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Platform and installation used for processed the waste resulted from sewer maintenance- technical and economic analysis

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Abstract: In this paper it is emphasized the importance of environmental investments and also is presents a technical and economical analysis for such investment. Through technical-economical analysis is trying to show that even if these investments are expensive recovery is done relatively in a short time.

Keywords: sludge, waste water treatment plant, environment

1. INTRODUCTION

In accordance with Treaty Accession to European Union, Romania has assumed obligations involving significant investment in water services and sewerage in order to comply with EU environmental standards.
It is required significant financial investments that significantly exceed the financial capabilities of most local authorities. Regionalisation is a key element for improving efficiency of local infrastructure and water and sewerage services, in terms of quality and costs to achieve environmental objectives, and ensure sustainability of investments, operation, long-term development strategy of the water sector and harmonious development.

Currently, S.C. AQUATIM S.A. Timisoara has the status of regional operator; one of the key sectors is represented by the waste water treatment plant. One of the S.C.Aquatim S.A problems is sludge storage resulted from maintenance (cleaning) sewerage network. Since February 1st , 2010, S.C. Aquatim S.A. is the regional operator of water services and sewerage systems, and currently provides these services in the city of Timisoara and other 64 municipalities, in the county - 8 towns, 23 large villages and 33 small villages [7].

2. STUDY CASE

One of the S.C. Aquatim S.A problems is the sludge storage resulted from maintenance (cleaning) sewerage network. This sludge is discharged into a dump inside the waste water treatment plant. Water derived from sedimentation is sent to water line from waste water treatment plant and the sludge is transported to a waste landfill. Taking into account the existing situation regarding improper discharge of sludge and also environmental pollution caused by this sludge it is necessary to achieve a coarse material separation plant guaranteeing a well sorted materials framing and a discharged water quality respecting Romanian Standards [4], [5], and [6].
Starting from the idea that it is necessary to do such environment investments, it has made a technical-economical analysis for two situations, namely:

1) Variant without water recirculation resulted from washing and sorting equipments
2) Variant with water recirculation from washing and sorting equipments

Investment goal is to reduce current expenses to transport sludge to the landfill from Ghizela but also to solve the environmental problem.

In figures 1and 2 it is presented the coarse material separation plants from which results the washed and sorted grit. The water needed for grit wash is taken from a well and also from water supply system. Four vacuum trucks could unload the sludge, in the same time, in a concrete underground tank [1], [2]. The tank is covered by grate which stops the grit with the particle bigger than 40 mm. The quantity of grit which remains on the grate is 9 mc/day. From this tank the sludge is carried out, using 3 screws and a monorail with clamshell bucket, in the first grit separation installation (ROTAMAT) [1],[2],and [8]. This installation is equipped with a rotating drum. With the rotating drum started and the wash water being added, the material supplied is first of all homogenized i.e. larger agglomerates are split up. At the same time the components < 10 mm are washed out by means of a spray bar. After that they are transported to the sump situated below the rotating drum. The coarse material > 10 mm is kept back by the rotating perforated plate and discharged into a container provided at the end of the washing drum [8].

The screen area is cleaned by means of a spray bar fixed at the outside of the washing drum.

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The particles having the diameter smaller than 10 mm are sent to another installation (COANDA) [2],[8].

The grit / water mixture flows either by means of a pump or by gravity into the vortex chamber where a rotary motion is induced. The grit particles sorted and washed by this installation is between 1-10 mm.

In the **Figure 1** it can been seen that the washing water from ROTAMAT, is send in settling tank but after sedimentation is sent also with water resulted from Coanda, in the water line of the waste water treatment plant . The quantity of grit sorted and washed by Rotamat is 18 mc/day and by Coanda 5 mc/day, grit which can be used for sewer reparation or could be sold.

