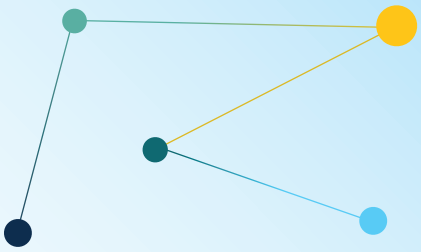
xstream
a datacor product

Steam and Gas Transient Analysis Software

Simulate and Solve Your Challenging Steam and Gas Transient Problems



xStream is a powerful fluid dynamic simulation tool for high-speed, acoustic transients that occur in steam and gas piping systems. Uncertainty in design and operations costs money and time. Now you can accurately simulate how your steam and gas systems will respond to potentially disruptive or harmful events.

CAPABILITIES

- Accurately simulate high-speed transients in steam and gas piping systems including choked flow conditions
- Easily change system input data including transient valve positions, compressor operation, control set points, pressures, temperatures and more
- Calculate transient unbalanced forces and define force sets as location pairs or single points
- Predict transient supply pressures, temperatures and flows to operating gas compressors and turbines when one trips offline
- Simulate tank blowdowns and charging, and determine the time to reach desired pressures
- Consider transient heat transfer in piping walls and tanks, including thermal capacitance
- Specify initial tank conditions or determine automatically from steady-state results
- Consider transient heat rate and changes in volume for a finite tank
- Predict transient pressures and flows due to heat exchanger tube ruptures
- Initiate transients based on time or triggered by a parameter criterion

BENEFITS

- **Increase uptime by understanding how an unexpected transient event will impact pressure, temperature and flow delivery to critical equipment**
- **Reduce expensive overdesign resulting from analytical uncertainty**
- **Improve safety by evaluating all system shut down scenarios**
- **Validate that required flow can be delivered with certainty**
- **Visualize the dynamic response and interaction of pressure waves**

APPLICATIONS

- **Ensure pressure, temperature and flow extremes are within design allowables**
- **Determine imbalanced pipe forces for sizing structural supports**
- **Troubleshoot existing systems to determine the cause of operational problems**

ADD-ON MODULE

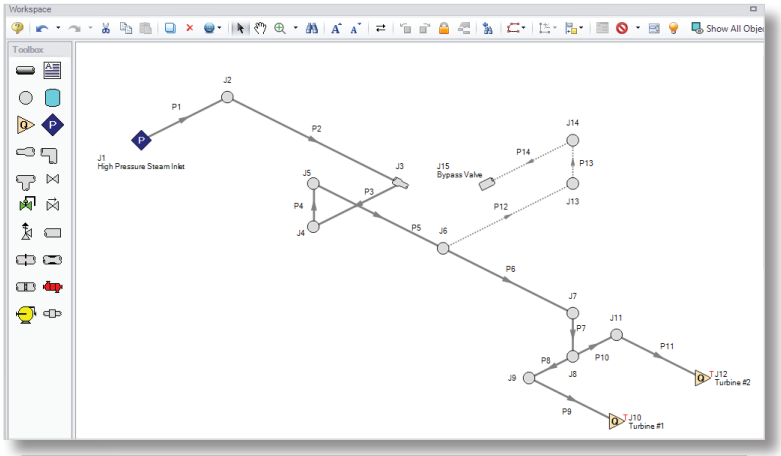
PFA

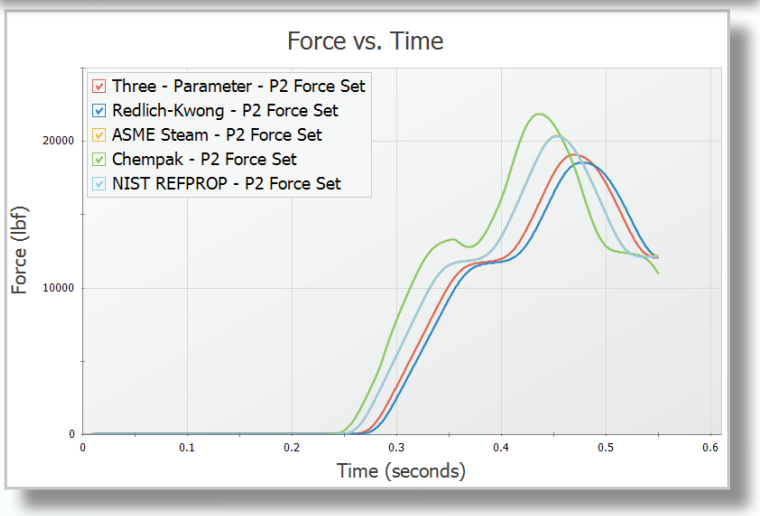
Pulsation Frequency Analysis

Helps identify pipe acoustical frequencies to avoid resonance from excitation, especially in systems with positive displacement pumps.

FEATURES

- Built-in steady-state solver to automatically initialize system before the transient
- Automatic pipe sectioning based on steady-state acoustic velocities
- Compound transient event logic to model complex control sequences
- Scenario Manager to track all design variants and operational possibilities in a single model file
- Integrated graphing and reporting
- Animation tools for visual interpretation of complex transient interactions
- Generates force imbalance files that can be automatically read into CAESAR II®, ROHR2, AutoPIPE and TRIFLEX® pipe stress dynamic models
- Built-in libraries of fluids (including NIST REFPROP and ASME Steam Tables) and fittings which can be extended and customized
- Define component mixtures using the built-in NIST REFPROP and Chempak add-on thermophysical databases, totaling over 600 unique fluids
- 2D flow diagram or isometric view interface





DATA INTEGRATION

- Import piping layouts and dimensional data from GIS Shapefiles, CAESAR II® Neutral Files, and PCF files from a wide range of sources
- Import and export files in EPANET format
- Robust Excel integration to import and export data

How Does It Work?

xStream incorporates a highly accurate steady-state solver which provides seamless transfer of initial conditions to the transient analysis. Steady-state solutions are determined using a modified Newton-Raphson matrix iteration plus proprietary methods developed by Datacor. A specialized Method of Characteristics is used to solve the transient mass, momentum and energy equations of pipe flow.

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Chempute Software (Pty) Ltd
+27 31 764 6840
sales@chempute.com