

A SYSTEMS VIEW OF PUMPING SYSTEMS

The whole is greater than the sum of its parts

by Alex Kramer, President, NECO Pumping Systems Inc.



NECO Systems Pumping Systems Inc. (NECO) was founded on the simple premise of providing high-quality, bid spec pumping packages to the commercial and industrial construction market. Over the course of its 25 years delivering approximately 3,400 pumping systems, the company has provided pumping packages, solutions and expertise to commercial, industrial and municipal customers throughout the Mid-Atlantic states. NECO's experience spans water pressure boosters, heat transfer, geothermal circulation, fuel oil transfer, wastewater systems and real-time industrial control solutions.

TAKING A SYSTEMS VIEW— MORE THAN COMPONENTS

NECO employs a "systems view" to delivering value to customers by optimizing performance, efficiency and reliability of their pumping systems through the application of controls, instrumentation, operations strategy, assessment services, and Hydraulic Institute-certified training seminars.

It can be argued that pumping systems are the heart of commercial and industrial facilities. They provide employees with a comfortable working environment, support manufacturing processes and remove waste. Yet, in most cases, pumping systems are thought of simply in terms of the individual pumps and motors that spin endlessly in a remote mechanical equipment room. That is, until they don't.

When a pumping system fails, building operations and processes are compromised, downtime and costs are incurred—and workers go home, leaving tasks unfinished.

Essential as they are, pumps—and the systems they support—are typically dealt with on an independent component basis rather than as a system. This means that multiple parties and trades might typically get involved and take on a compartmentalized role to solve the problem:

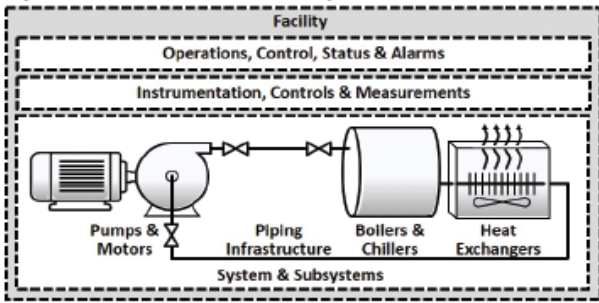
- Local maintenance personnel deal with pumps and motors.
- HVAC specialists deal with boilers, chillers and heat exchangers.
- Local plumbing contractors are called for piping and valves.
- Operations personnel are concerned with controls and measurements.
- Facility management tracks energy costs and efficiency.

When an event or failure occurs that affects operations, the inevitable question is "Who gets notified?" No water? Are the pumps down or is there an open pipe somewhere in the system? No heat? Is it the boilers or the fuel pumps or the circulating pumps?

So, how do you identify the problem? The systems view (as opposed to a components view) provides a holistic approach to diagnosing the issue. Additionally, the systems view integrates the elements of design, performance, operations, efficiency, and reliability of pumps and pumping systems (see chart).

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System View – HVAC Circulation Example



Pumps providing flow and pressure, the subsystems requiring that flow and pressure, and the piping infrastructure between, all have to be considered as a whole in the systems view. In fact, optimizing individual components does not produce an optimized system. NECO utilizes advanced system-wide tools to optimize performance, efficiency and reliability of the whole.

BROADER ELEMENTS OF A SYSTEMS PERSPECTIVE

Intelligent Controls. The Yaskawa iQpump Variable Frequency Drives installed by NECO are unique in that they utilize integrated pump-specific control software and require no external programmable logic controllers (PLCs) or other control devices. Variable frequency drives (VFDs) will constantly regulate pump performance to meet demand for flow and pressure rather than running pumps at constant speed, and then regulating flow and pressure with control valves. Yaskawa drives provide control, energy efficiency, and a broad range of operations measurements, analytics, and diagnostics.

Constant Status Monitoring. When operations affecting events or failures occur, traditional status alarms provide multiple points of failure and delay. Low pressure, high motor temperature and vibration and high level alarms are examples of system status indicating current or pending failures in a pumping system. Immediately notifying maintenance personnel of current or pending failures minimizes the impact, down time and losses associated with pumping system failures. NECO has addressed status alarms with its Notify™ Cellular Pumping Alarm system. Notify™ constantly monitors multiple points of system status, independent of other building systems, and sends text alarm messages to Maintenance First Responders.

Hydraulic Modeling. What is the total performance of your pumping system? Where are the choke points? What happens when you change equipment? How do you improve efficiency and reliability? These are all design and evaluation questions answered by hydraulic modeling. NECO systems employs hydraulic modeling software to assess pumping systems and benchmark-expected system performance.

Pumping System Assessment. If you're not sure where to start, or how to determine the health, performance and status of your pumping systems, you can turn to the Hydraulic Institute, the pumping industry advocate developing standards, providing education and contributing to legislative rule making. NECO provides Pumping System Assessment Services, certified by the Hydraulic Institute, assisting our customers to better understand the status, health, performance and ability of their pumping systems to meet expected demand.

With NECO's embrace of a system view to ensure efficiency and reliability, our customers can be assured that we will keep the heart of their building pumping to full capacity.

Alex Kramer received a Bachelor's Degree in Electrical Engineering from the University of Delaware and a Master's Degree in Systems Engineering from the University of Pennsylvania. Alex is Pump Systems Assessment Professional certified by the Hydraulic Institute and a collaborative instructor.



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