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Efficiency improvement of Sludge Drying Bed - Design Modification of present system

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Abstract
This paper is concerned with the present and future of Sludge Drying Bed. This is done through the study of present drying bed along with the Simulated Model using Computer aided Design. The computation of controlled and developed model has been studied extremely through DeBono technique of artificial intelligence along with Fish Bone diagram. The result obtained shows considerable reduction of drying of sludge, less odour formation and improve dewatering level in same interval of time.

Keywords: Sludge Drying Bed, CAD, odour, dewatering, simulation

1. Introduction
Sludge Drying Bed is unit used for dewatering of sludge in sewage treatment plant. The present SDB was made and developed in around 1950 (www. marysvilleohio.org ,2000) and same design is working even in present era. At that time, the environmental conditions were not like present conditions. As sewage treatment system was designed and commissioned far away from locality or village. The area was not the important factor, so fumes and gases were absorbed by flora and fauna surrounding the plant

From the survey and reports (www.neurope.eu, 2011), it was found that treatment work is progressing well but the collection and treatment compliance rates could still be improved. Same kind of data has been observed (www.sratx.org, 1999), in this survey which was conducted in US, which indicates that water and wastewater treatment systems needs improvement, particularly with regard to expanding local technical expertise on water supply, treatment and quality issues. There are also problems in wastewater treatment system designing as reported by Bielefeldt (2006).

According to CPCB (2005) there exists a large gap between sewage generation and its treatment. To overcome this problem we have to redesign or modify the conventional designs of sewage treatment plants.

The neural network is mainly used in this application to fill in data gaps. This is particularly useful for input data in different models (Booty et. al., 2001).

A better control of WWTP can be achieved by developing a robust mathematical tool for predicting the plant performance based on past observations of certain key parameters (Hamed et. al., 2003).

In every sewage treatment plant, sludge drying bed is an important part as it reduces the amount of sludge generated during treatment. The sludge drying bed usually emits a foul smell which has very adverse impact over nearby surrounding or environment. In my newly developed model, we have undergone a process of re- construction/ modification of sludge drying bed.

2. Materials and methods
Keeping in mind the present condition and review of literature, following methodology has been adopted:

2.1 Study of Problem associated with Sludge Drying Bed
The physical and physiological characters were studied during visit of the STP plant. It includes topography, temperature round the year, seasonal factor and solar radiation around the plant. This has helped in developing the fish bone Diagram of SDB

2.2Construction of New Model

1.2.1 Sketch

The sketch of hypothetical model was made with a mindset of keeping it economy and suitability for environmental conditions of studied area.

2.2.2 Computer Aided Design Model

Model has been developed for the best sketch after testing through Poke - Yoke standard procedure tool of quality control. Cad Model of proposed sketch had made for simulating the data using the blender software in CAE Linux.

2.3 Testing of Model

The Proposed model has undergone simulation process so that the real condition could be tested under the lab conditions. The De-novo Technique of artificial neural networking along with Fish bone diagram has been used to achieve the pop and corns of present SDB.

3. Results & Discussion

The analysis of the result also leads to the fact that the present model is highly effective and can cope with the present conditions.

The Fish bone diagram has helped in getting the real condition of SDB of sewage treatment plant.