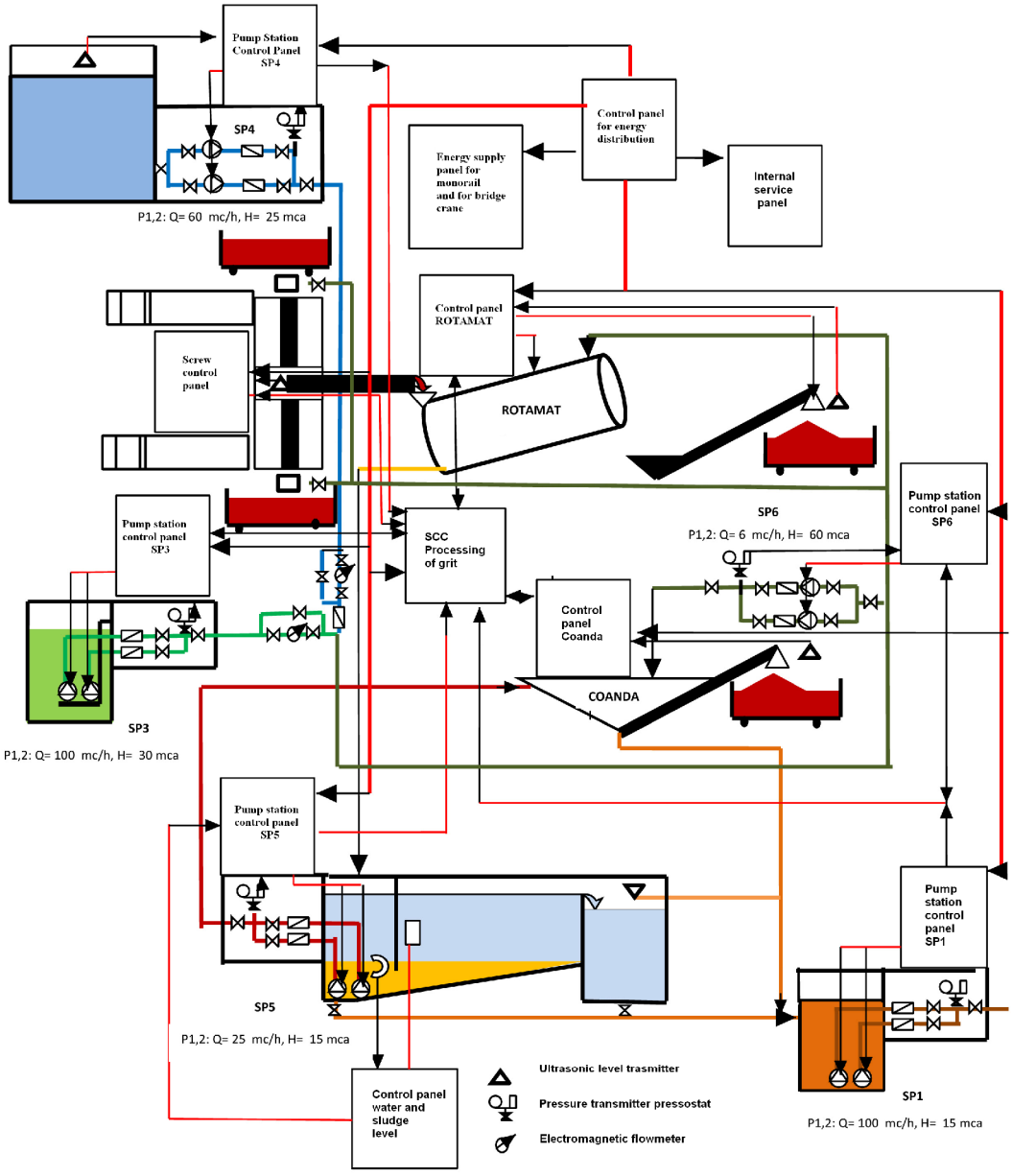

Fig.1 Coarse material separation plant variant without recirculation of water resulted from washing and sorting equipments

