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IMPLEMENTATION OF TECHNOLOGIES AND EQUIPMENTS FOR WASTE WATER TREATMENT IN ROVINARI MUNICIPALITY

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Summary

This paper describes aspects regarding the actual waste water treatment plant in Rovinari town, its degradation state and the fact that the discharge of polluted water is made directly into Jiu River. Due to the fact that sewerage systems and the waste water treatment plant of the town are in a terrible state, implementation studies of technologies and modern equipments are necessary for the treatment, water treatment and recycling of waste water. Proposals have been made for the use of Rotamat Ro 1 installations (fine screen), Rotamat Ro 2 (automatic separator installation), Rotamat Ro 9 (automatic stainless steel separator), Rotamat Ro 5 (compact installation), the modality of functioning and the advantages of using these technologies and equipments.

1. General aspects regarding Rovinari town

The town is situated in the southernmost part of the administrative territory and it comprises the residential districts Vârț and Poiana. The total surface of the territory amounts to 2632 ha, neighbouring the villages of Băleşti and Teleşti in the North, Bâlteni and Drăguţeşti in the East, the village of Câlnic in the West and the village of Fărcăşeşti in the South. The town is located 25 km to the south-west of Tg-Jiu Municipality, the residence of Gorj district and it is connected to it by the national road DN66 Petrosani – Tg. Jiu – Rovinari – Filiaşi – Craiova, taking part in its turn of the European Road System E 79. The Rovinari town is the result of a forced settlement, imposed by the mining production within the coalfield bearing the same denomination and it has been declared town in 1981, included in the category of small towns. (figure 1)

Figure 1. Geographical location of Rovinari Town

2. The actual status of Rovinari WasteWater Treatment Plant

Presently, the Rovinari town faces a major problem with regards to catchment and treatment of waste water and residual water.

The ignorance of the City Hall's representatives that have succeeded to the town's leadership for 25 years and the lack of funding has brought the waste water treatment plant into an unoperable state. (figure 2)

Figure 2. Wastewater Treatment Plant in Rovinari

This wastewater treatment plant is located on a land at the outskirts of the town, in an advanced state of degradation, clogged up by mud and reed, and the discharge of polluted water is made directly into Jiu River by means of the open channels. (figure 3) [5]

Figure 3. Wastewater discharge in Jiu River

3. The necessity for the implementation of some technologies and equipments for the waste water treatment in Rovinari

Due to the fact that the sewerage systems and the wastewater treatment networks are not in a favourable state, implementation studies of technologies and modern equipments are necessary, in order to treat and recycle the waste water and residual

water. The new rehabilitated sewerage networks should comply with the requirements and regulations of the European Union, to follow the effective legal framework, to be executed of modern materials and to be performed at the same time with the development of drinking water supply networks. The sewerage procedures should take into account the possibilities of catchment, treatment and discharge into outlets. [1]

4. Technologies and equipments proposed for the treatment of wastewater in Rovinari

The implementation strategies of modern technologies and equipments for the wastewater treatment resulted from the town's activities are based on the proposal and eventual further usage of the following installations:

