

# AM Retrofit Solution Resolves Valve Cavitation Issues In South Korea

Emerson's innovative Cavitrol Hex trim, a retrofit solution for Fisher Vee-Ball control valves, tackles mild pressure drop cavitation, preventing damage and ensuring uninterrupted plant operations. Find out how this field-proven anti-cavitation trim is revolutionizing the industry. By Willie Tan and Sida Huang from Emerson's Flow Controls Business Unit.



Sida Huang



Willie Tan

In the world of industrial processing, control valves play a critical role in regulating the flow of fluids through pipelines. However, when changes in operating conditions occur, these valves can experience damage that can have serious consequences.

An incident occurred at a refinery complex in South Korea, where a Fisher Vee-Ball control valve at the atmospheric distillation unit

(ADU) experienced cavitation due to changes in the operating process conditions. In this case, the valve was removed from the pipeline and overhauled for investigation.

Upon closer inspection, corrosion and erosion were found on the valve body outlet, as well as minor cavitation damage on the ball part. The presence of particles in the process fluid, which is the residue at the bottom of ADU, contributed to the erosion damage. It appears that the valve material was not compatible with the erosive process fluid, leading to corrosion and erosion. The occurrence of cavitation likely exacerbated the issue, leading to further damage and ultimately, valve failure.

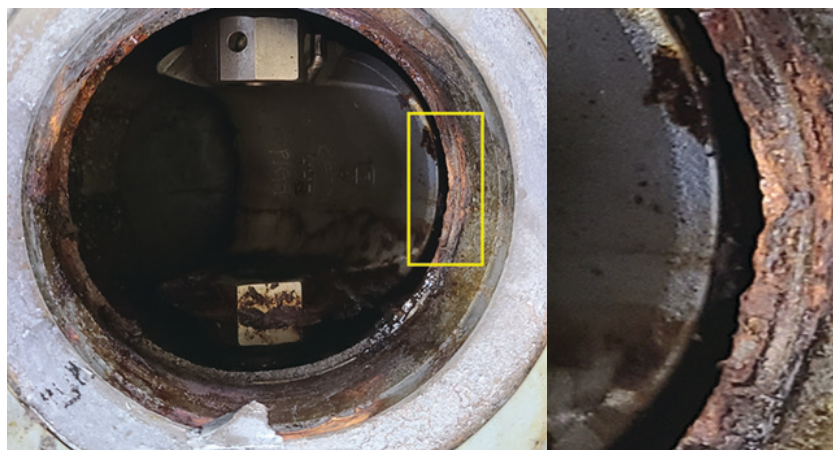
This incident underscores the importance of selecting appropriate materials for use in control valves and other equipment in industrial processing applications. Aligned with this statement, Emerson developed an innovative anti-cavitation trim solution, the Cavitrol Hex trim, designed to handle mild pressure drop cavitation.

The Cavitrol Hex is a single stage

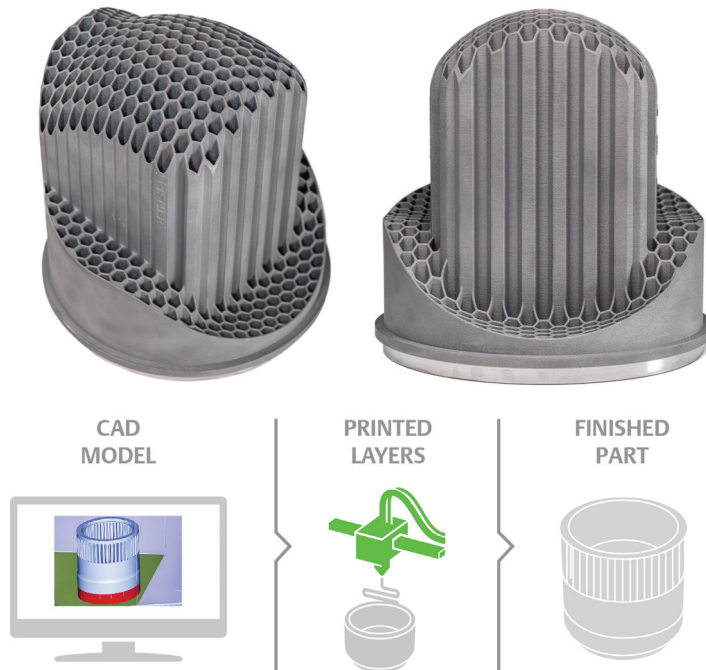
device that controls flow separation to ensure low pressure recovery. The hexagonal shape holes offer more drag with sharp corners and more surface area with long flow passage, slowing the process flow to reduce cavitation. Its hexagonal shape holes also allow particle size up to 0.35 inches to flow through, avoiding trim clogging issues due to the presence of particles in the heavy crude oil.

