

SINGER SOLUTIONS

Pittsfield Township, Michigan USA



Client:
Pittsfield Township, Michigan

Challenge:
High pressure drop ratio of 49.2 m (70 psi) to 4.9 m (7 psi) due to fluctuation in elevation ranges

Singer Solution:
Single Rolling Diaphragm with Anti-Cavitation Trim

Result:
The valve now consistently modulates the flow into the tank



Single Rolling Diaphragm with Anti-Cavitation Trim

Singer Eliminates Cavitation Damage in Pittsfield Township's Reservoir Filling Station

Pittsfield Township, Michigan provides water to about 39,000 people with needs varying from industrial, commercial to urban and rural. Their average daily water usage is 3.5MGD (13,249 m³/day) and increases up to 7.0MGD (26,498 m³/day) during summer days.

Pittsfield has a contract with neighboring community, Ypsilanti, to purchase up to 5000GPM (1,136 m³/h) of water that runs through their Textile Road Booster Pump Station. This station was built in 2004 and used a plug valve with electric actuator to modulate rate of flow into the tank, based on a meter in their system and Programmable Logic Controller. Ypsilanti water pressure is typically between 42.1 - 49.2 m (60-70 psi) whereas the maximum tank elevation ranges between empty and 16ft (approximately 4.9 m or 7 psi). Anywhere that you have a high pressure drop ratio across a valve, (typically a 3 to 1 ratio or more in pressure where the Sigma value is greater than 0.8) cavitation can be an issue. In this case, the Township was well above that ratio as 49.2 m (70 psi) to 4.9 m (7 psi) is much greater than 3:1, which accordingly resulted in significant cavitation of the plug valve.

“The Singer Valve is working fantastically. It is a simple and efficient solution with minimal maintenance.”

Billy Weirich
Pittsfield Township Utilities Superintendent

The consequences of cavitation can be strong vibrations, loud noise, choked flow, erosion of valve components, destruction of the actual valve, erosion and destruction of downstream piping and finally plant or distribution system shutdown. For Pittsfield, the downstream eccentric reducer failed first and the cavitation destroyed the cement lining in the ductile iron reducer and eventually eroded into the reducer walls. Pin holes formed, leaks sprung, and the Township had to replace



SINGER SOLUTIONS

Pittsfield Township, Michigan USA

Singer Eliminates Cavitation Damage in Pittsfield Township's Reservoir Filling Station

the fitting. During the second reducer replacement, the cavitation damage was not reserved to just the fitting, it had begun eating into the seat of the plug valve as well. The Township needed a solution to stop the cavitation damage immediately as well as maintain the current valve functions with their control programming.

"After two reducers were destroyed, it was clear that the plug valve was not working in this application," said Jennifer Zelski of Kennedy Industries. "We recommended Singer Valve's Single Rolling Diaphragm (SRD) actuated control valve with Anti-Cavitation Trim because it was the only plausible solution for this scenario." Pittsfield Township's engineer evaluated options with other valves as well as looking at closing upstream valves to help create pressure losses prior to the fill valve. All parties agreed that the SRD with Anti-Cavitation Trim would provide the all-around solution needed to eliminate cavitation damage without sacrificing other valves, changing processes or system dynamics.

Once the actual flow ranges along with inlet pressure ranges and the required outlet pressure were measured, the data was given to the Singer Valve engineering team who created a drilling pattern for the multiple orifices in the dual anti-cavitation cages, specific to this application. The key is to supply orifices that can manage maximum flow while creating enough backpressure in the cage to prevent the microscopic vapor bubbles from escaping. The dual anti-cavitation cages are then included in the new control valve.

Singer's control valve operates hydraulically with system line pressure as well as with dual solenoids and an interface controller that communicates with the Township's SCADA. The SRD allows the valve to operate steadily at both high and low flows and the pilot controls are built to be self-flushing for reduced maintenance.

Installation took three days, most of which was putting on the pipe wrap and some minor concrete work to modify the pipe supports under the valve. The new valve was integrated with the Township controls without modification of their existing programming.

Pittsfield has a very proactive maintenance program and checks this station weekly. The strainers are always inspected, but have yet to be found fouled up in this first year of operation. Other than these checks, there has been no need for any maintenance.

The SRD control valve with Anti-Cavitation Trim operates quietly and smoothly without cavitation. "The Singer Valve is working fantastically. It is a simple and efficient solution with minimal maintenance," said Billy Weirich, Pittsfield Township Utilities Superintendent. The valve continues to consistently modulate the flow into the tank without any shut down, so that the residents of Pittsfield can rely on a consistent water flow.

CAVITATION DAMAGE



Visible damage from cavitation prior to Singer Valve

SINGER VALVE INSTALLATION



2SC-PCO-AC Model



Connect with a Singer Valve Solutions Specialist today!

Head Office: 12850 - 87th Ave | Surrey, British Columbia, Canada
Tel: (604) 594 5404 | Fax: (604) 594 8845
Toll Free Fax (Canada & USA): 1 800 663 7266
Email: singer@singervalve.com | Web: singervalve.com