4.1. ROTAMAT Ro 1 fine screen

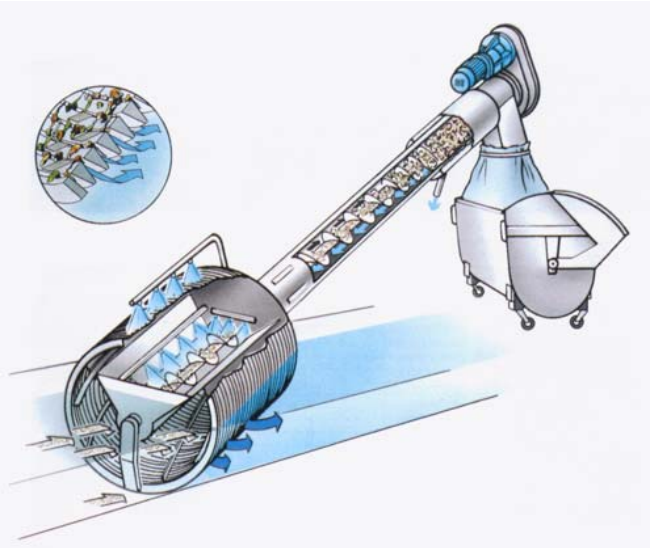

Figure 4. ROTAMAT Ro 1 fine screening

The ROTAMAT Ro 1 fine screen (figure 4) could be mounted both in a separate reservoir, and directly into the channel.

The wastewater is conveyed through the open front part of the catchment basket (screen), then passes through galleys reaching again the channel. The impurities are retained by the screen's galleys. Because of this, an auxiliary filtration is performed. In order to clean the screen from the retained material, inside the cylinder (screen) on the centred axis, a rotative comb filter is assembled. Its teeth are passing through the screen's sheds, removing the material, rising it to a vertical position, and throwing it to the collecting gutter of the extracting spiral disposed in the centre of the cylinder. From the collecting gutter, the material is ejected through the rotative movement of the extracting spiral. For a complete cleaning, when the comb comes back to its superior position, its teeth shall be cleaned by a supplementary scraper disposed at 15° from the vertical axis. During the extraction phase, the retained material (collected) is compacted, washed, dehydrated reaching 40 percent of dry solid substance. The organic washing of the retained material contributes to the optimization of the wastewater treatment process, to the improvement of the nitrogen / carbon mixtures ratio, all these contributing to costs reduction, as well. [2]

4.2. ROTAMAT Ro 9 Automatic screening installation made of stainless steel

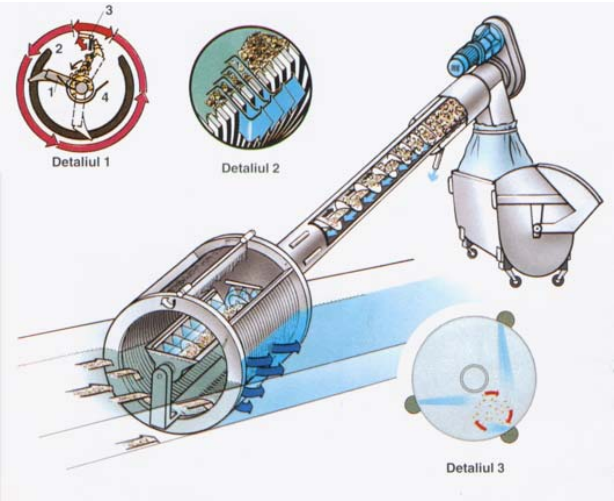

Figure 5. ROTAMAT Ro 2 automatic screening installation

ROTAMAT Ro 9 automatic screening installation (figure 5) represents experimental "solutions" for:

- ponds' waste water treatment plant
- bio-filter aquatic treatment plant
- smaller waste water treatment plants
- treatment of industrial residual waters
- sludge treatment
- floating layer separation
- removal of residues
- wastewater treatment

The setting is executed directly into the gutter or into a reservoir. The wastewater conveys through the surface of the screening. Due to the oblique screening surface, an optimum separation of the floating material, sedimented and in suspension is obtained .

The cleaning of the screening surface is performed by means of the rotative brushes covering the spiral front part. The solid material is retained. If needed, for a greater sewege ratio, the decanted material could be washed in order to be delivered from soluble components. Finally, the trasnport to the ascending pipe follows. The material retained shall be dehidrated to about 40% dry substance, it shall be compacted and ejected into the tank.

Due to the fact that washing and pressure devices of the retained material are integrated within the system, two supplementary components are saved from the washing procedure and the cost incurred for ejection is reduced to a minimum.

Screening, washing and compression within a system connected to an insertion device into encased bags ensure a functioning without prolific flavours.

