Jr.of Industrial Polluction Control 37(8)(2021) pp 0-1
www.icontrolpollluction.com
Editorial

TREATMENT METHODS OF ACID MINE DRAINAGE

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(Received 10 August, 2021; accepted 24 August, 2021)

DESCRIPTION

An Acid Mine Drainage (AMD) is a process that occurs when mining activities expose sulfur-containing minerals to atmospheric oxygen and moisture. The resulting sulfuric acid, which is a byproduct of the iron-oxidizing bacteria, dissolves heavy metals. The amount of acid mine drainage that's released depends on the volume and type of contained sulfides that are extracted. The discharge also affects the environment's ecological systems. The most significant source of acid mine drainage is from the abandoned mines in Romania. Many of the mines were left barren after they were abandoned. On the other hand, biological treatment methods are those that rely on biological activities to perform their intended function. Some of these include the use of enzymes and microorganisms.

Treatment Methods

AMD treatment are classified as "passive" or "active," both potentially combining physical, chemical, and biological approaches. Active treatment methods are more reliable and are typically less costly than passive systems, but they require more maintenance and capital intensive operations. Although they are more advantageous than traditional methods in terms of reducing mine effluent acidity, passive systems require a large footprint and are not suitable for high flow rates.In terms of active treatment, these components are used to reduce or accelerate the precipitation process. They can also be utilized to create conditions that are ideal for the growth and development of fungi and bacteria.In these systems, the acidity and pH conditions are modified, which leads to the formation of insoluble chemicals that precipitate and retain heavy metals.

pH Control

pH control is a commonly used AMD treatment method. It increases the pH level to prevent the leaching of most metals. This method can also reduce the solubility of most metals by precipitation.

De-Carbonation

The de-carbonation process is the first step in the flowsheet preparation of acid mine drainage systems. It involves removing CO_2 from the waste stream. Aerators are commonly used to reduce CO_2. They work by agitating the water below the tank, which results in the release of oxygen or nitrogen. A high concentration of CO_2 can cause aerators to retain hydraulics for a long time, which can help remove the CO_2.

Iron-Reaction Aeration

The flow exiting the de-carbonation tank splits through two troughs. It continues through the other side of the de-carbonation tank. The final step in the iron-reaction process is the distribution of the chemical.As iron goes from being in the reaction tank to being in the ferric hydroxide, it changes state. The blue/green water in the left tank is the de-carbonation stage. This water then travels to the reaction tanks and displays the different states of iron.

High-Density Sludge Process

The water then flows back into the iron-reaction tanks through the recirculation of the thickener. This process, known as the high-density sludge, is different from the traditional method. The underflow solids contain lime. By recirculating them, the recirculating particles can get more time to react with the lime, allowing the whole process to use all of the lime. Also, by introducing the lime, the recirculating particles can coat the outside of the tank, making the iron particles larger and denser.

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