FCCI

Research & Development Center

Title:

Model AVC/EOD/DOD-On-Site Filters for Sludge Dewatering

Prepared by:

Atifa Irshad

M.Phil. Physics

Research Assistant

Research and Development Department

Advisory Board

- Engr. Ahmad Hassan

  Chairman FCCI (R&D)

- Dr. Hafiz Muhammad Asif Javed

  Supervisor

  University of Agriculture, Faisalabad.

- Dr. Muhammad Arif

  Co- Supervisor

  N.F.C Institute of Engineering and Fertilizer Research

Working Board

- Atifa Irshad

  University of Agriculture, Faisalabad.

- Anam Shareef

  Co-Worker

  University of Agriculture, Faisalabad.

1. Introduction

Sludge

In Simple terms, "**Sludge**" is a semi-solid slurry created by several industrial and municipal activities **(Fig.1)**. Dewatering is the process of removing water from a solid substance or soil through wet classification, centrifugation, filtering, or other solid-liquid separation methods, such as removing leftover liquid from a filter cake using a filter press in different industrial operations.

Sludge dewatering

It is the process of reducing the waste volume to prepare it for disposal. Sludge is produced during the treatment of wastewater before it is discharged back into the environment. Sludge is a by-product collected from the slurry during the process of industrial or municipal wastewater treatment, and it has long been a problem for the water treatment sector. Before disposal, drying the sludge with a dewatering filter press decreases its weight and volume greatly [1].

Fig.1 Sludge Dewatering

2. Purpose of Sludge Dewatering

The two major goals of sludge dewatering are to reduce waste and improve overall disposal cost efficiency. Furthermore, stabilized sludge may be treated more safely, reducing health risks. Some sludges have a high positive recycling value and can be put into the soil. In general, both the public and private sectors must dispose of sludge in ways that are permitted by regulatory bodies, meet their own organizational needs, and are ecologically safe.

Sludge dewatering is usually done to reduce the sludge's weight and volume so that disposal expenditures, such as transportation, are kept to a minimum. Before sludge waste can be handled or disposed of most cost-effectively, it must first be reduced in volume [2].

3. Choosing the Most Appropriate Technology

As previously stated, the selection of a sludge treatment technology is based on several parameters, including the features, volume, timing, and disposal alternatives available. When looking for dewatering services, seek a partnership that can provide a full range of dewatering services as well as use the appropriate technology for your unique problems to deliver the most cost-effective approach [2].

4. About Model AVC/EOD/DOD

Simon Moos decided to design an on-site system that would carry the treatment works to the sludge after realizing that the average sludge had a large proportion of water that was being carried for disposal at the local wastewater treatment works, and so the AVC and DOD/EOD was created. The MOOS AVC/EOD/DOD system is designed to offer a significant "volume reduction" of sludge. The EOD/DOD is a polymer dosing and pumping apparatus. The EOD version is powered by electricity, whereas the DOD version is powered by a diesel engine **(Fig 2).**

As the sludge is poured into the AVC de-watering container, the EOD/DOD device is utilized to mix polymer into it. The addition of polymer to the sludge causes flocculation, which speeds up and improves the dewatering process. The sludge is pumped into the AVC dewatering container, where it is separated into water and dry particles. The AVC is made up of a closed container with filtration screens on the interior. The flocculated sludge is drained and de-watered through the filtering screens [3].

Fig 2. Model AVC/EOD/DOD - On-Site Dewatering Unit

5. Variants [3]

AVC - 6 m^3

With a total volume of 6 m^3, the AVC-6 is the smallest version of our sludge dewatering container. 1.100 kg empty weight 4,3 m^3 dewatering chamber 1,7 m^3. Reject water Tank 2.100 mm in length 1.800 mm in width 1.780 mm in height The AVC-6 is outstanding on-site dewatering equipment when used in conjunction with our EOD or DOD pumping and dosing units.

AVC - 28 m^3

With a capacity of 28m^3, this AVC is a basic dewatering container. Weight when empty: 6600 lbs. (3000 kg). 7400 gallons (US gal) (28.0 m^3). 21.50 feet in length (6552 mm). 8.20 ft in width (2500 mm). 8.45 ft. tall (2576 mm). The AVC-42 is outstanding on-site dewatering equipment when used in conjunction with our EOD or DOD pumping and dosing units.

AVC - 42 m^3

The AVC-42 dewatering container is characterized by its extra-large dewatered sludge capacity of 42 m^3. The AVC 42 is constructed on a semi-trailer chassis. 9144 mm in length 2500 mm in width 2576 mm in height 6250 kg is the weight of the person. The AVC-42 is outstanding on-site dewatering equipment when used in conjunction with our EOD or DOD pumping and dosing units.

