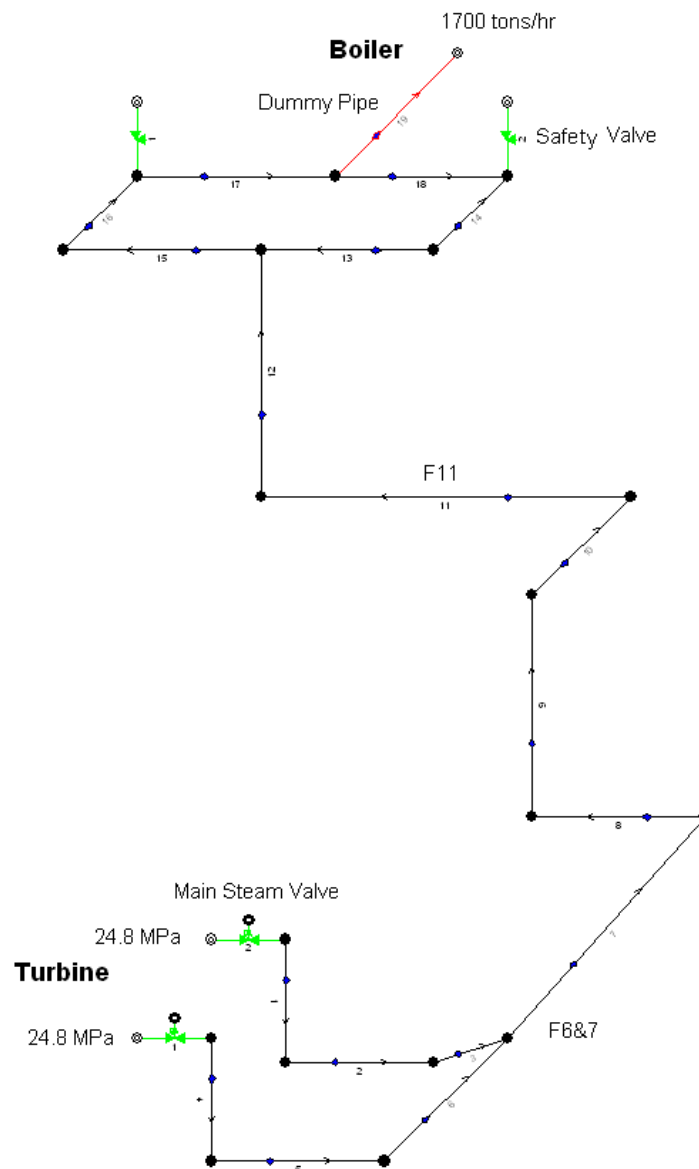


Application Bulletin – Power Industry PIPENET® Transient Module Case Study

STEAM HAMMER IN MAIN STEAM SYSTEM

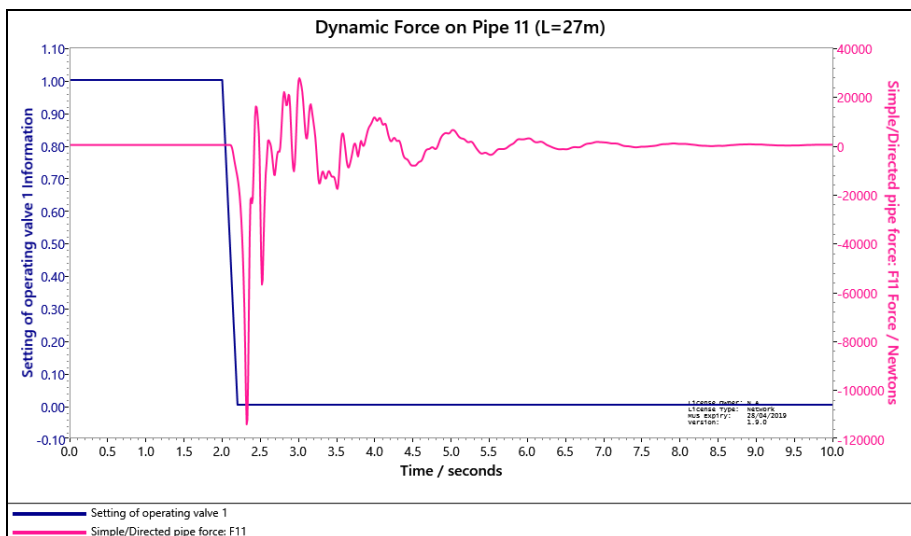
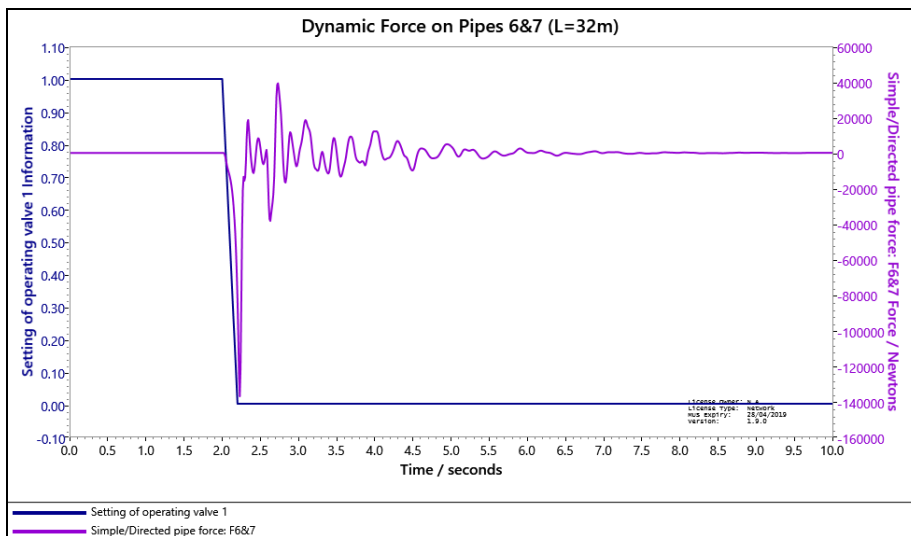
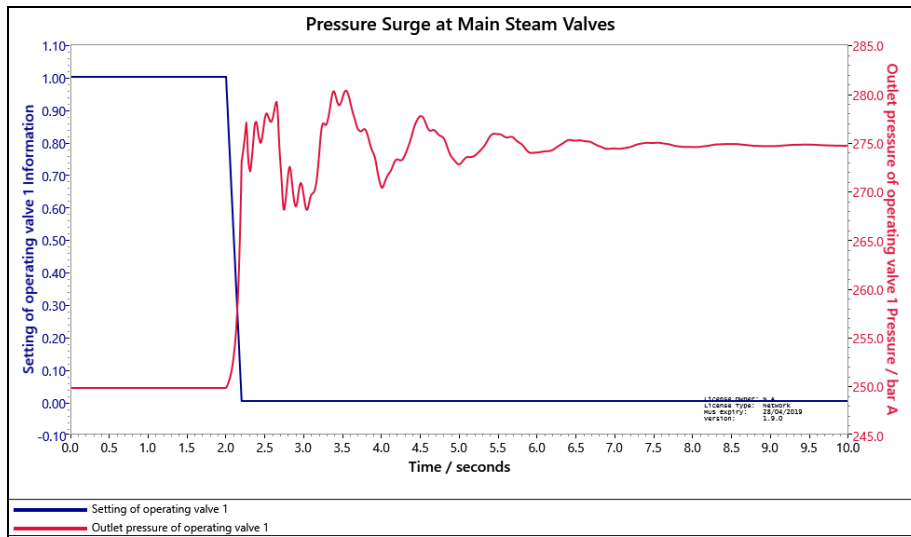
BACKGROUND

