Rough calculation
device SaDaiM-1 working on the principle of the proposed inventor Azerbaijan

http://peswiki.com/index.php/Directory:SaDaiM_Buoyancy_Technology_by_Sayad_Abdullaoqli_Mammadov

In principle, the proposed technology, power elements rotating shaft-floats, in the amount of **32** pieces, consistently attached to the inner and outer rings of the left and right side with an intermediate distance of **0,37** m from each other, which is practicable stir inside of **11 m** towers and tower filled with water to a level of **10 m**.

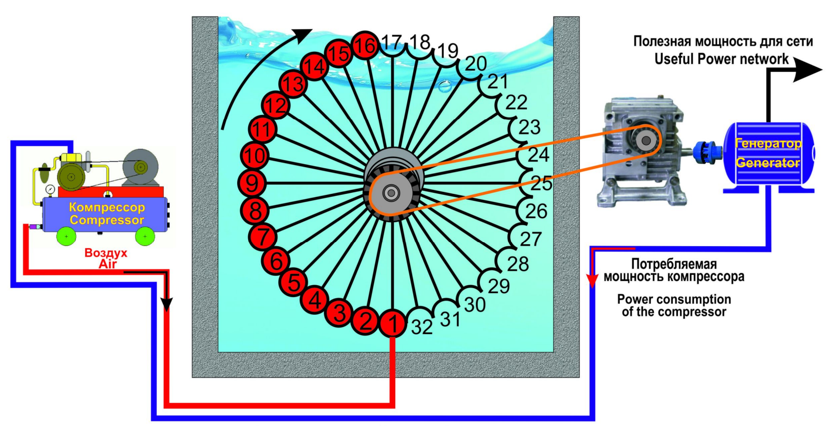

Схема устройства СаДаиМ
Scheme device SaDaiM

Floats, by means of support fastened to the hub shaft, wherein the neck are put on left and right cushion rolling set in the central part of the tower from the bottom up expelling water circumferential filled in the tower shaft leads into a rotary motion.

Consideration of the linear characteristic of the proposed process, that is, the transformation (conversion or change) of energy in hydrostatic pressure post static liquid (or gas) into mechanical energy of the masses (in a rotary motion).

For approximate calculation of physical quantities are indicated: $\mathbf{E_k}$– kinetic energy. $\mathbf{E_p}$ – potential energy. **n = 32** – the number of floats. **a= 0,5 м** – the width of the float, **b = 0,5 м**– the height of the float, **c=1 м** – the length of the float. **g = 9,80665 N/kg** – value of gravity. **h=10 м**– the water level is deep tower. **ρ= 1000 kg/m^3**– the density of the water mass. **P= 1 kgf/sm^2**– fills the air pressure. **V= 0,25 m^3**– volume of floats filled with air. **R= 5 m** – range gear with a float on the shaft shoulder or force which acts perpendicular to the twisting force (that is, the smallest perpendicular from the center of rotation to the line of action of torsional forces, and equaling the radius of the rotor). **M**– moment of force or torque force couple float. $\mathbf{A_s}$– spent work. $\mathbf{A_u}$ – useful effect. **φ= 90^0** – the angular displacement of the float or the rotor. $\mathcal{V}$ – the linear velocity of the float or rotor. **ω**– angular velocity or float. **ℓ**– distance traveled (movement) or the length of the arc during the rotation of the float or rotor. **T= 4 s** – period of revolution of the rotor shaft. **t=1 s**– time spent at the angles of rotation. ***f***– shaft speed in the rotor. **η**– theoretical efficiency. $\mathbf{N_d}$– power device.

The average value of the twisting force depending on the angle of deployment of floats**:**

$$\cos\varphi_{cp} = (\cos\sum_{1}^{23}\varphi + \cos\sum_{69}^{90}\varphi)/45 = (14,8266+13,8266)/45 = 0,63674$$

In accordance with the proposed scientific principle: to use the **kinetic energy** of the compressor discharge air mass, which creates volume in the floats mounted on the left (or right) side of the rotor immersed in the water column in the tower;

system of management unit provides parallel processes, i.e. the mass of air ($\mathbf{E_p}$), both inside the cavity is **filled** floats **at the bottom** dead center position (**270 degrees**) and **emptied**

from the cavity of floats **at the top** dead center (**90 degrees**) in the vertical symmetry of the rotor;

diapason torsional, force acts in the rotor floats, begins with the bottom dead center (**270 degree**) and ends at the top dead center (**90 degrees**) in a vertical symmetry in the left (or right) side of the rotor.