AVC and DOD

The EOD/DOD unit is used to mix polymer into the sludge as it is being pumped into the AVC de-watering container. The mixing of polymer into the sludge creates flocculation that increases the speed and efficiency of the dewatering process. Under normal circumstances, the sludge is drawn into the EOD/DOD by the sludge pump located on the EOD/DOD and then the polymer is injected automatically at a suitable amount by the polymer pump and injection system of the EOD/DOD. The user can easily regulate the actual amount of polymer injected by adjusting the speed of the polymer pump (Fig 3).

The EOD is a pumping and dosing equipment that uses electricity to mix polymer into the sludge. Allweiler sludge pump, 30 m^3/h or 40 m^3/h. 40 m^3/h cyclone Allweiler polymer pump. 800 rpm polymer mixing device 850-liter polymer tank 2800 mm in length 1430 mm in width 1380 mm in height The EOD delivers outstanding on-site dewatering equipment when combined with our AVC – dewatering unit. The AVC is a sealed container with filtration screens on both sides and a filtration screen down the center. The flocculated sludge is drained and de-watered by the filtration screens [3].

Fig 3. MOOS AVC container and pump system

6. Product Description For AVC

The dewatered sludge is dumped through a full-width door with a hydraulically assisted locking mechanism at the back of the container. The front of the container has a filler pipe via which sludge is pumped into the container. A rotating galvanized ladder is attached at the front of the container, and when dragged down, it erects a galvanized safety rail, allowing simple and safe access to the top, where the inspection hatches are. Two 3" ball valves, one on each side, release the cleaned water. The container is fitted with an interior ladder for convenient cleaning and inspection accessibility. Sandblasting, priming, and painting are all done on the container. Epoxy has been applied to the interior surface [3].

- **Empty weight**: 6600 lbs. (3000 kg)
- **Volume**: 7400 US gal. (28.0 m^3)
- **Length:** 21.50 ft (6552 mm)
- **Width**: 8.20 ft (2500 mm)
- **Height:** 8.45 ft (2576 mm)

7. On-Site Dewatering Unit

8. The EOD/DOD

As the sludge is poured into the AVC de-watering container, the EOD/DOD device is utilized to mix polymer into it. The addition of polymer to the sludge causes flocculation, which speeds up and improves the dewatering process. The polymer feeding/dosing pump is self-priming and completes the process of mixing the correct amount of polymer into the sludge. When it comes to pumping sludge from the source into the AVC de-watering container, the screw pump comes in handy. When the application calls for the sludge to be discharged directly into the AVC, the cyclone is necessary, since it permits sludge including crude particles to be put into the container from a regular vacuum tanker. A tank holds the polymer supply for the feeding/dosing pump. The mixing equipment in the tank ensures that the polymer mixture is homogeneous. Cleaning the tank is made easier with an access hole. The sludge pump, polymer pump, and mixing propeller, as well as all start/stop operations, are controlled via a control panel. The dosing plant, as well as the pump/cyclone, have been sandblasted, primed, and painted. [3].

9. Ideal For Industrial Processes

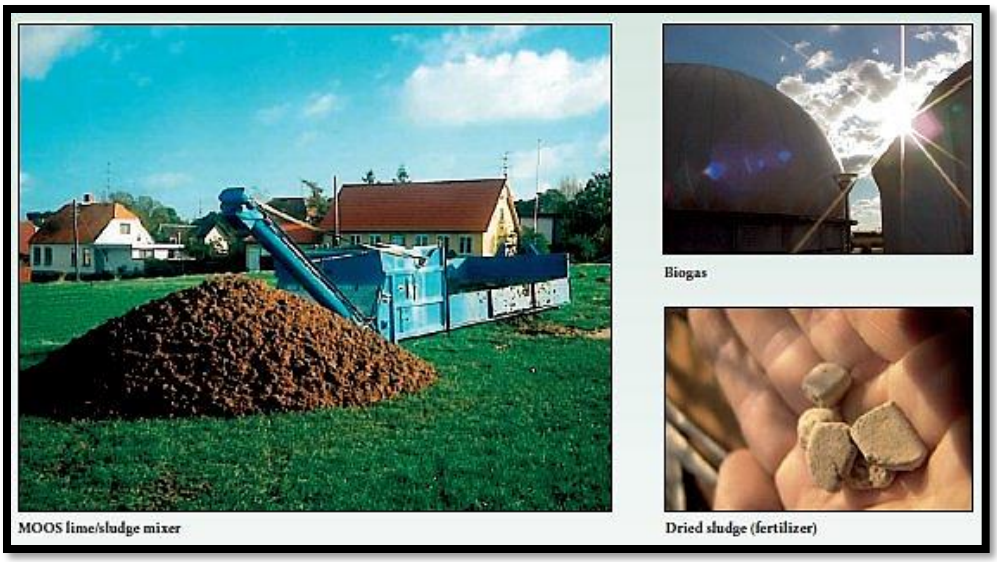
The AVC system is perfect for dewatering wastewater generated by a variety of industrial operations. The AVC has shown to be an excellent solution for dewatering everything from sludge from a palm oil mill to fly ash from cooling towers.

