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Basic sanitation as a preponderant factor in the public health of communities

Basic sanitation as a major factor in the public health of communities

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SUMMARY
The deficiency in basic sanitation in Brazil brings with it a concern, considering the seriousness of its role in the connection it has with health and the environment. Sanitation as a health promotion encompasses the foundation of a circumspect physical structure of a water, sewage and drainage system, which differentiates it from an operation in the physical environment. In light of the above, this study's general objective is to analyze the importance of basic sanitation for public health in communities. Specific objectives: present the definition and characteristics of sanitary sewage; Check which means can be used to treat sewage. Bibliographical research was used as a methodology. **Key words:**Sanitation. Public health. Sewage.

ABSTRACT
The deficiency in basic sanitation in Brazil brings with it a concern, considering the seriousness of its role in the connection it has with health and the environment. Sanitation as a health promotion encompasses the foundation of a circumspect physical structure of water, sewage and drainage systems, which differentiates it from an operation in the physical environment. In this context, this study aims to analyze the importance of basic sanitation for public health in communities. As specific objectives: to present the definition and characteristics of sanitary sewage; check what means can be used for sewage treatment. Bibliographic research was used as a methodology.
Keywords: Sanitation. Public health. Sewer.

1. INTRODUCTION

The deficiency in basic sanitation in Brazil brings with it a concern, considering the seriousness of its role in the connection it has with health and the environment.

In Canada, at the 1st International Conference on Health Promotion held in 1986, it constitutes the term of reference from which health promotion images were developed. Through this document, the concept of health promotion becomes open, which establishes a movement whose basic concern is the increase of human beings in a healthy world.

The World Health Organization (WHO) defines Health Promotion as something that is much more than the lack of diseases, since the macro determinants of the health-disease process are taken into account in the approach, with the aim of transform them conveniently.

It covers the prevention of diseases similar to that presented in the Ottawa Charter. In this way, caution is would limit itself to indicating contact barriers between the disease and fit individuals, while the promotion would have as its aim the quality of life, the total banishment, or at least a slow process of the disease, according to Lefèvre and Lefèvre (2004).

Analyzing that sanitation as a positive action for well-being must assume the responsibility of seeking to eradicate certain diseases in partnership with the health sector and other sectors linked to health, this The study seeks to answer the following question: Why is basic sanitation considered a preponderant factor in the public health of communities?

In light of the above, this study has the general objective of analyzing the importance of basic sanitation for health public in communities. Specific objectives: present the definition and characteristics of sanitary sewage; Check which means can be used to treat sewage.

Sanitation as a health promotion encompasses the foundation of a circumspect physical structure of a water, sewage and drainage system, which differentiates it from an operation in the physical environment.

Thus, this study is justified considering that the conceptions of sanitation as promotion are

The aim is to collaborate to achieve changes in the case of individuals and their environment through the implementation of engineering systems. As a methodology, bibliographical research was used.

2 THEORETICAL FRAMEWORK

2.1 DEFINITION OF SANITARY SEWAGE

Green is of great importance to society, considering that nature is a strong point for the well-being of the population, promoting greater quality of life and integration of the individual in the social environment (LINDGREN, 1978).

Lindgren (1978, p. 41) states that "leisure is a topic normally treated as a problem of green areas both in the city and with the distribution of community equipment".

It is explained that when sanitary sewage in leisure areas does not have treatment systems,they cancause public health problems and generate degradation to the landscape and the environment (PEREIRA, 2003).

Therefore, current treatment systems have the main objective of reducing public health problems and environmental damage, however, they are generally not integrated with other environmental and social systems (PEREIRA, 2003).

Sanitation began to be developed according to the evolution of different civilizations, being set back by their fall, and renewed with the appearance of others. As an example, bathrooms, sewage networks and street drainage were found in a ruin of a civilization in India approximately 4,000 years ago (MONTEIRO JUNIOR; RENDEIRO NETO, 2011).

The old testament has addressed links to the sanitary practices of the Jews, such as the use of water to clean dirty clothes, which was favoring the appearance of diseases (scabies) and that is why water supply wells were kept covered, clean and away from possible sources. of pollution (TONETTI, et al, 2012).

Currently, in rural areas, the population consumes resources to be able to build their homes, without having to include the sanitary facilities that are indispensable, such as the protected well and the septic tank (MONTEIRO JUNIOR; REN-DEIRO NETO, 2011).