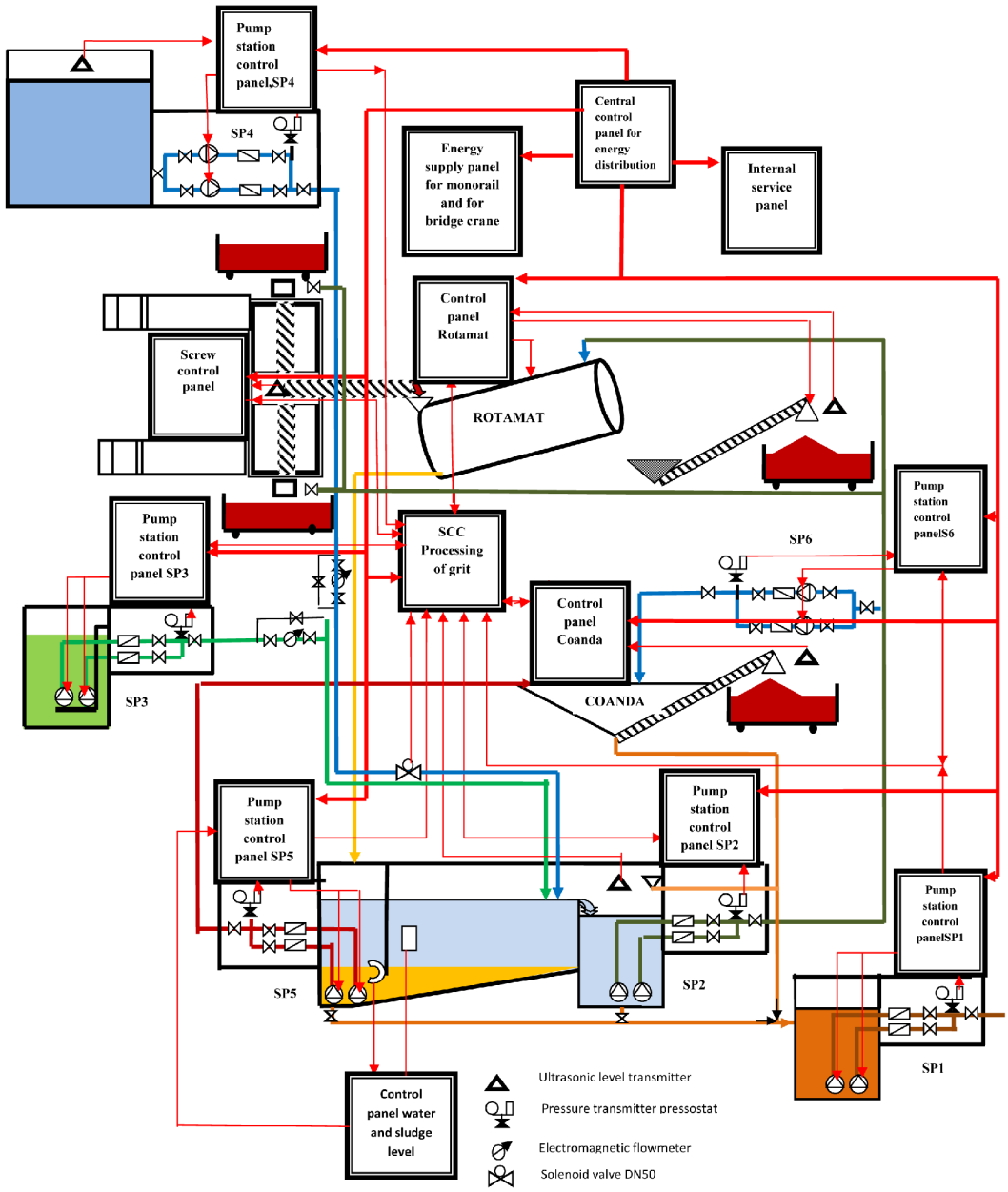

Fig.2 Coarse material separation plant variant with recirculation of water resulted from washing and sorting equipments [2]

In **Figure 2** it can be seen that the washing water from ROTAMAT is sent to a settling tank and will be reused. The washing water from the COANDA and from settling tank is sent to the water line from waste water treatment plant. For this variant of coarse material separation plant for the water and installations disinfection is used chlorine. As can be seen in the **Figure 3** and in the **Figure 4**, the total investment for variant without recirculation is less than the variant with recirculation. This is because for the variant with recirculation a pumping station is required in addition.

In **Figure 5** can be seen that total operating costs for the variant without recirculation is greater than the variant with recirculation. In the **Figure 6** can be seen that the shorter period to recuperate the investments is the variant with recirculation.