In this case, **the potential energy expended** (**E_p**), i.e. **the work expended** (**A_s**) per revolution can be expressed using the classical elementary physical calculation:

In a first variant

$$A_s = E_p = ng\rho hV = 1 \bullet 9{,}80665\ N/kg \bullet 1000\ kg/m^3 \bullet 10\ m \bullet 0{,}25\ m^3 = 24\ 516{,}62\ J$$

In a second variant

$$A_s = E_p = ng\rho hV = 32 \bullet 9{,}80665\ N/kg \bullet 1000\ kg/m^3 \bullet 10\ m \bullet 0{,}25\ m^3 = 784\ 532\ J$$

In a third variant

$$A_s = E_p = nPV = 32 \bullet 1\ kgf/sm^2 \bullet 0{,}25\ m^3 = 32 \bullet 1\ kgf/sm^2 \bullet 9{,}80665 N/0{,}0001 m^2 \bullet 0{,}25\ m^3 = 784\ 532\ J$$

In the process of uninterrupted parallel filling floats on the left (or right) side of the rotor and the emptying of the cavities on the right (or left) side of the rotor, **floats by the hydrostatic pressure** in the shaft of the rotor creates a stable middle point **(M)** force, torque rotor shaft:

In a first variant

$$M = nFR = ng\rho VR\cos\varphi = 1 \bullet 9{,}80665 N/kg \bullet 1000 kg/m^3 \bullet 0{,}25\ m^3 \bullet 5m \bullet 0{,}63674 = 7805{,}35\ Nm$$

Without cosine:

$$M = nFR = ng\rho VR = 1 \bullet 9{,}80665 N/kg \bullet 1000 kg/m^3 \bullet 0{,}25\ m^3 \bullet 5m = 12\ 258{,}31\ Nm$$

In a second variant

$$M = nFR = ng\rho VR\cos\varphi = 32 \bullet 9{,}80665 N/kg \bullet 1000 kg/m^3 \bullet 0{,}25\ m^3 \bullet 5m \bullet 0{,}63674 = 249\ 771{,}45\ Nm$$

Without cosine:

$$M = nFR = ng\rho VR = 32 \bullet 9{,}80665 N/kg \bullet 1000 kg/m^3 \bullet 0{,}25\ m^3 \bullet 5m = 392\ 266\ Nm$$

As a result, the device creates a **compulsory condition** (if the body of the force, it does work) for the product **A_u** **useful mechanical work per revolution**, which is the scientific and theoretical basis for power generation on the scale required:

In a first variant

$$A_u = M\varphi = 7805{,}35\ Nm \bullet 3{,}1416 = 24\ 521{,}28\ J$$

Without cosine:

$$A_u = M\varphi = 12\ 258{,}31\ Nm \bullet 3{,}1416 = 38\ 510{,}71\ J$$

In a second variant

$$A_u = M\varphi = 249\ 771{,}45\ Nm \bullet 3{,}1416 = 784\ 681{,}98\ J$$

Without cosine:

$$A_u = M\varphi = 392\ 266\ Nm \bullet 3{,}1416 = 1\ 232\ 342{,}86\ J$$

In a third variant

$$A_u = F\ell = M/R \cdot \varphi R = M\varphi R/R = M\varphi = 249\ 771{,}45\ Nm \cdot 3{,}1416 = 784\ 681{,}98\ J$$

Without cosine:

$$A_u = F\ell = M/R \cdot \varphi R = M\varphi R/R = M\varphi = 392\ 266\ Nm \cdot 3{,}1416 = 1\ 232\ 342{,}86\ J$$

Based spent and useful work in the unit value of the theoretical coefficient of efficiency (COE) up to:

In a first variant

$$\eta = A_u/A_s \cdot 100\% = 24\ 521{,}28\ J/24\ 516{,}62\ J \cdot 100\% = 100{,}00\%$$

Without cosine:

$$\eta = A_u/A_s \cdot 100\% = 38\ 510{,}71\ J/24\ 516{,}62\ J \cdot 100\% = 157{,}08\ \%$$

In a second variant

$$\eta = A_u/A_s \cdot 100\% = 784\ 681{,}98\ J/784\ 532\ J \cdot 100\% = 100{,}00\%$$

Without cosine:

$$\eta = A_u/A_s \cdot 100\% = 1\ 232\ 342{,}86\ J\ /\ 784\ 532\ J \cdot 100\% = 157{,}08\ \%$$

Determination of the power developed by the proposed device, i.e physical quantity measured by the ratio of the work to the period of time during which it was made. Capacity in a linear motion equal to the scalar product of the vector of the force **F** on the velocity vector $\boldsymbol{v}$, with which the body moves and the angle between the velocity vector **cosφ** and strength, and rotational motion of the body, the product of the torque (moment of couple) by the angular velocity.

To determine the power of the device, that is, the rate of conversion (change) of energy, it is necessary to measure experimentally, one of the main cinematic or linear physical quantities characterizing the rotary motion.

To this end, the result of experimental measurements shows that the angular rotation of the rotor radius or angular movement of the float per unit time is equal to about 90 degrees.

$$\varphi = 90^0 = 1{,}5708\ rad$$

Consideration of other cinematic characteristics of mechanical movement, i.e in the form of rotational motion - a process of continuous rotation in mechanics and its relation with the values of the progressive movement**:**

I. Movement refers to the movement of the float circumferentially. This movement can be described by the same method as that used in the description of rectilinear motion. But the more convenient following method generally accepted in science.

Due to the fact that in the case where the float moves along the circumference of any wheel with radius **R**, is necessary to center the axis of rotation, the radius of any point of the circumference of the wheel. Then, follow not only the point of departure, but also for the radius drawn to the point of the circumference of the wheel.

Obviously, there is, as the float moves and radius turns. That is, when the float during the time interval **t** will be moved from one point to another and the same time the radius of turn at an angle φ.

The coordinate system and the system timing, angle **φ** is an angle of rotation range. At the selected reference frame, the movement of the float may be characterized as follows:

firstly, that the float in the interval of time **t**, the path **ℓ** extends along a circular arc;

secondly, that it makes displacement **ℓ**, the module is equal to the arc length of the chord;

thirdly, that the radius drawn to the point is rotated by an angle φ.

If you compare this movement with other movements of different radii, it is revealed that all bodies moving in circles with radii **r** and **R**, are not only turn the corner, but equal and with respect to the radius of the arc length:

$$\ell/r = L/R$$

Accordingly, it can be concluded that for whatever audio circumferentially moving body, at equal angles of rotation of the radius will be equal to the ratio of the radius of the arc. So taken, measure angles, this ratio

$$\varphi = \ell/R$$

Communication between the length **ℓ** and the arc rotation angle **φ** radius **R**, a relationship where the value of the length **ℓ** of the arc traversed will equal

$$\ell = R\varphi = 5m \bullet 1{,}5708 = 7{,}854\ m$$

In degrees

$$\ell = \frac{2\pi R\varphi}{360^0} = \frac{\pi R\varphi}{180^0} = \frac{3{,}1416 \cdot 5\text{м} \cdot 90^0}{180^0} = 7{,}854m$$

Respectively $\mathbf{R = \ell/\varphi}$

In measuring angles, a unit of measurement of the angle is usually not adopted angular degree and the angle corresponding to the arc length **ℓ** is equal to the radius **R**, where the angle **φ** is equal to unity.

This corner unit is now generally accepted in science, and it is called a radian (**the international designation: rad – is the angle between two radii of a circle, cut out on a circle arc whose length is equal to the radius. Or rad – is the path traveled by point circumferentially at a predetermined angle of rotation in degrees, in other words the angle expressed in radians is determined amount perimeters (arc length) unit circle, similar to the length measured in number of unit linear standards (e.g., meters) Stack in this segment**).