The word sanitize comes from making sane, healthy or healthy, therefore, sanitation is equivalent to preventive public health, reducing the need to go to hospitals, because it eliminates the chances of contagion due to various diseases, that is, where there is sanitation, the chances of a healthy life are greater and mortality rates remain lower (ANVISA, 2002).

Defining the composition of sanitary sewage, fresh sewage is gray, turbid and with little more than an unpleasant odor. It contains many large (feces, plastics, pieces of cloth, pieces of wood), small (paper, grains, etc.) and microscopic (colloidal) floating solids (MONTEIRO JUNIOR; RENDEIRO NETO, 2011).

When we are in hot climates, the sewage quickly loses dissolved oxygen, becoming septic and having a stronger odor, due to the presence of hydrogen sulfide gas. Sanitary sewers vary in space, their functions include several variables, from climate to cultural habits, they also vary over time, which makes their characterization more complex (TONETTI, et al, 2012).

In Brazil, a small portion of sewage receives adequate treatment, leaving aside sewage from the outskirts, causing damage to the environment and public health. Conventional sewage technology has a high cost, making service in low-income areas difficult. In Brazil, more than half of the population does not have a sewage system with technologies that can be adapted to local characteristics, with lower costs, but with quality and efficiency (MONTEIRO JUNIOR; RENDEIRO NETO, 2011).

Even with technological advances, the current national health situation is still precarious, taking into account the lack of resources for investment, in view of the deficiency of public environmental sanitation policies, which has been contributing to the proliferation of illnesses that could be avoided if they were preventive measures were taken in relation to sanitation measures (FUNASA, 2009).

There are a reasonable number of municipalities that do not have sewage collection and treatment facilities and therefore sanitation program is not seen as a priority, becoming individual and localized in specific municipalities (PEREIRA, 2003)

There is a sanitation supply that is associated with systems that are made up of a physical and educational, legal and institutional infrastructure that highlights the following services: water supply for the population; collection, treatment and environmentally appropriate disposal; the packaging, collection, transportation and final destination of solid waste; rainwater collection, and control of puddles and floods, control of communicable diseases, means of transport, housing in workplaces and hospitals, water, air and soil, acoustics and visual (MONTEIRO JUNIOR; RENDEIRO NETO, 2011).

2.2 CHEMICAL CHARACTERISTICS OF SANITARY SEWAGE

About 70% of the solids in sewage are of organic origin, generally being a combination of carbon, hydrogen and oxygen and sometimes nitrogen. In inorganic matter, it is formed mainly by the existence of sand and dissolved mineral substances (FUNASA, 2004).

In average sewage, 70% of the solids are compounds of organic origin consisting of proteins, carbohydrates, fats and oils and to a lesser extent byurea,surfactants, phenols, pesticides (JORDÃO; PESSOA, 1995).

Nitrogen, carbon, hydrogen, oxygen are released, which may contain phosphorus, sulfur and iron and are normally of animal origin, and can also occur in vegetables. The sulfur that is supplied by proteins is responsible for the production of hydrogen sulfide gas that is present in wastewater (SILVA, 2004).

It contains carbon, hydrogen and oxygen and are the first substances to be attacked by bacteria, being present in sugars, starch and cellulose. Dueto degradationbacterialof thecarbohydrates are produced organic acids, which can generate an increase in the acidity of the sewage (JORDÃO; PESSOA, 1995).

The inorganic matter present in sewage is made up of sand and other dissolved mineral substances, coming from washing water, and it is not usual to remove this type of material, which has little influence on a sewage treatment system as it is an inert material, always should be carefulto the possibilitiesclogging and saturation of filters and tanks, when there is a large quantity of this material (SILVA, 2004).

2.3 WASTE FROM SANITATION SERVICES

With Law No. 11,445 of January 2007, a new context for basic sanitation was established, with new guidelines adding possible legal forms of institutional organization of services, being coherent with the different social, environmental and economic realities of Brazil (BRASIL, 2007).

It establishes that basic sanitation must be the subject of integrated planning, with elaboration by the holder together with other entities of the Federation and even service providers (BRASIL, 2007).

Some important devices were also created to reduce regulatory risks in the provision of basic sanitation services, as well as the recognition of the need for these services to have economic sustainability, for any form of institutional organization, which can be observed in art. 29 and art. 2nd: Art. 29 states that public basic sanitation services will have economic-financial sustainability ensured, whenever possible, through remuneration for charging for services: “I - water supply and sanitary sewage: preferably in the form of tariffs and other public prices, which may be established for each of the services or for both together”; Art. 2 Public basic sanitation services will be provided based on the following fundamental principles: “III - water supply, sanitary sewage, urban cleaning and solid waste management carried out in ways appropriate to public health and environmental protection” (BRAZIL, 2007).

