

The Best Solution for Struvite Problem in Wastewater Treatment Plants

Struvite. Also known as magnesium ammonium phosphate, the proper control of Struvite has been a big issue of Wastewater Treatment Plants for a long time.

A common occurrence in wastewater treatment plants, Struvite can quickly get out of control. When the conditions are right, Struvite will rapidly form crystals that spread throughout pipelines. It is most commonly a problem in digesters or downstream dewatering facilities and in spots with local turbulence, such as pipe elbows, valves, and pumps.

In order to remove the Struvite from the fluid or to reduce its concentration, chemical treatments using chemical additives, such as Ferric or Aluminum or Magnesium ions, have been widely utilized. This approach was to some extent successful, but it is also very likely that excessive usage of these chemicals commonly may accelerate pipe corrosion.

So, the current chemical techniques bring the following problems;

- High cost of chemical additives
- Frequent down times
- High cost of cleaning and repair
- High cost of parts replacement
- Environmental issues

However, the Struvite problem can be solved when the ultrasonic technology is utilized.

The technology is a physical method, not chemical.

Then, how Ultrasonic Scale Preventer (USP) can be applied to the struvite problem? Magnetostrictive (Fe-Co type) transducer of USP transforms electric energy into acoustic wave (ultrasonic vibration). When the transducer is welded on the pipeline or spots with local turbulence, the ultrasonic wave is directly transmitted to the pipeline and the flowing sewage fluids in pipeline. By this, the fluid is continuously turbulent and also cavitation occurs in the fluid. Scales cannot be readily precipitated in the pipeline because scale formation is prohibited by the vibration activated by ultrasonic wave. Preexisting scales tend to detached from the pipe walls by the cavitation and are also shattered into very small particles by the principal of surface increase of ultrasonic wave.

This ultrasonic method can be suitably applied to resolve the known clogging problems caused by Struvite commonly encountered in the sewage treatment environments.

Contrary to the chemical treatment which may bring about pipe corrosion and environmental issues, the ultrasonic method can be a safe, environment-friendly, powerful alternative approach. As the struvite is very soft and thus easily breakable, continuous vibration (24 hours per day, 365

days per year) generated by ultrasonic transducers forces struvite crystals to be shattered into very fine particles. The precipitation of struvite onto the substrate (pipe wall) from flowing fluids is also strongly hampered by ultrasonic wave. When this vibration is combined with cavitation effect, the ultrasonic treatment will become more powerful.

USP can bring the following advantages;

- High reduction of chemicals usage
- High reduction of down time
- High reduction of maintenance cost
- Longer lifespan of equipments and pipes
- Environmental compliance

Here is an successful story. The USP pilot test for their sludge dehydrator piping system was conducted at the Tancheon (Bundang City) Sewage Treatment Plant in Korea for 6 months. This test showed the USP was very successful. As a consequence, the plant extended USP installations to their sludge processing pipe lines. In addition, the Busan City Sewage Treatment Plant who applied USP to their pipe line has got similar results, and those effects have also been proven.

It is certain that the USP is one of the currently best solutions to solve the struvite problem which has been a common 'pain-in-the-neck' among many people in sewage treatment industry.

Before USP Installation



6 month after USP Installation