Establishing a connection between the angular degrees and radians. If the float makes one complete revolution around the circumference of radius **R**, where the length **ℓ** passed the circle will be equal to **2πR**, then the value of the angle in radians is equal to:

$$\varphi = \ell/R = 2\pi R/R = 2\pi = 2 \bullet 3{,}1416 = 6{,}2832\ \text{rad}$$

Obviously, the angle is deployed **πR/R=π rad** = **180⁰.** The number **π** (pi) - the value of which does not change and is the ratio of the circumference to its diameter length. Consequently, a rotation radius circulating it through an angle **2π rad**. In degrees, as the angle is $\mathbf{360^0}$. From **1 rad** equals

$$1\ \text{rad} = 360^0/2\pi = 180^0/\pi = 180^0/3{,}1416 = 57^0.17.44$$

II. Movement of the float refers to a uniform circular motion. As a result of experimental observations establish that floats with uniform rotary motion, makes circular motion at the same speed, but with a variable direction.

If, in the rectilinear motion to describe the magnitude were: **displacement, velocity, acceleration,** rotational motion of their peers are: angular rotation or angular displacement, angular velocity and angular acceleration.

During the rotational movement, the main role is: angle- movement; angular velocity, i.e. the velocity of rotation - the angle of rotation per unit time; Acceleration angular variation of the angular velocity per unit of time.

Under the angular velocity must be understood the ratio of the rotation angle range, to the period of time within which to make this turn. The angular velocity characterizes the rotational speed and the float measured in radians per second.

$$\omega=\varphi/t= 90^0/s= 1{,}5708 \text{ rad/s}$$

Respectively $\varphi=\omega t$ и $t=\varphi/\omega$

Communication between the angular velocity **ω** the number of the period **T** of rotation. For a uniform angular velocity is equal to the frequency of cyclic rotation and linked to the period of rotation **T**

$$\omega=2\pi/T=2\bullet 3{,}1416/4s=1{,}5708 \text{ rad/s}$$

Respectively $T= 2\pi/\omega$

Communication between the angular velocity with **ω** speed f per unit time. Indeed, during one revolution radius turns through an angle **2π rad**. Hence, it is done per unit of time, for example at the back f radius turns through the angle $2\pi f$ rad., So the angular velocity **ω** numerically linked to the rotational speed (number of revolutions) f per unit time.

You can identify the angular velocity **ω** in radians per second. Since the angle in one revolution is changing eg- **2π** and consequently a second will- $2\pi f/60$ (**rad/sec**).

You can identify the angular velocity **ω** in radians per minute, where per revolution angle changes eg- **2π** and thus a minute will- $2\pi f$ **(rad/min)** and then

$$\omega= 2\pi f= 2\bullet 3{,}1416\bullet 1/4s=1{,}5708 \text{ rad/s}$$

Respectively $f= \omega/2\pi$

When using the angular velocity **ω** degrees in a second, a numerical relationship with the frequency of rotation is f

$$\omega= 360^0 f=360^0\bullet 1/4s=90^0/s= 1{,}5708 \text{ rad/s}$$

Respectively $f= \omega/360^0$

Communication between the angular velocity ω and its linear velocity $\mathcal{V}$, where the ratio of interrelated

$$\omega= \mathcal{V}/R=7{,}854m/5m=1{,}5708 \text{ rad/s}$$

Respectively $\mathcal{V}= \omega R$ и $R= \mathcal{V}/\omega$

At uniform rotation time for which the float makes one complete revolution (**1 turnover =2π радиан = 360°**), that is rotated by an angle **2π**, called the period **T** of rotation.

$$T=1/f= 1/0{,}25 \text{ rev/s}= 4s$$

Respectively $f= 1/T$

Thus, we get the opportunity to determine the power N_d device operating on the principle of energy use static protection, that is, the energy of the static pressure of liquid column static masses.

