

APPLICATION OF POLYESTER IN WASTEWATER TREATMENT THE CONCEPT OF BEST AVAILABLE TECHNOLOGY

Professional paper

Lejla Spaho, Salim Ibrahimfendić

Faculty of Technical Studies, University of Travnik, Bosnia and Herzegovina

Abstract

There is a very large offer in the market with regard to polyester materials, as well as a wide range of products in the field of construction. Its largest application is in the pipe material for water supply and wastewater disposal, as well as plants for waste water treatment. This presentation will describe how modern technology / (BAT) and the legal framework in terms of environmental impact on the application of these materials in construction.

Keywords: Polyester materials, wastewater disposal plant, wastewater treatment, environmental protection

Introduction

At the end of the 20th century the production of polyester, polyester resin and other synthetic polymers increases and expands in terms of materials for water supply and wastewater disposal. At that time the polymers technology develops in order to find a product with wide application on this market. Today's construction industry is unthinkable without plastics and polymers and the most frequent application of this material is for wastewater disposal, and for facilities to treat these waters. We can freely say that this is the age of plastic and modern technology but with the aim to protect water, air and soil. At the state level there is a constitutional provision that was used to define the existing activities in the field of our environment and at the entity level a law has been passed in this domain. Sustainable development is development that meets the needs of the present generation in term of their environment without compromising the needs of future generations which means that the sustainable development of a harmonized system of technological, economic and social activities in the overall development in which natural and created values are used economically and reasonable in order to preserve and improve the quality of the environment for present and future generations. Sustainable development is achieved through adoption and implementation of decisions that ensure balance of the economical interests and environmental protection, it is a long-term concept includes and integrates environmental, economic and social / social development.

1. Production of polymers in the world and Europe

Analyzing the market of products and materials, it can be concluded that the plastics and rubber fundamentally changed the human life and it is very difficult to find any modern product, that has no polymer parts. World's production of polymers in 2004 exceeded 250 million tons. If this quantity is expressed in volume, it is then almost twice higher than the production of steel, and is expected that the production of polymer materials after 2010 will reach 300 million tons. It sets new demands on manufacturers of polymer products, which have to produce high-quality and profitable products. Because of its specific properties, plastics and rubber have a very wide range of applications, and make these materials very useful from the standpoint of growing concern for the environment and reducing the consumption of natural raw materials. Among more than 50 different types of plastic materials that are manufactured today, the majority (or more than 65%) makes five so-called widely applicable thermoplastics: low density polyethylene (PE-LD), linear low density polyethylene (PE-LLD) and high density polyethylene (HDPE), then polyvinyl chloride (PVC), polypropylene (PP), polystyrene (PS) and polyethylene terephthalate (PET). In the European Union in 2004, 32.3 million tons of these materials was consumed (3.3 more than in 2003), and due to the economic crisis since 2005 there has been no increase in production. Almost 20% of the plastic from the total production in Europe is spent in the construction industry.

2. Chronology of the pipe material within hydraulic structures

The EU requirements for BAT document “Strengthening the capacity for implementation of integrated pollution prevention and control in Bosnia (IP-PC-BiH)” and the protection of water, air and soil from pollution, and the introduction of economical friendly technologies and new materials and systems for wastewater treatment. Not so long ago, (50 years ago) tubes were manufactured from different materials: reinforced concrete, prestressed reinforced concrete, steel (welded and seamless), cast-iron, nodular cast iron - ductile, made of synthetic materials of various types (plastic and other synthetic materials) ceramic clay lead, copper and many other.

Today, these pipes have been replaced with the polyester materials and basic division is on: pipes of PVC, pipes from polyester materials, pipes of hard polyethylene (PE). The good side of the plastic pipes: high resistance to corrosion (aggressive soil and water), low weight (easy transportation and installation), frost resistance, resistance to stray currents, low thermal conductivity, good hydraulic properties (smoothness), light processing (cutting, trim). Disadvantages of plastic pipes: much stretching at high temperatures, flammability decline in strength at temperatures greater than 20°C, the stiffness of PVC pipes at temperatures below 0°C.

When we look at waste water, pipe materials and cleaner technologies we can conclude that there has been significant progress. The development of new technologies and ever more stricter legal framework, special attention is paid primarily to the industrial waste waters, their treatment and limit values for waste water before there are discharge.

3. General aspects of the best available techniques for industrial wastewater

Federal Ministry of Environment and Tourism, on the basis of Article 87 of the Law on Environmental Protection (“Official Newspaper of Bosnia”, no. 33/03) and the Regulations on the adoption of best available techniques for achieving environmental quality standards (Official Newspaper of Bosnia and Herzegovina no.92/07) has rendered a decision that includes technical instructions for the best available technology - BAT documents, published in the Of-

ficial Newspaper of Bosnia no.61/09 of 28.9.2009, which have become obligatorily in structural design and installation of equipment, management and process control, equipment maintenance, and the adoption of measures to prevent pollution of water, air and soil.

Waste water treatment can be divided into several groups:

1. Coarse and fine mechanical separation of waste water with equalizing
2. Flotation it is practiced before settling and biological treatment process;
3. Precipitators for sand and other similar materials;
4. Precipitators for organic mass,
5. Biological waste water treatment with pipelines and concrete pools with equalization.

Based on the above mentioned wastewater treatment technology the industry for treatment products and devices to treat municipal wastewater, and industrial wastewater is growing. The design of these devices is based on environmentally friendly materials - polyesters and the function is based on the biological wastewater treatment. Very often designers and technologists decide to use devices with biological methods in pool. In the secondary sedimentation tank separation of the “activated sludge” and biological thin layer of the treated wastewater is made. The precipitated mixture of bacteria and microorganisms are pumped back at the entrance to the pool as sludge. SBR devices (Sequencing Batch Reactor) the pool and secondary settling are not spatially separated. The process of biological treatment and subsequent deposition takes place in the same pool (SBR reactor). SBR-reactor is for a certain time used as biological methods in pool and after the blowers as secondary settling.

4. Conclusion

Given that within my work I design sewerage system's and prepare studies for less complex technology, I believe that very little is invested in the protection of the environment in terms of pollution. Among other things, most of the investor fails to comply with the recommendations and do not invest in wastewater treatment. Also, most of the districts maintain a mixed sewage system because it is cheaper and more acceptable for the budget. Power distribution sys-

tems are costly as well as systems for waste water treatment. So the waste water is discharged uncontrollably often in waterways.

By following legal provisions, good practice and

technologies, we can influence this issue. Production equipment for waste water treatment and competition in the market in terms of producers can expect some progress but only in the domain of foul water and very little in terms of industry.

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PRIMJENA POLIESTERA KOD OTPADNIH VODA KROZ KONCEPT NAJBOLJE RASPOLOŽIVE TEHNOLOGIJE (BAT)

Sažetak

Postoji veoma veoma velika ponuda na tržištu u pogledu poliesterskih materijala, kao i širok spektar proizvoda u oblasti građevinarstva. Njihova najveća primjena je u cijevnom materijalu za vodoopskrbu i odvodnju

otpadnih voda kao i postrojenja za tretman otpadnih voda. U ovom radu će se opisati koliko su savremene tehnologije (BAT) i zakonski okviri u pogledu zaštite okoline uticali na primjenu ovih materijala u građevinarstvu.

Ključne riječi: poliesterski materijali, odvodnja otpadnih voda, postrojenja, tretman otpadnih voda, zaštita okoline

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Correspondence to:

Lejla Spaho

Faculty of Technical Studies, University of Travnik,

Bosnia and Herzegovina,

E-mail: lejlaspaho@hotmail.com
