STRUCTURAL & VIBRATION ANALYSIS OF CONTROL VALVES

Our customer is a global provider of integrated flow control solutions in oil and gas industries, specializing in highly engineering control valves. Due to a critical nature of installations, a high degree of structural robustness is desired. Not only the valves need to withstand high internal pressure, but it also need to function reliably under vibration. The most cost effective & quick way to establish design robustness is through Finite Element Analysis.

Zeus Numerix was engaged by customer for all their valve design ranging from 2” to 12” nominal diameters. Considering valve as a pressure vessel, FEM was carried out as per ASME Section VIII, Division 2 and Appendix 4 “Design based on Stress Analysis”. Valve was simulated under vibratory environment by predicting its natural frequency. A high value above forced excitation frequency confirmed robustness.

Figure 66: (a) Stress Distribution on Valve Body (b) Deformation of Cage under Extreme Load

During the design phase of valves, Zeus Numerix acted as an extended team to the customer. A process guaranteeing delivery of desired analysis in minimum turnaround time was setup. This association meant that customer was able to obtain specialized design support without needing to increase its fixed cost.