In a first variant

$$N_d = A_u/t = F\ell/t = F\mathcal{V} = ng\rho V\cos\varphi \bullet \mathcal{V} = 1 \bullet 9{,}80665\ \mathrm{N/kg} \bullet 1000\ \mathrm{kg/m^3} \bullet 0{,}25\ \mathrm{m^3} \bullet 0{,}63674 \bullet 7{,}854\ \mathrm{m/s} = 12{,}260\ \mathrm{кW}$$

In a second variant

$$N_d = M\varphi/t = M\omega = 249\ 771{,}45\ \mathrm{Nm} \bullet 1{,}5708\ \mathrm{rad/s} = 392{,}\ 341\ \mathrm{кW}$$

In a third variant

$$N_d = 2\pi f ng\rho VR = 2\pi f FR = 2\pi f M = 2 \bullet 3{,}1416 \bullet 0{,}25\ \mathrm{rev/s} \bullet 249\ 771{,}45\ \mathrm{Nm} = 392{,}\ 341\ \mathrm{кW}$$

Without cosine:

$$N_d = 2\pi f ng\rho VR = 2\pi f FR = 2\pi f M = 2 \bullet 3{,}1416 \bullet 0{,}25\ \mathrm{rev/s} \bullet 392\ 266\ \mathrm{Nm} = 616{,}\ 171\ \mathrm{кW}$$

CONCLUSION: If you will be taken into account that on a cogwheel of a coordinate in the fourth quarter, the strength, with the help of the drive chain operates (attached) to shoulder perpendicular, then the moment of force should be determined, as the product of the force by the distance from the axis of rotation of the float.

Accordingly, the shaft will operate stable total force generated volume of the float in a quantity of **15 pieces**, remaining on the left or right half of a circle in vertical symmetry of the rotor.

The chain operates on the gears with a force **F**, wherein the drive chain is moving at a speed $\mathcal{V} = 2\pi R f$. It is assumed that the chain does not slide on the wheel means that moves at the same speed as with a point on the circumference of the gears.

In this case, the assumption in the power unit in the working position, operating on this principle will be $N_d = F \bullet 2\pi R f$. But here **FR = M** (**M**- torque forces, **R**- lever arm, ***f***- shaft speed (float) or revolutions per second). Then, the power unit will be approximately:

$$N_d = 2\pi f M = 2\pi f FR = 2\pi f ng\rho VR =$$
$$= 2 \bullet 3{,}1416 \bullet 0{,}25\ \text{об/s} \bullet 15 \bullet 9{,}80665\ \mathrm{N/kg} \bullet 1000\ \mathrm{kg/m} \bullet 0{,}25\ \mathrm{m^3} \bullet 5\mathrm{m} = 288{,}830\ \mathrm{кW}$$

To ensure the smooth operation of the device at the frequency established, required to consistently provide a stable injection (filling) the air in the cavity volume passing floats to the bottom dead center of the tower on the coordinate of the shaft in the range from **270** degrees to **90** degrees in a clockwise (or reverse) direction.

In other words, when the linear motion (or displacement) of the float between the initial and final arc of the vertical distance of the distributor in the aisles of appropriate length cameras, which is necessary for one sek ensure injection (filling) **0,25 $\mathrm{m^2}$** volume of air at a pressure **1 $\mathrm{kgf/sm^2}$**. This requires a compressor with a capacity of at least **50 ℓ/сек** open pressure of more than **1 $\mathrm{kgf/sm^2}$**.

Performance of existing air compressors located on the operation, for example, turbo, piston and screw with an electric motor, allows for their use in the process of transformation, "**ENERGY** hydrostatic pressure **COLUMN STATIC LIQUID MASS** into mechanical energy, and its in the electric".

Finally we come to the need to find suitable compressors, i.e. a compressor with a pumping rate of **50 ℓ/сек**

Note: 1. Based on the above, we can conclude that if indeed **5,5 kW** compressor system provides the device proposed in the group **Rosch KPP**, the device has a progressive future.

2. For a reliable selection of the compressor must also Recommendations made in this area. **Screw compressor:** **WAN NK-100/18,5 кW 8 бар 3 160 ℓ/min (52,7 ℓ/sek)**