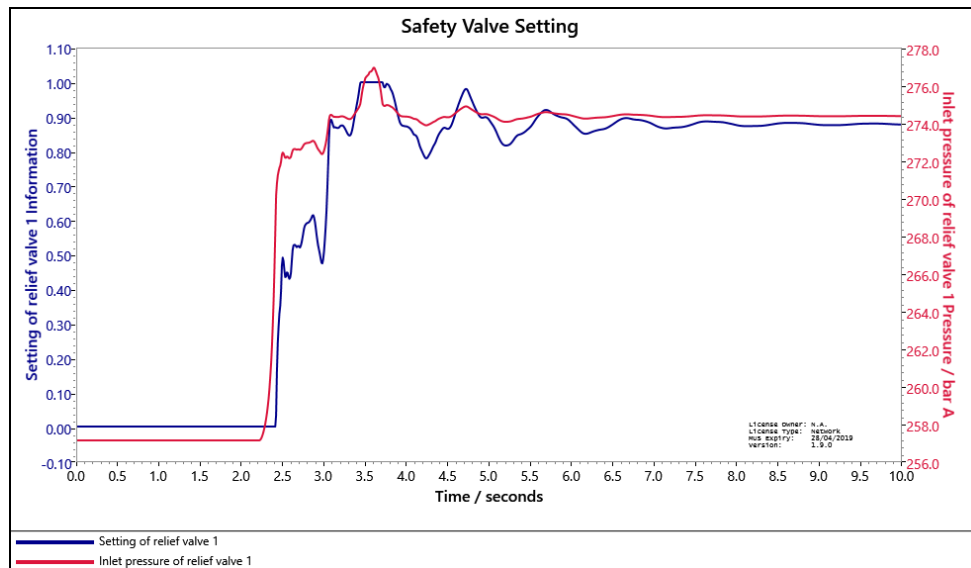
In this supercritical power plant in China, with boiler capacity 1700 tons/hr, running at 25.5 MPa and 571°C, PIPENET was used to calculate the effect of a pressure surge after a turbine trip, estimating the dynamic forces caused by the rapid closure of the main steam valves and rapid opening of the safety valves. The safety valves open when the pressure exceeds 27.0 MPa, and are fully open once the pressure reaches 27.5 MPa. Two types of pipe are used in this network 420.7 ID x 79.5 mm and 306.4 ID x 59.5 mm. The main steam valve closes in 0.2 seconds.



SCENARIO – Turbine Trip

Once the turbine trips, both main steam valves are closed. The results are seen in the graphs below.





The maximum pressure surge in the system exceeded the set point of the safety valves (around 28.0 MPa), with the maximum dynamic force reaching up to 4.3kN/m.

CONCLUSIONS

PIPENET can be used to help protect various components of the steam system, including, but not limited to the turbine, the boiler, the pipes and the safety valves, as well as helping optimise supports and dampers. The results of PIPENET's calculations can be used by stress analysis software to evaluate the structural integrity of the system.

If you have any questions about this case study, or any other of PIPENET's capabilities, please email us at Pipenet@sunrise-sys.com.

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