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The GRIME

May / June 2010
Newsletter

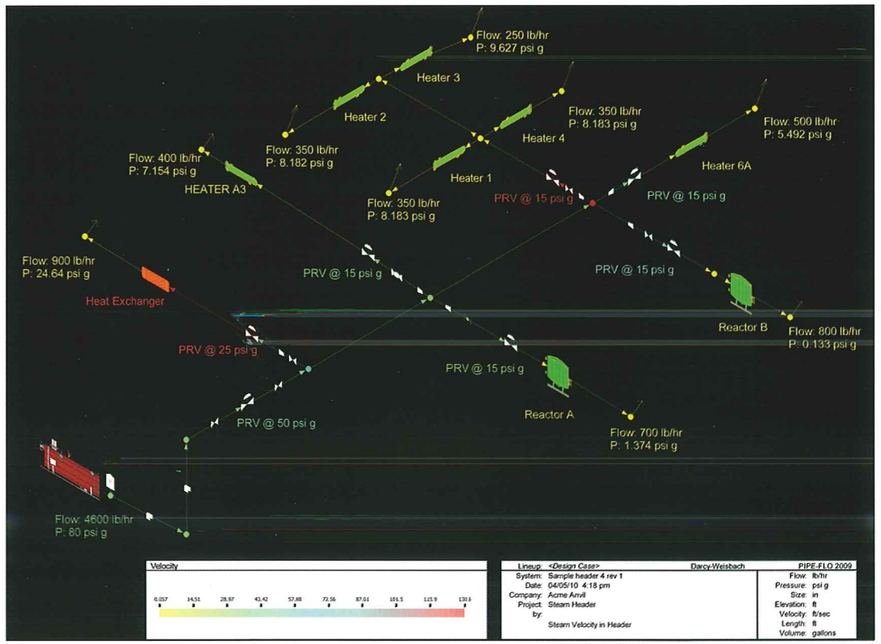
Ware introduces new product to help customers map steam

Ware's new Steam Mapping product provides a "road map" for customers on a steam distribution system and condensate return system. Steam mapping provides an analytical tool for documenting the current steam distribution system and documenting changes to the system.

"For many customers, their steam distribution system consists of old, inaccurate construction or design drawings which do take into account any additions or alterations made over the years to their system," said Bill Fogarty, Ware Valve Division Manager. "And, in many cases, the current documentation does not provide any insight into what is actually going on in the system under different operating conditions."

Steam Mapping, which is sold in conjunction with Ware's Steam Survey program, is an analytical tool that uses software that provides detail on flow rates, pressure drops, velocity, head loss, pipe size and capacity of a steam distribution system.

The Steam Mapping tool can be used to define problems in a steam distribution header such as excessive pressure drop through the steam distribution header, inability to deliver the required amount of steam to a process area or pipe sizes that are too small for the required flow. The tool can also identify excessive velocity through, a condition that will cause damage to system components.



Ware introduces continued on page 2

Ware introduces continued from page 1

Ware professional who will gather details on the steam and condensate system. Information such as the size, number, length and schedule of each pipe in the system is recorded. A count is taken of all elbows, tees, reducers, isolation valves, control valves, pressure reducing valves, branch headers and components from the point of generation to each point of use.

All of the information is then loaded into the software to generate a model of the system. By using customer supplied information of either the mass flow in or out of the system, Ware can then calculate the pressure loss, velocity, flow rates and pressures for the steam system in series and branch configurations.

Once this model is complete, Ware can alter components such as the control valves or calculate throttle valve positions needed to balance the circuits in a piping system or size flow meters and balancing orifices and see how this affects the operation of the total piping systems.

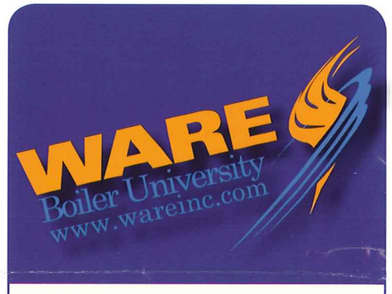
If a customer is anticipating major additions to or reductions of the steam system, the changes can be modeled prior to making them to determine what the impact of these changes will be in advance.

The model can also assist in diagnosing problems encountered in the system such as elbow and valve components wearing out prematurely.

The customer receives an electronic file that can be viewed using a viewer file. Typically, several scenarios are modeled, for example, first shift, second shift and off hour demands or peak heating demands versus summer loading. Individual components in the system can be viewed or the system can be viewed in its entirety using color gradients to show all pipe sizes, velocities and flow rates.

"All Ware customers can benefit from Steam Mapping," said Fogarty. "The software is robust and able to handle large systems such as universities, district heating systems and large industrial applications."

For more information on Steam Mapping, please call Bill Fogarty at (502) 968-2211.



"Boiler and Pressure Vessel incidents, which can have devastating consequences, are usually the result of human error."

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HOT TIP ARTICLE

High-pressure boilers with backpressure turbine-generators can be cost effective

A high-pressure boiler with a backpressure steam turbine-generator can be a smart choice when purchasing a new boiler. When placed between the boiler and the steam distribution network, this type of boiler can be very cost effective.

The capital cost of a back-pressure turbogenerator with electrical switchgear is approximately $900 per kilowatt (kW) for a small system (150kW) to less than $200/kW for a larger system (less than 2,000 kW). Installation costs are typically 75 percent of the equipment costs, but vary based on piping and wiring runs.

In many situations, a turbine-generator can produce enough electricity to justify the capital cost of purchasing the higher-pressure boiler and turbine-generator.

Facilities often install boilers that produce steam at the lowest pressure consistent with use and distribution requirements since fuel usage per unit of steam production increases with boiler pressure. But, with a backpressure turbine configuration, the turbine does not consume steam. The turbine instead decreases the pressure and energy content of steam that is later exhausted into the process header.

The turbogenerator reduces steam pressure which is the same steam purpose as a pressure-reducing valve. However, in addition to the low-pressure steam, the turbogenerator uses the pressure drop to produce highly valued electricity as well. When a nozzle directs jets of high-pressure steam against the blades of the turbine's rotor, shaft power is produced and the rotor, which is attached to the shaft, is coupled to an electrical generator.

Packaged backpressure turbogenerators are now available in ratings as low as 50 kW and should be considered when a boiler has steam flows of at least 3,000 pounds per hour and when the steam pressure drop between the boiler and the distribution network is at least 100 pounds per square inch gauge. The backpressure turbine is generally installed along with a pressure-reducing valve to ensure that periodic turbine-generator maintenance does not interfere with plant thermal deliveries.

Converting electricity efficiently
The energy from high-pressure inlet stream in a backpressure steam turbine is efficiently converted into electricity. Then, low-pressure exhaust steam is provided to a plant process. The turbine exhaust steam has a lower temperature than the superheated steam created when pressure is reduced through a pressure-reducing valve. Steam plants with backpressure turbine installations must increase their boiler steam throughput by 5 – 7 percent typically in order to make up for this heat loss and meet process energy requirements. Every Btu that is recovered as high-value electricity is replaced with an equivalent Btu of heat for downstream processes.

This level of savings is often more than adequate to justify the capital and maintenance expenditures for the backpressure turbine-generator set and the incremental cost of purchasing and installing the higher-pressure boiler.

Information for this tip was taken from the U.S. Department of Energy's (DOE) Best Practices Web site at www.eere.energy.gov. Use this Web site to access other industrial efficiency resources and information or refer to "Improving Steam System Performance: A Sourcebook for Industry" from the U.S. DOE.

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