Design of Pressure-Relieving System using Dynamic Simulation

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Process system equipment should be protected from a rise of internal fluid pressure in a vessel, pump, compressor, or column. The overpressure is caused by abnormal operating conditions such as exposure to fire, operator error, and heating/cooling medium failure. The key point of selection of proper pressure-relieving system is how to determine pressure relief load and size of relief devices. Conventional method to design relief load and sizing devices is following API standard based on steady-state assumption of the system. However, this approach is inadequate and usually results in oversized relief devices because it does not consider dynamic behaviour of the process. In this study, column operating is selected to examine the sizing of relieving devices and the difference of design results between conventional method and dynamic simulation approach with several relieving scenarios. Finally, a formalized design procedure of pressure safety valve using dynamic simulation is presented from analysis of the different results between two methods.