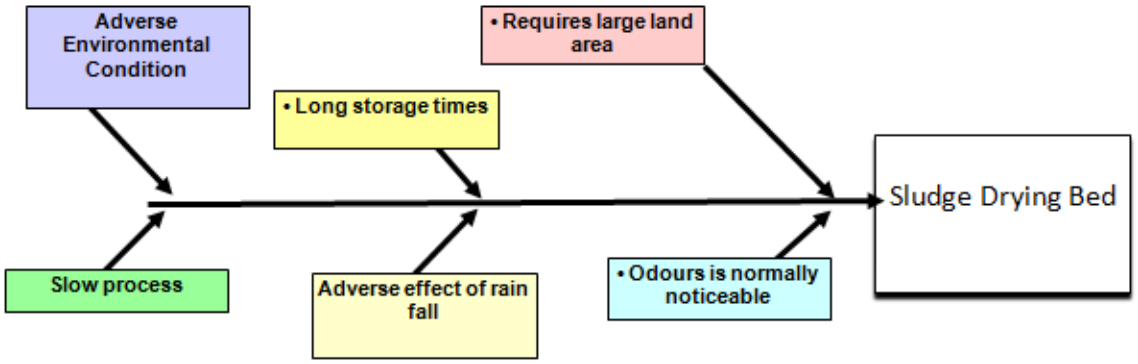

Fig 1: Fish Bone Diagram of Sludge Drying Bed

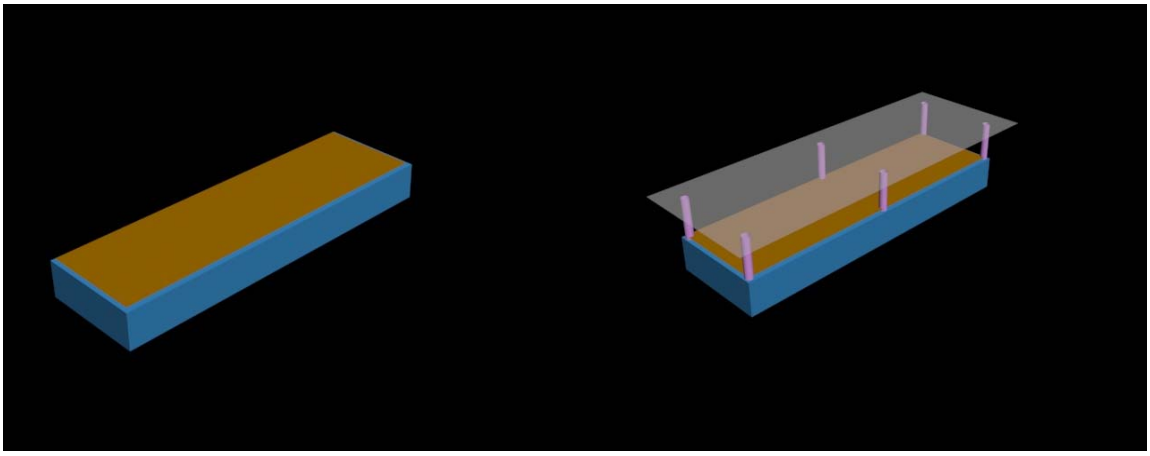

Fig 2: CAD Design For Present SDB (left) and Proposed SDB (right)

After testing of proposed model in the De Bono Technique along with open foam software in linux leads to following results

1) The generated lab scale model is very useful in controlling the odour of sludge drying bed.
2) The more amount of sludge can be dried in same time as compared to drying bed.
3) Designing is economical and cheaper with almost no adverse effect on environment.
4) There is no requirement for the re- construction of sludge drying bed as the modification can be applied over the present system.
5) Reduces the dew wetting of sludge during dusk and dawn.
6) Reduces the wetting of sludge during rainy season.
7) Improve the overall efficiency of sewage treatment plant.

4. Conclusions

The developed model is efficient in dewatering of sludge as compared to present SDB. This leads to the conclusion that problems can be reduced to negligible limit with minor modifications to existing SDB. The computational control of developed model will
benefit the society to a large extent.

5. References

1. Bielefeldt, R. A. (2006). Aeesp case studies compilation. Retrieved from . http://www.aeespfoundation.org/publications/pdf/AEESP_CS_7.pdf
2. Booty, W. G., Lam, D. C. L., Wong, I. W. S., and Siconolfi, P. (2001). *Design and implementation of an environmental decision support system*. Environmental Modelling and amp; Software. Retrieved from http://www.sciencedirect.com/science/article/pii/S1364815201000160

3. CPCB (2005). Status of sewage treatment in India. Retrieved from. http://www.scribd.com/doc/52723905/status-of-sewage-treatment-in-india
4. Hamed, Maged M., Khalafallah, Mona G., and Hassanien, Ezzat A. (2004). Prediction of wastewater treatment plant performance using artificial neural networks. *Environmental Modelling and amp; Software, 19*(10), 919-928.
5. www.marysvilleohio.org (2000). Report reveals history of waste water treatment plants. Retrieved from http://www.marysvilleohio.org/index.aspx?NID=188
6. www.neurope.eu (2011). Report reveals wastewater treatment still needs improvement http://www.neurope.eu/article/report-reveals-waste-water-treatment-still-needs-improvement
7. www.sratx.org (1995). Water and Wastewater Treatment needs. Retrieved from . http://www.sratx.org/srwmp/comprehensive_plan/final_report/html/Section9/Section9.htm