"Since the Cavitrol Hex can be retrofitted into existing Fisher Vee-Ball valve construction, it helps customers reduce maintenance cost as the globe valve with anti-cavitation trim solution isn't the mandatory way to resolve the cavitation issue which happens on the ball valve," said Sida Huang, Lifecycle Support Engineer, Control Valves & Instruments, Emerson Singapore.

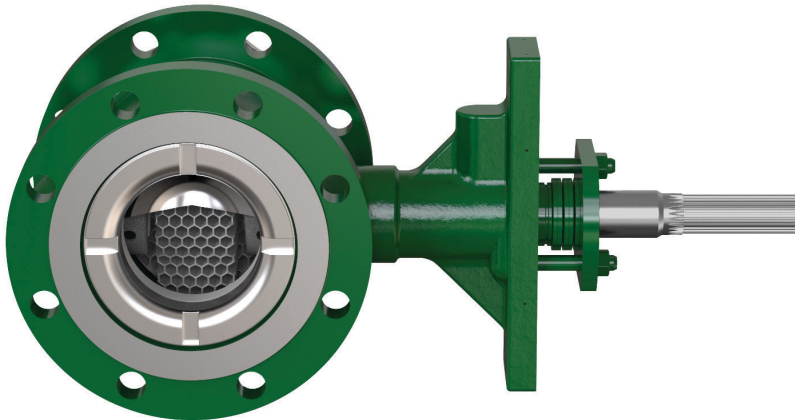
Willie Tan, Business Development Manager, Control Valves & Instruments, Emerson Singapore, added that maintaining the same ball valve at the site helps in reducing the piping modification as compared to changing the existing



Damage was found when the ball valve was removed from the pipeline



**Additive manufacturing utilizes computer-aided design (CAD) software, which creates precise parts and eliminates the potential of manufacturing defect**



**The hexagonal shape holes also offer more drag with sharp corners and more surface area with long flow passage which help slow the process flow to prevent cavitation**

ball valve to a globe valve with anti-cavitation trim. Also, changing to a globe valve will likely create a valve insufficient capacity issue which leads to likelihood of having a larger body size requirement.

This Cavitrol Hex trim is manufactured via additive manufacturing, also known as 3D printing. Additive manufacturing technologies have revolutionized the way to approach design and traditional manufacturing. Instead of using traditional subtractive methods, in which material is removed from a larger block to

create a desired shape, additive manufacturing builds up material layer by layer to create a final product. This allows the creation of highly intricate geometries that may have been difficult or impossible to achieve using traditional manufacturing methods. It also allows faster and more efficient manufacturing processes, reduces lead time and enables faster prototyping and iteration.

Considering the presence of particles in heavy crude oil, the Cavitrol Hex is made of Ultimet material, a hard chrome alloy

material, that has been able to withstand the erosive process fluid and particles in heavy crude oil and has been operating maintenance-free since 2019.

#### FIELD PROVEN PERFORMANCE

The Fisher Cavitrol Hex anti-cavitation trim is a retrofit solution for ball valves or rotary valves upgrade alternative that helps prevent cavitation damage. It has been proven to provide significant OPEX savings of up to 50% by avoiding major piping modifications and using a rotary valve with anti-cavitation trim instead of a globe valve with anti-cavitation trim. This trim improves valve performance and reliability, which ensures plant process continuity.

The customer's decision to purchase another unit for parallel process lines and to consider a change-out for other problematic rotary valve units is a testimony to the effectiveness and reliability of the Cavitrol Hex trim.



**Fisher Vee-Ball Cavitrol Hex Trim combines the advantages of Vee-Ball capacity and rangeability with Cavitrol Hex Trim that helps prevent cavitation**



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