

ITT Goulds Pumps Form Suction Intake (FSI)

Located in the center of fertile farmland, Decatur is logistically ideal for corn and soybean milling and processing. These processes require large quantities of water and in turn generate large amounts of organic waste. In the 1980's a major plant upgrade took place that included capacity upgrades in which a new effluent pump station was built in order to handle increased plant capacity.

The Problem

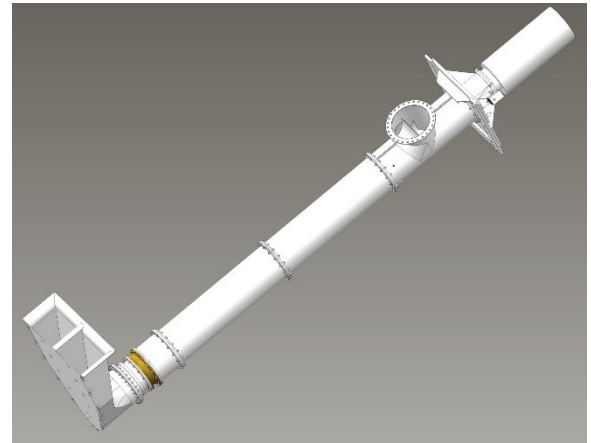
Originally, the pumps were submersible propeller pumps; however, these pumps experienced instabilities, high vibration, and vortexing. This was ultimately attributed to a hydraulically poor station design and the customer's limited submergence available for vortex suppression. Some attempts were made to add splitter plates and baffles to aid pump suction conditions but the problem was never solved. Some of the submersible pumps were replaced with vertical shaft pumps (VS1) with conventional suction bells. However, these pumps still experienced excessive vibration. The problem had to be resolved, and the district requested a quote for a pump that would address all these requirements. ITT VPO was the only pump company that comprehensively considered the hydraulics starting with the pump station design.

The Solution

In collaboration with Clemson Hydraulics, ITT recommended to the customer a physical model study of their pump station with the pump and a Formed Suction Intake (FSI). An FSI is connected directly to the suction flange below the impeller. The design of the FSI opening reduces the tendency for surface vortices to form and allows operation at lower minimum submergence levels than specified by Hydraulic Institute standard 9.8-2018. Since delivery of this order, customer has reported successful operation.

The Benefits

An FSI is a reliable design used to improve flow to the impeller in vertical pumps. In addition, an FSI can be a potential solution for future applications with limited submergence for vortex suppression. An FSI is also a great solution in applications where site excavation is limited. An FSI can lower the pump length required which in turn requires less excavation at site for the customer. This can provide a large potential cost savings to the customer.



3D Model of Vertical Pump with a FSI



Finished Fabricated Form Suction Intake



Physical Intake Model created by Clemson Hydraulics.