1.4 SNIS– NATIONAL INFORMATION SYSTEM

Created in 1996, by the Federal Government, based on data from 1995, the National Information System (SNIS) is directly linked to the National Secretariat of Environmental Sanitation – SNSA of the Ministry of Cities (BRASIL, 1996).

To obtain and provide information, the SNIS relies on a database administered at the federal level, which contains information of an institutional, administrative, operational, managerial, economic-financial and quality nature on water, sewage and solid waste management (SNIS, 2016).

The information is provided by state companies, municipal authorities, city halls and, among some more specific cases, through secretariats, departments or private companies. It has established itself as the largest and most important database in thesanitation sectorBrazilian, with effects and purposes at the federal, state and municipal levels (SNIS, 2016).

2.5 SEWAGE TREATMENT TECHNOLOGIES

The sewage treatment system consists of a set of unitary operations and processes. The concept of operation and unitary process is sometimes used interchangeably, due to the fact that they can occur simultaneously in the same treatment unit. In general, the following definitions can be adopted (METCALF & EDDY, 1991): Unitary physical operations: methods where physical force is applied (e.g. grating, flocculation, sedimentation, filtration); Unitary chemical processes: methods where the addition of chemical products is applied (e.g. precipitation, adsorption, disinfection); Unitary biological processes: treatment methods where the removal of contaminants is done through biological activity (e.g. removal of carbonaceous organic matter, nitrification, denitrification).

2.6 GENERATION AND COMPOSITION OF SLUDGE IN SEWAGE TREATMENT SYSTEMS

In wastewater, the organic material present in the influent is a mixture of many compounds, which can be classified into two categories: biodegradable and non-biodegradable. They can also be separated into two fractions: soluble and particulate. (DAVIS & HALL, 1997).

The chemical composition of sludge is an important factor in maintaining aquatic biodiversity, as sludge is the habitat of community organisms.benthic– basis of the entire trophic chain (WATANABE, 1997).

Among the solid pollutants present in the aquatic environment, industrial sludge stands out. They result from the regular emission of industrial effluents that “flood rocky bottoms, alter the granulometry of soft bottoms, always with the aim of increasing the fine fraction of dust andcolloid"(ROSS, 2003, p. 331). The bottom substrate of rivers naturally contains clay, transported periodically (when there is heavy rainfall), or regularly throughout the year.

Sewage sludge is the residue generated after the treatment of wastewater (sewage) with the aim of making it less polluted as possible, in order to allow its return to the environment without being agents of pollution. The management of this product, through recycling or disposal methods, is one of the most important problems associated with projects and operations of sewage treatment plants. (FREITAS, 2005).

The management of this material normally represents 20 to 60% of the operating costs of an ETE/ETA (PROSAB, 2001), and in Brazil only 40.12% of the urban population is served by collection and only 40% of what is collected receives treatment. adequate, generating the prospect of a significant increase in sludge generation (PROSAB, 2001).

The term “sewage sludge” is a generic name for the waste generated by wastewater treatment systems. Therefore, its composition depends on the type of treatment adopted and the characteristics of the generating sources (SANEPAR, 1997).

Sludge from sewage can be classified as a material rich in organic matter, with levels high levels of moisture, nitrogen, phosphorus, micronutrients and other minerals, thus becoming an important agricultural input. (AISSE et al., 1999).

Plant macronutrient concentrations in sewage sludge vary greatly. The average concentration of a "typical" sewage sludge would contain 3.2% N, 1.4% Pand 0.23% K. With the exception of K, these nutritional values are similar to those of manures (HUE, 1992). The potassium content of sewage sludge is inherently low, with most of the K compounds being water-soluble and remaining in the sewage effluent or aqueous fraction during sludge dewatering.

By the same mechanism, a portion of inorganic N, especially NH4, which is enriched during sludge digestion, can be lost. However, organic N is by far the largest fraction, ranging between 50 and 90% of total N in any type of sludge. Unlike N, organic P only presents concentrations between 10 and 30% of the total P in anaerobic sludge (SOMMERS et al., 1976). Remaining OP is inorganic, in the forms of Ca, Fe, Al and phosphates. (SOMMERS et al., 1977).

There is also a difference between soils, and in tropical soils, there is a rapid oxidation of organic matter, which is further evidence of the great advantage of using biosolids as conditioners capable of improving the physical, chemical and biological characteristics of the soil. with major impacts on agricultural productivity. However, this recycling requires low levels of heavy metals and pathogens, while disposal in landfills is less demanding in these parameters; however, greater care is still needed with transport to distant locations (PROSAB, 2001).

