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WASTEWATER TREATMENT IN HÓDMEZŐVÁSÁRHELY

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Abstract: The contamination of our living waters is a serious environmental issue in every corner of our world. The main polluting sources are the industry, the agriculture and the general population in their everyday life. In the protection of our living waters, the mainly used technology is the wastewater treatment, whose main objective is to prevent the contaminants from seeping into the water's environment. With the continuous growth of the urbanization, both the developed and the underdeveloped countries' way of life are modified so the wastewater gets collected in increasing quantities. Although the concentration of pollutants may appear in very different degrees, in certain cases severely concentrated pollutions may occur. Wastewater being produced in such big quantities must not be irrigated to the soil in the hopes of using its nutrient content. Thus, the purification of wastewater required proper engineering mainly because the load surpasses the self-cleaning ability of the water. The consequence of such demand resulted in the establishment of different artificial cleansing methods varying in complexity and specialty – mechanical and biological treatments.

Keywords: wastewater, wastewater treatment, Hódmezővásárhely

INTRODUCTION

All the people should know that all the used water in every home goes down through drains and through sewage collection system to wastewater treatment plants. We have to clean our wastewater before it returns to the environment. This wastewater can contain municipal sewage (which comes from households), agricultural wastewater, institutional and industrial wastewater. An average Hungarian person contributes 90-160 litres of wastewater each day. It depends on where they live; in small, in big cities or on ranches. [2] [4]

GENERALLY ABOUT WASTEWATER TREATMENT

There are three phases of cleansing wastewater: primary treatment, secondary treatment and sludge treatment.

The first is primary treatment, which means a physical removal of floatable and settleable solids. One task of primary treatment is to remove large objects (such as stones or sticks) with scum removal and grit removal and then comes a settling tank to settle out settleable solids. Essentially primary treatment is a mechanical removal.

The essence of secondary treatment is biological removal of dissolved solids. This typically utilizes biological treatment processes, in which microorganisms convert non-settleable and settleable solids.

There are two parts of biological treatments: aeration and sedimentation. Activated sludge can be circulated between these tanks. Then the treated effluent flows back to the environment. By chance, it can be disinfected before release.

From primary and from secondary treatment as well comes sludge to treat with various technologies such as thickening, dewatering and digestion. Then we can use it or disposal it. [1] [2] [4]

SEWAGE TREATMENT PLANT IN HÓDMEZŐVÁSÁRHELY

Hódmezővásárhely is located in South-East Hungary, on the Great Plain, in the county of Csongrád. This city has the second biggest area in the country. Until the middle of the 20th Century it was one of the most highly populated town.

Already in the 90's almost the whole city had sewage collection system. Therefore, the city needed a better and more effective sewage treatment plant. Namely, this wastewater is predominantly from municipal sources (households and small industry from Mártyély) it is called sewage and its treatment is called sewage treatment.

This new sewage treatment plant was built in 1994 with new – those days – modern technology, called 2AB by the UTB Company (Figure 1), which had 15.000 m³/d cleansing capacity. This plant works at nowadays as well and has earned a recognition from the Hungarian Hydrological Corporation. [5]

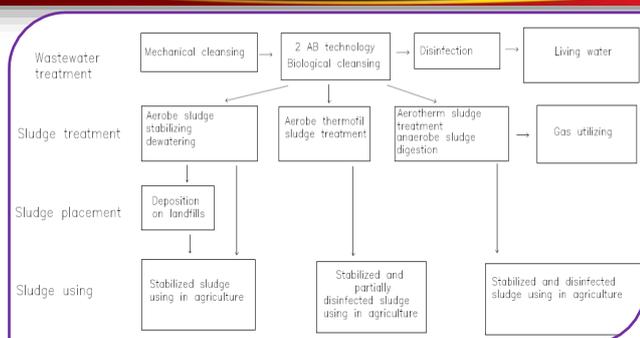


Figure 1. Method of UTB technology [5]

Features of this plant:

- » needs small area
- » does not have bad smell
- » has low energy-using
- » has low operating costs
- » can save energy by the biogas utilizing
- » uses digestion
- » has no denitrification and phosphorremoval.