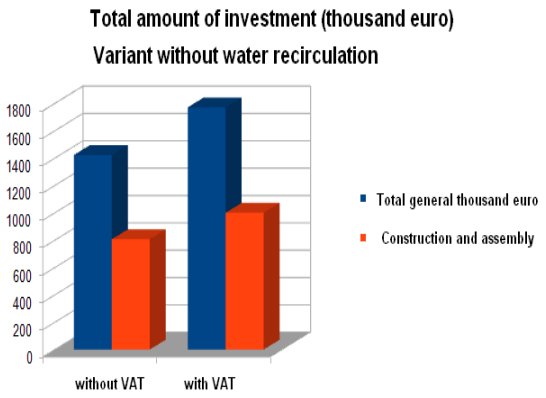

Fig.3 Total amount of investment for the variant without recirculation of water

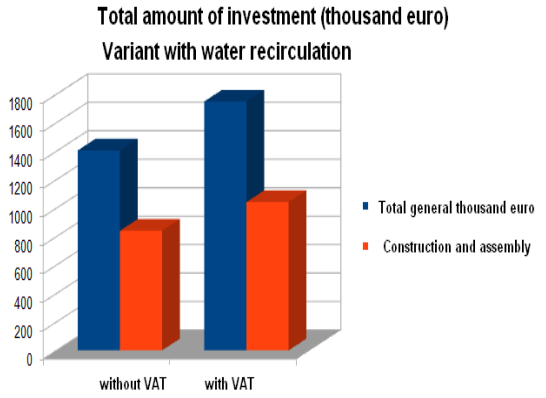

Fig.4 Total amount of investment for the variant with recirculation of water

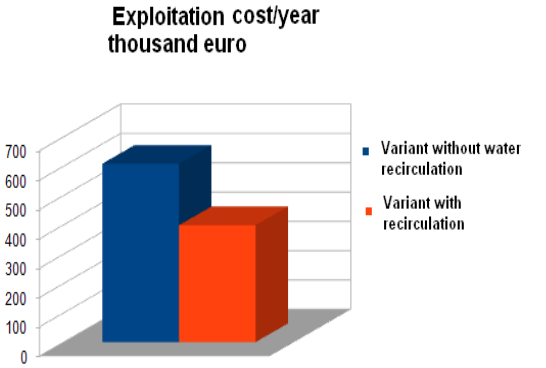

Fig.5 Total amount of exploitation

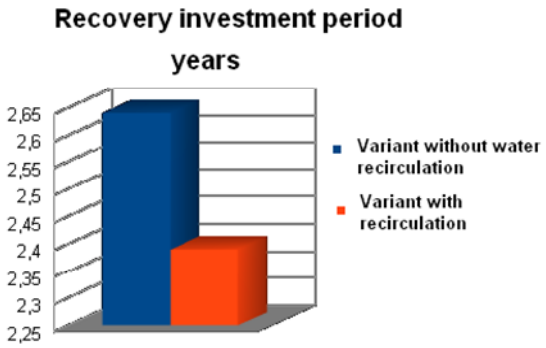

Fig.6 Period to recovery the investment

3. CONCLUSIONS

Investment program is focused on accomplishment of the works intended to implement the "**Coarse material separation plant".**

Financial analysis of project process, the following calculation steps:

- Determining Investment Program which involves the establishment need for investment according the staging of the investments.
- Sludge processing capacity18 250 mc/year
- Determination of additional operating costs

Total unit cost after the realization of the investment for sludge:

C_u = 171,48 lei/mc (existing Variant)

C_{u-I} = 33,31 lei/mc (Variant I)

C_{u-II} = 21,82 lei/mc (Variant II).

- Prices

Given that operating costs do not exceed the existing variant (variant without investment), the price will be kept. The return on investment - is the reduction of operating costs and operating.

In the technical-economic analysis has resulted that the water recirculation variant is more advantageous from all point of view.

The advantages of using the method with water recirculation are:

- Total amount of investment is smaller than another variant
- The costs of exploitation are smaller
- The period to recovery the investment is also smaller

4. REFERENCES

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