To define the structures, steps, processes and equipment necessary to promote the adequate stabilization, handling and management of this waste, it is necessary to first identify the most suitable alternatives for recycling and/or final disposal (PROSAB, 2001). Generally, the moisture content of raw sludge varies between 90 and 99%, which considerably increases the volume of sludge produced in STPs.

2.7 MIXED SEWAGE TREATMENT

Sewage treatment using a mixed system is characterized by an anaerobic treatment phase and then an aerobic phase, where the effluent is oxygenated. The system is composed of UASB reactors followed by aerated reactors (activated sludge). (CATUI ENGENHARIA, 2014).

The ETE was designed with the following objectives regarding the quality of the treated effluent: Meet, at least, to the limits established by article 18 of decree 8468/75 and CONAMA resolutions 357/05 and 397/08. Remove organic matter to produce effluent at secondary level. Disinfect the effluent for total coliform count ≤ 10^3 col/ 100ml. (CATUI ENGENHARIA, 2014).

Primary treatment aims to remove raw sewage from the collection network, first passing through the medium and fine opening baskets, both with manual cleaning. At this stage, grating systems were constructed in order to retain floating coarse solids, whose particles have dimensions greater than 1.0 (one) centimeters (CATUÍ ENGENHARIA, 2014)

After this first stage of treatment, the effluent will pass through a sand box, which is a rectangular box of technical dimensions; Built in waterproof masonry, its purpose is to remove particles with diameters varying from 0.1 to 0.4 mm, which are contained in domestic sewage (FERNANDES, 2016).

2.8 FINAL DISPOSAL OF SLUDGE

The final destination of the sludge is extremely important, and according to the legislation of several countries, including Brazil, the responsibility for problems that may be caused by inadequate disposal always lies with the producers of the waste, and may be covered by the Environmental Crimes Law. (Law No. 9,605 of 12/02/98), leading to penalties such as fines, sanctions and, in some cases, criminal liability (BRASIL, 1998).

In effect, when polluting, one commits, in theory, among other administrative infractions, an environmental crime, provided for in Law 9,605/1998, Art. 54, item 7. Art. 33. Cause, by emission of effluents or loading of materials, the perishing of specimens of aquatic fauna existing in rivers, lakes, dams, lagoons, bays or Brazilian jurisdictional waters . Penalty – detention, from one to three years, or fine, or both cumulatively (BRASIL, 1998).

Thus, there is an intense technological development for the post-treatment of sludge and its final destination, involving solid-liquid separation systems (natural and mechanical dehydration), hygiene and agricultural application, incineration, landfills (ANDREOLI, 2001) .

Observing this expansion of impacts and risks caused by the discharge of waste into bodies of water due to the physical-chemical-biological characteristics, form and retention time, the conditions of final disposal of the waste, in addition to the physical-chemical-biological characteristics of the receiving watercourse, the impact caused by the sludge and solids resulting from dewatering can also cause risks to the environment, if disposed of inappropriately.

This disposal of solids in landfills, considered in most cases as the only solution, will soon be phased out, as it will no longer be permitted by environmental agencies (Law 12,305/2010). The landfill is a place to dispose of waste, which is not the case with ETE sludge (BRASIL, 2010).

Due to a series of precautions that must be taken with landfill disposal and growing environmental demands, an increase in the agricultural use of sludge is estimated, due to its profitability and sustainability of the process (DAVIS and HALL, 1997).

If intended exclusively for agricultural areas, at an application rate of 5 t/ha (conservative rate), it would require 0.309% of all arable land in the country, a rate identical to the estimate made for the United States (UN – HABITAT, 2008, p. 75).

However, for this destination to be applied in agriculture, the sludge must be analyzed, mainly in relation to heavy metals, pathogenic organisms and toxic compounds, which limit its use (JORDÃO and PESSÔA, 1995).

CONCLUSION

It was verified here that the concepts of health promotion and prevention, such as sanitation, are a relationship in a multidimensional space in which social actors participate in their own way through political and educational actions regarding the biological and chemical factors of this space.

The relationship between preventive and promotional basic sanitation is differentiated, which is linked to educational actions aimed at promoting changes in community customs, aimed at the equipment and services provided so that the transmission of the disease does not occur.

In this way, the importance of popular participation is understood in order to carry out engineering actions that prevent diseases, requiring intersectorality.

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