At that time a lot of cities used this technologies: Martfű, Ercsi, Écs, Gyömrő, Ibrány, Jánossomorja, Kópháza, Soltvadker, Recsk-Parád-Mátraderecske, Szerencs and Szilvásvárad. [5]



Figure 2. Present sewage treatment plant in Hódmezővásárhely [7]

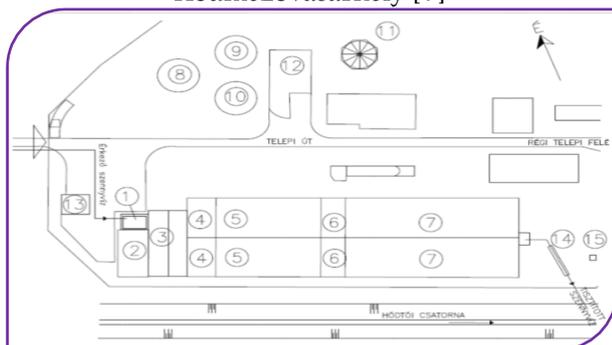


Figure 3. The site plan of the sewage treatment plant in Hódmezővásárhely [6]. Content: wastewater receiver, scum removal, grit removal, 2AB oxidation ponds, primary treatment, 2AB sedimentation, primary treatment, 2ab oxidation ponds, secondary treatment, 2ab sedimentation, secondary treatment, sludge-thickener, digestion tank, sludge tank, gas tank, aerothermal building, sniffed sewage pre-treater, parshall-channel [3] [6]

The population of Hódmezővásárhely has reached 44 795 in 2015. [10] Sewage treatment has two parts in this plant. (Figure 2, Figure 3) The first part

is waterline, which contains two phases: mechanical and biological treatment. The second part of cleansing is sludge line, which means the second phase, the sludge treatment. The 72% of the sewage system of Hódmezővásárhely is combined storm drains and sewers. The rain goes instantly through sewage system to treatment plant. Other wastewaters come from a small industry (from Mártély) and from separated ranches as sniffed sewage. The process of treatment flows like on the following picture.

CONCLUSIONS

Although the treatment plant of this city was built in the '90's, it is still an effective and properly maintained plant. However, the renovation of Hódmezővásárhely's treatment plant is scheduled we would like to believe that a reclaimed water, (which means potable water) will not be so futuristic idea and we can recycle all our used water not just in big cities, but all around the world. The technology is not enough, people living in environment of waste water treatment plant have individual feeling about it as well. Although smell can sometimes appear is not dangerous for human life people have sensitive feeling about bad smell. Expansion of town Hódmezővásárhely is very fast, so new buildings are closer to the plant. It means inhabitants require against high tech technology during renewing waste water treatment plant is getting stronger. It makes a typical situation how to find technical and social solutions for best and more comfortable sustainable life.

References

- [1.] Fazekas B., Kárpáti Á., Kovács Zs. (2014): Szennyvíztisztítás korszerű módszerei, Veszprém: Pannon Egy. Környezetmérnöki Intézet, <http://nbn.urn.hu/>
- [2.] *** Wastewater treatment, Water Environment Federation, WEF_ww_curriculum.pdf, 2015
- [3.] *** A hódmezővásárhelyi szennyvíztisztító telep Próbautazási Kezelési Utasítása és Működési Szabályzata, Hódmezővásárhely, (2015)
- [4.] Öllős G. (1992): Szennyvíztisztítás, BME MTI, Budapest
- [5.] *** Az United Technologies Bureau Kft., UTB technológia ismertető kiadványa (1994)
- [6.] *** A hódmezővásárhelyi szennyvíztisztító telep technológiai leírásai, kézirat, Hódmezővásárhely (1994)
- [7.] Harmat Péter magán képgyűjteménye (2015)
- [8.] Hódmezővásárhely Megyei Jogú Város Polgármesteri Hivatal Városfejlesztési- és Építéshatósági Iroda adatai alapján, Hódmezővásárhely, (2016)

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