INDIAN WATER WORKS ASSOCIATION, MUMBAI CENTRE

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DROPLET

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from Chairperson Desk

We live in the most advanced time in technological innovation. Unfortunately, early technological advancements were hardly environmentally conscious. Coal was first used in the 1880s, but on a minor scale. However, by 1961, it had become the primary fossil fuel used to generate electricity across the globe. Modern planes, cars, trains, and ships have made it possible for us to travel all around the world. But their technological developments, along with the ever growing demand has led to more carbon emissions. The worse effect of climate change are already visible in the formats of erratic and extreme weather conditions, global warmings, etc.

Digital technologies are achieving dramatic reduction in emissions. We use climate technologies such as drought resistant crops, early warning systems and sea walls. There are also 'soft' climate technologies, such as energy efficient practices or training for using equipment.

In terms of renewable technologies, wind and solar power can make the deepest cuts to net emissions in the short term. Research, increased demand and innovation have made wind and solar energy one of the cheapest energy sources out there, cheaper even than fossil fuels.

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Editor Brief

India is growing at a tremendous pace and has been recognized as one of the fastest growing economy in the World. Water supply sustainability is becoming critical day by day due to our increasing population and reducing per capita availability. The concept of waste to wealth fits well for water and waste management in India considering the demand situation and circularity of water. Wastewater is increasingly recognized as a reliable source of freshwater, particularly for agricultural applications and non-potable use.

For the year 2020-21, the estimated wastewater generation has been estimated as 72,368 MLD for urban areas and 39,604 Million Litres per Day (MLD) in the rural regions. Currently, the installed sewage treatment capacity is 31,841 MLD, but the operational capacity is 26,869 MLD, which are much lower than the load generated. Of the total urban sewage generated, only 28% (20,236 MLD) was the actual quantity of wastewater treated. This implies that 72% of the wastewater remains untreated and is disposed of in rivers/lakes/groundwater. The CPCB has identified 351 stretches on 323 rivers to monitor the river water quality using Biochemical Oxygen Demand (BOD) as an indicator of pollution. About 50% river stretches are in the category of mildly polluted to severely polluted category.

There are some increases in infrastructure e.g., another 4,827 MLD sewage treatment capacity, has been proposed. If this is added to the existing installed capacity, then the gap between the wastewater generated and the capacity available for treatment (CPCB) reduces to 49%. This gap, between generated and treated, has to be addressed to utilise

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Expert's Article

Safe and Environmentally Friendly Management of Sewage Treatment Plant Bio-Solids (Sludge) - A need of the Hour in India

Dr. Uday G. Kelkar, P.E., BCEE,
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While treated water from the Sewage Treatment Plants (STPs) can be discharged into recipient water bodies after desired treatment as per requirements and/or standards established by Statutory Agencies, handling of sewage sludge and its treatment remains complicated. As more and more STPs are being designed to meet stringent discharge standards and therefore include advanced unit operations involving nutrient (nitrogen and phosphorus) removal a large quantity of sludge is being generated as a by-product. Currently, such sludge generated at the STP is either given to farmers at no-cost as organic fertiliser or for soil amendment or sent to unsecured landfill/dump yards by the Contractor operating the STP.

