

Pumping Course Description

Pumping energy reduction efforts typically focus on inefficient system control schemes that match the system's delivered flow to the needs of the process and also waste considerable amounts of energy. This workshop will examine a number of different approaches to varying the capacity of a pumping system. These are:

- Recirculation – where fluid leaves the discharge of the pump and flows, via a recirculation line, directly back to the suction tank, (very wasteful of pumping energy);
- Throttling Valves – a control valve on the discharge side of the pump partially closes forcing the operating point back up the pump curve and reducing the flow delivered, (wastes a considerable amount of energy if the valve stays throttled most of the time);
- Parallel Pumping with Throttling Valves – multiple pumps piped in parallel discharge into a common header. Throttling control valves are often employed with this arrangement to control flow in different lines coming off of the main supply header (often the maximum number of pumps ever needed are operated all of the time and header pressure fluctuates with the demand for flow).

All of these control schemes waste a considerable amount of energy when used in systems where the flow requirements vary over time and/or the pumps are oversized. The workshop will explain how to determine the wasted pumping energy in these types of systems.

System designers typically oversize pumps in order to be sure the pump(s) will be large enough to provide the needed flow when the systems are actually built and operated. Oversized pumps are often “made smaller” by closing valves at the pump discharge to reduce the flow to the amount needed. Other methods of reducing a pump's capacity are to trim the impeller if the required flow is always the same, or installing a variable frequency drive (VFD) to slow the rotational speed of the pump and reduce its capacity. Impeller trimming is an efficient way to reduce the capacity of an oversized pump if the pump is oversized all of the time and the amount of flow reduction is not too large. If the flow requirements vary then trimming the impeller is probably not the correct solution. Installation of a VFD is often the best solution allowing the capacity of the pump to be varied over a wide range, saving energy as the pump's speed is reduced. Case studies illustrating these concepts will be presented in the workshop.