Case Studies Overview:

There are a variety of case studies on the Engineered Software Website, with more being added. These case studies were created for some of the most typical applications PIPE-FLO is called on to analyze.

**Pump Sizing** - Selecting the proper pump is the most important step in the designing of a piping system. This case study provides instructions for using PIPE-FLO to select the best centrifugal pump.

**Balancing the System** - Often cooling and heating piping systems are not properly balanced to deliver the required flow rate to the various loads. Two things occurs when this happens. 1. More fluid than is needed is pumped through the system, which increases pumping cost. 2. The extra flow through the various paths cannot be used for future system load expansion, which increases the capitol cost. This example shows how to use PIPE-FLO to balance a cooling system.

**Problem Control Valves** - Many times even the simplest piping system presents a large problem when it is not operating properly. In this example, we have a single pump circuit pumping from a supply tank to a pressurized tank. We will use PIPE-FLO to discover what can be done to correct a problem with a control valve.

**Finding System Bottlenecks** - As process loads increase, additional fluid is pumped through the system. Without a clear picture of the entire piping system you can quickly pay a high price in pumping cost to get a small increase in flow rate. This study is based on an analysis of a reclaim water pump system at a nickel mining operation. You will see how a quickly modeling the piping system allowed the plant engineer to save over $250,000 per year in pumping costs.

**Minimizing Pumping Cost** - In this study we will see how calculating a pump's design point can improve the pump operation and minimize pumping cost. You will quickly see how important it is to re-evaluate a system when any changes are made.

**Piping System Expansion** - In this example, we will be adding four new banks of tools to the ultra pure water system in an integrated circuit manufacturing facility. You will see how to use PIPE-FLO's copy features to quickly add to an existing system. Once the changes have been made we will see their effect on the system operation.

**Time Simulation with PIPE-FLO** - It is often necessary to observe how a piping system operates over time. PIPE-FLO is a steady state hydraulic analysis program, and therefore is not designed to perform extended period simulation. However, there are a couple of options for extending PIPE-FLO's capabilities to include dynamic system analysis. In this example, you will see how to use the Lineup feature, and some simple calculations outside the program to perform some simple time simulation studies.

**Variable Speed Pumps** - When designing piping systems in which the system demand varies (for example, a chilled water distribution system with varying loads throughout the year), variable speed pumps may be an effective energy and cost savings option. In these systems, the pump speed can be adjusted to meet the varying demands of the system. This article describes the implementation and operation of both fixed speed and variable speed pumps in PIPE-FLO and Flow of Fluids.

**Using Overtime in Ship Deballasting Operation** - One of our customers was working with a shipyard and was tasked with determining a method to pump out six ballast tanks on a ship while the ship's cargo was being loaded. The ship had to complete the deballasting operation within 12 hours to meet a tight schedule. This article shows how he was able to find a solution using PIPE-FLO Professional and Overtime.