To express the characteristics of the sludge, as well as the production in terms of mass and volume, it is essential to understand some fundamental relationships as: Total volatile and fixed solids; Density and Specific Gravity of the Sludge; Destruction of Volatile Solid; Solids Capture; Primary Sludge Production; Secondary Sludge Production. There are currently no regulations in India specifically dealing with the handling, transport, treatment, and disposal of sewage sludge. However, there are national laws related to waste management (covering municipal wastes, hazardous wastes, sewage, air quality and general environmental protection) which can also impact sludge management In many cases India, disposal of dewatered sludge that is left to the Operator (invariably a Contractor who is operating the plant) for "proper disposal", unfortunately, ends up in nearby river streams or in uncontrolled dump yards in areas not too far from the STP usually leased by the Contractor as a part of his contractual obligation. This non-classification & therefore the non-regulated nature of sludge and its poor management and negligible treatment, creates environmental hazards. This problem will undoubtedly increase manifold as more and more sewerage systems and associated STPs are being built in India. Therefore, it is becoming imperative to focus on the solids stream too in addition to the routine emphasis on liquid stream during the design & development of the treatment process for the STP and their execution. In other words, an effective sludge (bio-solids) classification scheme based on its moisture and pathogen content (levels) along with appropriate sustainable management (recycle and reuse based on the Circular economy practices) of treated sewage sludge (biosolids) from STPs in India. Therefore, the concept of sustainability in Sludge Management Systems also warrants a holistic view and an integrated approach while avoiding surface pollution therefore safeguarding the Environment.

The concept of circular economy takes production processes into consideration and outlines how to reuse, repair, and recycle items, thus increasing sustainable manufacturing and consumption. This way, in addition to reducing waste, saves energy and helps avoid irreversible damage caused in terms of climate and biodiversity, as well as in terms of air, soil, and water pollution, owing to the use of resources at a rate that exceeds the Earth's capacity to renew them. In order to mitigate the possible environmental consequences, it is necessary to minimise the generation of waste and encourage the use of products, materials, and resources that will remain in the economy for as long as possible. These are the

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Need on Sludge Management

Currently, Sludge or Biosolids are either used as both soil conditioner/fertiliser by farmers or landfilled or dumped into existing streams or non-regulated areas.

Strong need to address following issues

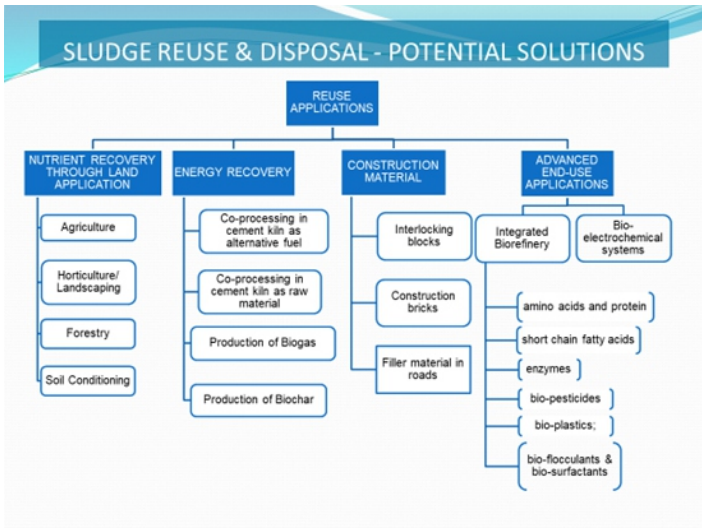
- Health hazards from STP-Sludge, Mitigation of current sludge disposal practices.
- Lack of any specific guidelines for biosolids disposal methods
- Non-availability of Standards or Guidelines on the characteristics of biosolids with respect to their classification based on metal concentration, vector control, pathogen levels and odour control.
- Inadequate guidance or knowledge of appropriate technology(ies) or combination thereof for safe and environment friendly treatment and disposal of biosolids.
- Absence of an appropriate Framework for management and disposal of biosolids based on available disposal option(s), quantity of sludge generation an STP or a number of STPs,
- feasibility of possible reuse options after their appropriate management and last but not the least, the ULBs selection of the most appropriate disposal option based on population as well as the number of STPs being operated by them.

...Expert's Article contd. from page 2

foundations of the so-called circular economy which seeks a new model of production and consumption of goods and services associated with sustainability.

Thus, when we treat this sludge to produce biosolids and use it for land application to utilise its rich nutrients in agricultural fields or recover energy from sustainable ways, we set an example of a circular economy.

