CASE STUDY-2 : CFD ANALYSIS OF SWING CHECK VALVE

INTRODUCTION

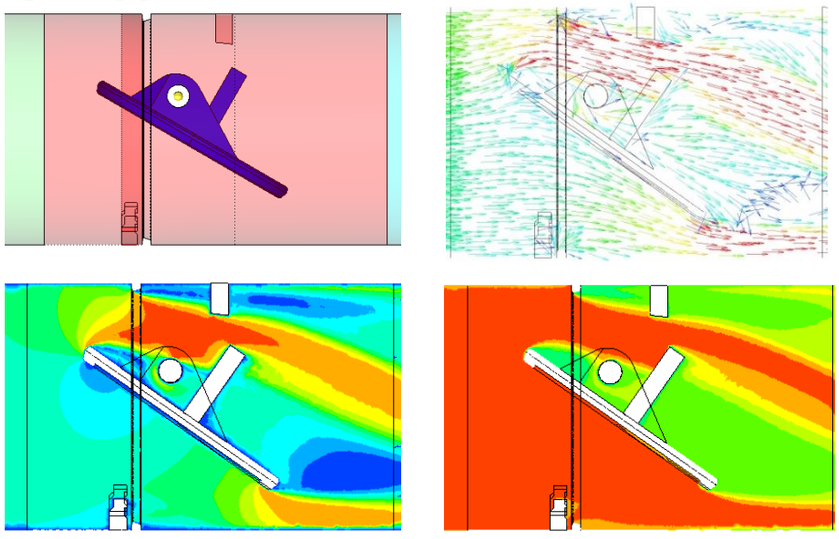
Swing Check Valve is very important component of process industry which gets closed upon forward-flow stoppage and prevent or minimize the development of reverse flow. It is very important to keep valve disc in fully open position during steady state operating condition and CFD helps in determining the opening position of valve disc during this flow condition by calculating the torque acting on valve disc.

CHALLENGES

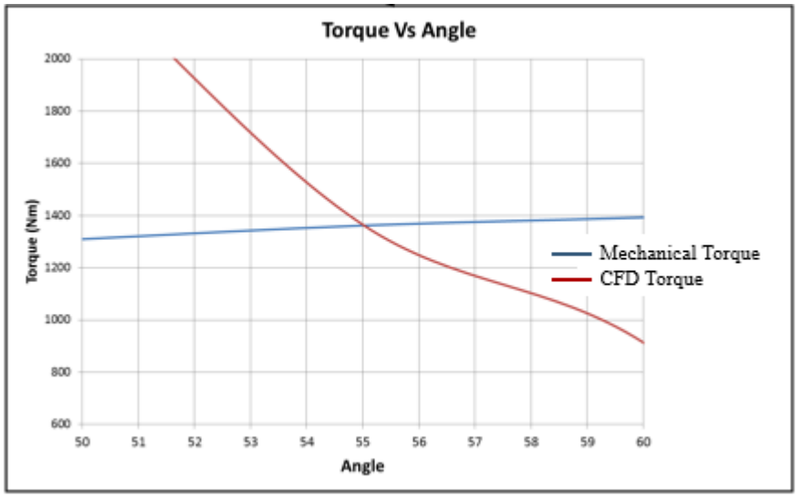
- Meshing of close proximity regions in flow domain.
- Accurate estimation of torque acting on valve disc.
- Setting a procedure for determining Valve disc opening position during steady state operating condition.

THE SOLUTION

Valve coefficient (Cv) vs flow rate data provided by the valve supplier is applicable for valve with disc in fully open position, hence it is very important to determine the opening position of valve disc for required steady state operating condition. CFD helped in determining the valve opening position by evaluating torque acting on disc of swing check valve during its steady state operation. The main challenge was setting an appropriate process for evaluating the opening position of valve disc based on extracted CFD torque data and available mechanical torque data. It was found that valve disc was not getting fully opened during its steady state operating condition due to disc overweight, hence accordingly counter measures were suggested for increasing the opening position of valve.



Swing Check Valve with Disc at 50^{o} Opening Position



Mechanical & CFD Torque Vs Disc Opening Angle

BENEFITS

- Quick estimation of torque acting on valve disc.
- Valve disc opening position in steady state operating condition prior to valve installation in piping network.
- Cost effective solution for reduced number of trials.

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