4.3. ROTAMAT Ro compact installation

All the phases of the process are integrated within a stainless steel reservoir in the case of the compact installation (figure 6). The wastewater is conveyed through a fine screening (the sizes of the grid meshes 5, 7, 12 mm) or a separator (the sizes of the grid meshes 2, 5, 4 mm). The cleaning of all floating and suspending materials takes place.

The retained material is ejected from a reservoir through an integrated spiral press for the retained material, is dehidrated and compacted to a 40% solid substance.

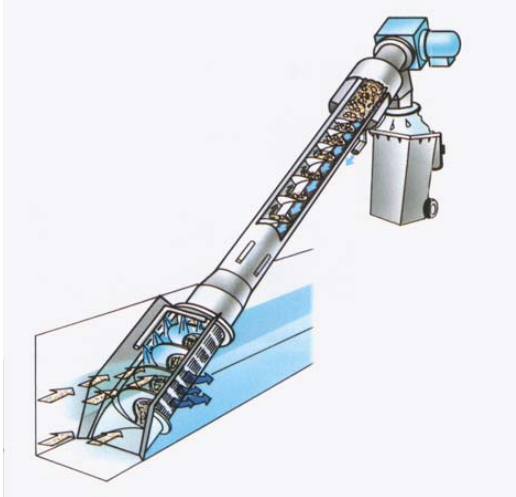

Figure 6. ROTAMAT Ro 9 automatic screening installation

This retained material, dehidrated and compacted is ejected to a norma tank. The water resulting from the press is recycled to the wastewater flow, avoiding the CBO5 transformation. The retained material, due to the integrated press, reduces its capacity with 60% and the weight with 50% thus saving the costs related to clearing procedure.

At the end of the retained material spyral conveyance, situated horizontally, this material is ejected into a side collector. From here, it is extracted by means of the sand classifier. The sand is dehidrated and then separately ejected. The compact installation could be additionaly foreseen with aeration installation from the grit separator. A grease separator could be further connected. Aeration and grease separation are supplementary utilities for the optimization of the entire function. [4]

4.4. ROTAMAT Ro compact installation

Figure 7. Functioning method of the ROTOMAT Ro 5 compact installation

All the phases of the process are integrated within a stainless steel reservoir in the case of the compact installation (figure 7). The wastewater is conveyed through a fine

screening (the sizes of the grid meshes 5, 7, 12 mm) or a separator (the sizes of the grid meshes 2, 5, 4 mm). The cleaning of all floating and suspending materials takes place. The retained material is ejected from a reservoir through an integrated spiral press for the retained material, is dehidrated and compacted to a 40% solid substance. This retained material, dehidrated and compacted is ejected to a norma tank. The water resulting from the press is recycled to the wastewater flow, avoiding the CBO5 transformation. The retained material, due to the integrated press, reduces its capacity with 60% and the weight with 50% thus saving the costs related to clearing procedure.

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5. Conclusions

By the introduction of the ROTAMAT screening installation, we avoid:

- Decomposing of the floating material from the reservoir's surface
- Clogging of the aeration devices and pumps
- Fewer cleaning processes and less personnel employed for these works
- The optimization of the wastewater treatment installations and consequently more profitable operating costs
- Cleaner sludge without decomposing material
- Filtration, dehidration, compactation of the retained material
- Considerable reduction of clearing costs
- For a galley size < 2.5 mm the primary clarifying phase could be dropped
- Reduced investment costs
- Rapid fitting, with no problems arising, including the possibility of auxiliary facilities
- Auto-cleaning of the screening surface ensured by brushes
- Complete stainless steel construction, ensuring a great reliableness and no maintenance costs
- tighten installation against unpleasant odours
- reduced clearing costs by the integration of washing and compression device of the retained material
- no need for a building, the open air set-up is possible by means of a heating device against freezing conditions the galley size of 0.25 up to 5 mm, the flow up to 120 l/s (432m^3/h)

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