Worldwide, Governments have developed a Policy and Regulatory Framework (including Guidance Documents) on both sludge reuse and its use as a renewable resource. The intent of developing these Guidelines is to develop and provide a road map for Advancing Resource Recovery from biosolids and exploring current, as well as, emerging opportunities for recovery and appropriate utilisation of organics, energy and nutrients in bio solids specifically for Indian realities. Following the principles of sustainability and circular economy, countries and utilities are moving from focusing on waste minimization to resource recovery. As a result, many of the STPs around the world are renaming their facility as Water Resource and Recovery Facility after implementing some of the initiatives towards circular economy. Treating sludge and reusing biosolids as a fertiliser or soil amendment/ conditioner is a step towards a circular economy which a large number of STPs are adopting global practices. Over the last 10 years, major advances in sludge dewatering and reuse have taken place worldwide including developing classification of biosolid into non-pathogenic or semi-pathogenic. Since the US EPA sludge guidelines have been developed extensively covering all aspects of sludge disposal, It is proposed to adopt US EPA classification of sludge type (depicted and defined in US EPA document 40 CFR Part 503) such as 1) Class A: – Bio-solids with free of pathogens or very low number of pathogen presence with maximum vector control, 2) Class B: - Bio-solids with low to moderate levels of pathogen and moderate vector control, 3) Class C: Bio-solids with higher number of pathogen and lower vector control and has to be disposed-off into a secured landfill with proper controls.



The evaluation of alternatives for sewage sludge treatment and final disposal is usually a complex scenario, due to the interdependence of various drivers such as; adaption of combination of specific unit processes such as anaerobic digestion (both mesophilic and/or thermophilic), thermal hydrolysis (THP), pasteurization, thickening & dewatering, solar heating & drying, incineration, as well as the characteristics of bio solids, economic, environmental, health and safety and finally legal aspects. Although complex and expensive, final sludge disposal is often neglected in the concept formulation and design stages of sewage treatment systems. Because sludge management represents a considerable percentage (20–60%) of the operational cost of a sewage treatment plant. The choice of the sludge processing methods and final destination alternatives should be given due emphasis during concept formulation and design stages. Typically, time is devoted to design and formulation of liquid stream detailing, however, it is also of equal importance to focus on the balance solids stream to ensure all the products both the treated liquid or sewage and the solids as sludge are disposed-off in a very safe and environmentally friendly and sustainable manner.

NEWS ROOM

55th Annual Convention of Indian Water Works Association was held at Pune on 20-22nd Jan 2023. The theme of the convention was Sustainable Management of Water & Sanitation : Availability for all. Good participation from IWWA Mumbai Centre including contributions from Chairperson Er Maniessha Palande, Secretary Shri Pramod Dalvi, Er R B Bambale during COM meeting. Dr Ulhas Naik, Dr Pradeep Kalbar, Er Dilip Sonwane participated as Panel Members for discussions on 24x7 and Amrut Mission Workshop. Er K B Wadhvane presented as article on sewage treatment.

a) S K Shah memorial shield for Best Managed centre is awarded to Mumbai Centre

b) V D Deshpande memorial prize to Shri Mohan Matsye.

c) Linga Raja Dass Award is awarded to Er Milind Kelkar.

d) Best Lecture award to Er Ramsharn Shukla

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from Chairperson Desk

We need to focus on climate Technologies in the sector fuel efficient cooking, solar powered water supply networks, regrowing underground forests and regreening depleted resources, transforming trash to treasures and equipping the next generation of climate advocates.

- Er. Maniessha Palande

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from Editor Brief

the wastewater as a valuable resource. The sludge coming out of waste-water treatment plant is large in quantity and requires proper treatment & safe disposal. For the readers, we have good article on Sludge Management in this issue.

The annual convention of Indian Water Works Association was held at Pune recently between 20th to 22nd Jan 2023. There has been good participation by IWWA Mumbai centre including awards to individuals and Mumbai Centre. Hearty Congratulation to you all.

- Er. Dilip Sonwane