Whether it's for ordinary contracts or industrial operations, the AVC system saves money on disposal and transportation while also reducing the impact on the environment. [3].

10.Recycling of Dewatered Sludge

The dewatered cake from the AVC system can be recycled and disposed of in a variety of ways. The dewatered cake can be lime stabilized and used as fertilizer on agricultural land, composted, or utilized in biogas facilities, depending on its specific nature. Dewatered sludge is combined with lime in a MOOS lime/sludge mixing unit. The pH level is increased to 14 and the temperature is set to around 80 degrees Celsius. This provides effective sanitation and reduces pathogens by a factor of six.

Grease or contaminated cakes can be utilized to speed up the combustion process in incineration facilities, or placed in a landfill as a last option. Apart from building effective sludge



dewatering systems, one of Simon Moos Manufacturing's strengths is that, through the company's contracting business, we can provide advice and technical help in the treatment of sludges based on our expertise and experience gathered over many years. [3].

11. Quality Cleansed Water

The flocculated sludge collects hazardous particles and retains them inside the dewatered cake throughout the dewatering process. This signifies that the cleansed water is of a high grade and may be reused. The AVC has a one-of-a-kind performance, as seen by the reduction values in the table below. In some circumstances, additional reduction of the permeates extremely tiny percentage of suspended particulates is required. A mechanical filter, sand filter, charcoal filter, UV filter, or UF filter might be used. It depends on the specific situation and the need for water reuse. The basis of our dewatering system is our ability to provide a flexible and cost-effective solution while still meeting regulatory criteria. [3].

12. The Reason for The AVC System's Global Recognition

The AVC has been delivered in more than 20 countries worldwide. I think that the Simon Moos brand's success is due to a highly motivated workforce that is continually striving for perfection. I didn't win a new geographic market with an idea, but rather with a first-rate product. I have an open attitude to our customers and the market as a firm; it is part of the Danish culture. This successful approach to our business has resulted in ongoing product development, combining the greatest ideas from our engineers and designers with feedback from our customers all around the world. This is the foundation of our company [3].

Combine Unit

The AVC and DOD/EOD can be dispersed in a structure where the EOD/DOD is incorporated into the AVC dewatering container, resulting in a single unit! When the system is permanently installed in one location, for example, this is the ideal solution [3].

13. Sludge Dewatering Benefits

Waste Volume Reduction

Water removal is the primary technique of reducing volume before the sludge by-product can be economically disposed of because sludge dewatering focuses on weight and volume reduction to decrease waste disposal costs.

Reduced Transportation Costs

Sludge management may be expensive. Cakes with a high solids content are less expensive. Dewatering equipment is a useful technique for managing sludge buildup since it reduces transportation and storage costs.

Consistent Cake Dryness with Lower Risk of Spilling/Leaking

Cake dryness is uniform when sludge dewatering filter presses are used. The dry, high-solid cakes not only save transportation expenses but also reduce the chance of spilling or leaking into the roadways. This is a significant problem, especially when trucking through residential areas.

Wastewater Recycling

Another advantage of sludge dewatering is the ability to recycle wastewater. Industries and communities can recover the treated water from sludge dewatering after it is free of risks and impurities. Even though the water is usually not drinkable, it has a wide range of uses. Steam-powered plants are an excellent illustration of how recovered water may help a business or community.

Equipment is Easily Automated

Many people consider filter presses to be labor-intensive machines. Sludge dewatering presses, on the other hand, can be equipped with automated cloth washers, mechanically aided cake release, and sophisticated control systems that allow communication with the main plant management system, all of which make sludge dewatering considerably easier.

Eco-Friendly

Finally, sludge dewatering is beneficial to the environment in numerous ways, the first of which is that it reduces the amount of trash to a more compact, manageable size for disposal. While the dry cakes are discarded, the filtrate can be reused to decrease the requirement for additional sources of water in municipal and industrial wastewater treatment facilities, as well as the overall quantity of water required for treatment.

Filter presses are a proven, cost-effective alternative for waste minimization when it comes to sludge dewatering equipment. Filter presses are excellent in removing excess water from a wide range of industrial and municipal wastewater sludges and are effective for most forms of sludge.

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