EXPERIMENTAL STUDY ON ANALYSIS OF A LONGITUDINAL HORIZONTAL DECANTER

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ABSTRACT: The work description steps necessary to achieve a horizontal decanter experimental and experimental tests to effectuate it.

KEY WORDS: decanter, wastewater, sludge.

1. INTRODUCTION

Longitudinal horizontal decanters are concrete pools with a rectangular shape , with lengths between 30 m and 100 m and average depth of 3.0 m These pools are built separately or in groups , in order to achieve reductions of land and savings volumes concrete walls, as well as the sharing of facilities for cleaning . Tank bottom slab is carried out with an average slope of 0.01 m reverse the direction of flow of the water, for easy sliding of the sludge to the collection hopper located at the upstream end of the settler. [1]

Sludge to sludge collection hopper can be mechanically mounted on a trolley scraper mechanisms (Figure 1) or an endless chain and manually using hydromonitors. When using cell scrapers mounted on the trolley , the trolley in front of a slide collection provides foam and fat floating on the surface of the water , being pushed toward a trough for disposal floating matter, being placed at the upstream strainer. [2]

Removal of sludge from the hopper to a gravity (if the local conditions permit) with a minimum pipe diameter of 200 mm, or by pumping using a discharge pipe with a diameter greater than 150 mm , and the head pressure (where the spread) minimum pipe diameter is 200 mm.

Of particular importance in ensuring maximum efficiency of horizontal decanters , is the uniform access to water clarifier . For this purpose, the solution may be applied to the openings provided in the deflector or walls solution only by drilling , holes in the mat is directed to the future presentation by changing the direction of flow of the water, to ensure uniform flow over the entire height of the water in the tank. [3]

To clean decanter type scraper uses DLP (longitudinal primary clarifier) supplied by different companies from home and abroad whose performance and reliability contribute crucial to the smooth running of processes. For uniform distribution of the water in the tank and in particular the dissipation of kinetic energy at the entrance semi-buried transverse walls are provided with a height of 0.5 to 0.7 m placed at a distance of from 0.5 to 0.7 m from the holes - baffles.

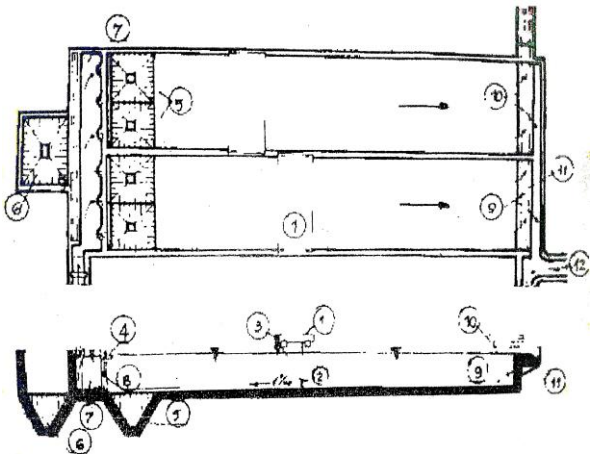

Figure 1. Horizontal Decanter scraper mounted on the trolley
1 - stroller, 2 - sludge scraper blade, 3 - blade to collect the foam and fat, 4 - channel for the discharge of the foam and fat, 5 - sludge funnel, 6 - sludge collecting pit, 7 - plenum chamber water, 8 - water access holes; 9 - trough for collecting clarified water; 10 - triangular weir, 11 - in case of emergency spillway, 12 - draining toward receiver, 13 - Escape the biological stage.

2. SIZING

For sizing experimental settler proceeded to calculate (size) of each component of such a system:
- Pool;
- Scraper;
- Sludge storage hopper;
- Bridge scraper;
- Overflow triangular;
- Channel for collecting clarified water;
- Support;
- Mobile system;
- The rail drawbridge;

Scheme design of decanter is presented in Figure 2.

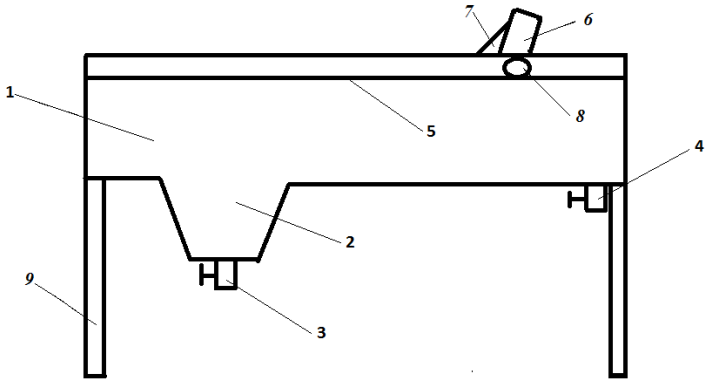

Figure 2. Scheme of construction of settler experimental
1 - pool, 2 - sludge storage hopper;, 3 - overflow triangular 4 - channel for collecting clarified water; 5 - rail drawbridge, 6 - bridge scraper, 7 - scraper, 8 - mobile system; 9 - support;

3. CONSTRUCTION

For making clarifier following materials were used:
- Glass fibers;
- Resin;
- Hardener;

- Valves;
- Plate pale;
- Mobile system (conveyor wheel;).
- Washing solution;
- Wooden slats;

The first step in the construction of the experimental facility consisted of transposing the geometric dimensions of each component on the sheet of fiberglass, followed by cutting steps (Figure 3), assembly, parts of the experimental system.

