water Mills (Gharats) Into Micro Hydro-Power Stations In Western Himalayan Regions Of India: An Experimental Analysis*. *International Journal Of Renewable Energy Research*. Vol.10, No.3, September 2020.

[2] Burhan Baran (2021). *Usage Of Waste Water Treatment Plants Hydroelectric Energy For Urban Lighting Energy : The Case Of Turkey*. *International Journal Of Engineering Research And Development*. Volume:13, Issue:2, June 2021.

[3] Bunga Meilinda Putri, Listia Ningrum, Nova Masripah Maulida (2021). *Simple Micro-Hydro Uses Water As A Renewable Energy Source*. *Indonesian Journal Of Multidiciplinary Research* 1 (1) (2021) 23-28.

[4] Bachtera Indarto, Afif Mahrus Kurnia Putra, and Muhammad Arief Bustomi (2021). *Characteristics Analysis Of The Archimedes Screw Turbine Micro-Hydro Power Plant With Variation Of Turbine Elevation Angle*. JFA (Jurnal Fisika Dan Aplikasinya) Volume 17, *Number* 2, *June* 2021.

[5] Akhmad Fauzan Al Ansory, Istianto Budhi Rahardja (2020). *Optimize Design Impeller To Inchrease Efficiency Centrifugal Pump That Functioned As A Turbine Use Computational Fluid Dynamics (CFD)*. *Advances In Engineering Research*, Volume 203. *Proceedings of the 2nd Borobudur International Symposium on Science and Technology* (BIS-STE 2020).

[6] Adarsh Gupta, Anand Prakash, Girish Kumar Singh and Harshit Tripathi (2021). *Design Of A Micro Hydro Power Plant Based On The Vortex Flow Of Water*. *International Journal of Advanced Research in Science, Communication and Technology* (IJARSCT). Volume 5, Issue 1, *May* 2021.

[7] Z K Misbah, M Rizal, & R S M Sahril (2021) . *Feasibility Study Of Micro Hydro Power Plant In Oboi River, Tutuling Village, East Halmahera Regency*. IOP Conf. *Series: Materials Science and Engineering* 1125 (2021) 012010.

[8] Indrayani, and Renny Citra Ramadhani (2021). *Design Of Microhydro Power Plant Prototype Based On Kelekar River Flow Discharge*. IOP Conf. *Series: Earth and Environmental Science* 832 (2021) 012065.

[9] Mohammad Anggara Setiarso, Wahyu Widiyanto, Sanidhya Nika Purnomo (2017). Potensi Tenaga Listrik Dan Penggunaan Turbin Ulir Untuk Pembangkit Skala Kecil Di Saluran Irigasi Banjarcahyana. Dinamika Rekayasa Vol. 13 No. 1 (2017) Hal. : 18-27. p-ISSN: 1858-3075 | e-ISSN: 2527-6131.

[10] Aida Syarif, Yohandri Bow, KA Ridwan, Delvi Karlini, Septiani Wulandari (2019). Analisis Unjuk Kerja Prototipe Pembangkit Listrik Tenaga Mikrohidro Turbin Pelton Sumber Daya *Head* Potensial. Politeknik Negeri Sriwijaya, Jurnal Kinetika. Vol. 10, No. 02 (Juli 2019): 1- 8.

[11] I Putu Wahyu Indra Wedanta, Wayan Arta Wijaya, Lie Jasa (2021). Analisa Pengaruh Kemiringan *Head* Dan Variasi Sudut *Blade* Turbin Ulir Terhadap Kinerja PLTMH. Jurnal SPEKTRUM Vol. 8, No. 1 Maret 2021.

[12] Mahendra Widyartono, Aditya Chandra Hermawan, Subuh Isnur Haryudo (2021). Kajian Kemiringan *Blade* Dan *Head* Turbin *Archimedes Screw* Terhadap Daya Keluaran Generator Ac 1 Phase 3 kW. Jurnal Teknik Elektro Volume 10 Nomor 01 Tahun 2021, 219-228.

[13] Adly Havendria, Yul Hizhara, Oding Syamiro Perdana (2021). Kaji Eksperimental Pengaruh Debit Dan Kemiringan Poros Terhadap Daya Mekanik *Prototype* Turbin Ulir Tipe AH-01 dan AH-02. METAL: Jurnal Sistem Mekanik Dan Termal – Vol. 5 No. 1 (2021) 17-22.

[14] Sahid, Mulyono, Yanuar Mahfudz S, Dwiana Hendrawati, Anis Roihatin (2020). Penerapan *Reservoir* Kecil (*Forebay*) Untuk Pembangkit Listrik Memanfaatkan Potensi Mikrohidro Kawasan Wisata Semirang Desa Gogik Kabupaten Semarang. Prosiding Seminar Hasil Penelitian dan Pengabdian Masyarakat Polines. Vol. 3 (2020) Halaman 861-873.

[15] Zainuri Anwar, Beta Saud Parsaroan, Edi Sunarso (2021). Rancangan Bangun Turbin Mikrohidro Tipe *Archimedes Screw* Dengan Kapasitas Daya 560 Watt. *Journal of Electrical Power Control and Automation*, 4 (1), Juni 2021, 29-34.

[16] Willy Setiawan, Nuryanti Mustari, Ahmad Taufik (2021). Inovasi Pemerintah Dalam Menghasilkan Listrik Murah Pembangkit Listrik Tenaga Micro Hidro (PLTMH) Di Kampung Kayu Biranga Kabupaten Bulukumba. KYBERNOLOGY : *Journal of Government Studies*. Vol. 1 No. 1 April 2021.

[17] Nugraha, M.N., Kusumanto, R.D., Indrayani. *Preliminary Analysis of Mini Portable Hydro Power Plant Using Archimedes Screw Turbine*. 2nd International Conference on Computer Science and Engineering (2nd IC2SE) at Universitas Putra Indonesia YPTK Padang. Indonesia. 2022. DOI: 10.1109/IC2SE52832. 2021.9791966.

[18] Yogi Dinata, Indrayani, Tresna Dewi. *Analysis of Reservoir Water Discharge at Solar Power Plant Tanjung Raja Village as a Basis for Pico Hydro Power Plant Planning in Paddy-Field Area*. International Journal of Advanced Science Computing and Engineering, Vol 4, No.2, 2022, pp 76 -78, http://ijasce.org/index.php/IJASCE/article/ view/82.