The experimental plant was placed on a glass fiber support, and to prevent adverse action of UV rays This was coated according to the technical standard colors (Figure 4).

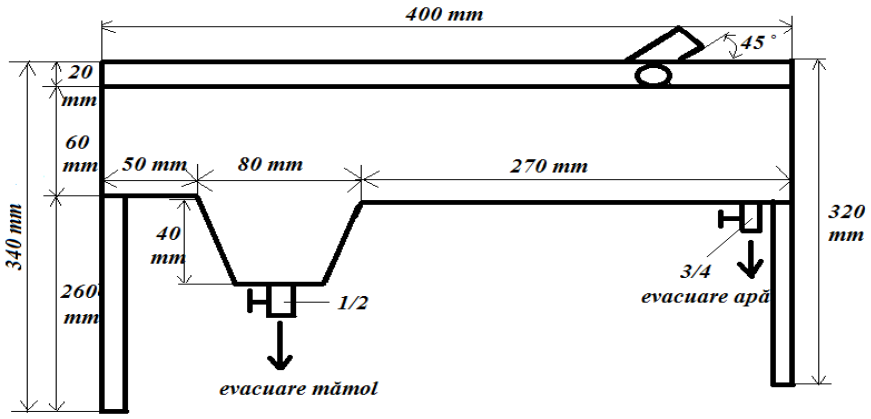

Figure 3. Round cutting

Figure 4. Painting settler

4. THE EXPERIMENTAL

Experimental tests were carried out pond using a mixture of water + clay to 3 different concentrations. These materials (Figure 5) were mixed water - clay used in experimental tests.

Mass of clay in the mixture used to conduct the experiments which was found to be an analytical balance, and the turbidity of the solution from entering the system and the evacuation from this was determined by using a turbidimeter.

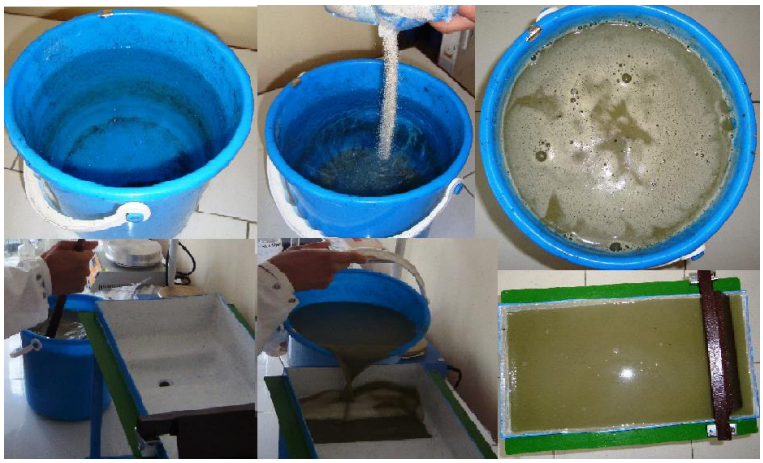

Figure 5. Mix water + clay

Settling efficiency of the experimental system for the three tests were calculated using the formula:

$$\eta = \frac{T_i - T_{f(1,2,3,)}}{T_i} \cdot 100\,[\%] \qquad (1)$$

where: η - settling efficiency [%];

T_i - the initial turbidity of the mixture introduced into the decanter;

T_f - the final turbidity of the mixture introduced into the decanter;

The results obtained from experimental tests is shown in Table 1.

Table 1. The results of the measurements

Nr. Crt.	T_f [NTU]	T_i [NTU]	Duration decanting [min]	η [%]
1.	494,3	830,8	10	40,5
2.	314,7		20	62,1
3.	261,4		30	68,5

5. CONCLUSIONS

The final conclusion that can be drawn from the interpretation of the results presented in Table 1 is that the experimental settling sediment material can retain a percentage between 40.5 and 68.5 [%].

6. REFERENCES

[1]. Androne, I., Industrial Wastewater Treatment, Volume II. Technical Publishing House, Bucharest, 1989;
[2]. Mihai, D., Urban wastewater treatment, Ed Tehnopress IASI, 2005;
[3]. Negulescu, M., Wastewater treatment, Technical Publishing House, Bucharest, 1978;