EEHPC 2012 Workshop

How to Demonstrate the Return on Investment of Energy Efficient Designs

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Machine builders are facing challenges in finding new and effective ways to improve equipment designs. Challenges include rising operating costs (energy), higher productivity demands, and regulations impacting design considerations. These challenges are creating a change in the landscape on how decision makers view "value" when designing changes into machines.

For many companies, up-front cost, or installed cost, has been a leading consideration when it comes to machine design. Systems didn't have to rely on being leading edge technology, rather they tended to focus on simple, tried and true designs that had been used many times and had been driven down in component cost by purchasing departments.

However, leading companies (and their customers) are now recognizing that total system cost needs to be considered, not just the outlay of money up-front. Issues such as operating costs and impacts to other costs related to design choices (such as prime movers) have escalated thinking to look more at the complete system and how it's used in operation.

This change in thinking (total system cost versus only installed costs) presents another issue for designers… While some design improvements might be accomplished with little change in costs, other system changes can involve higher cost components. Now it may be necessary to show that the value of a more efficient pump is worth the higher purchase price and will pay for itself in an acceptable time frame... and acceptable Return on Investment (ROI).

Fortunately, there are some simple measures to relate energy savings to bottom line numbers. As an example, if we can save 3 kW (2 HP) of power over an 8 hour period each day with 5 days per week and 50 weeks per year, we can show 6000 kW-hrs/yr energy savings. With an energy cost of say, $0.10/kw-hr, we can show a $600/year savings. If our investment to achieve this savings is even as high as $1,000, the ROI can be achieved in $1,000 ÷$600 = 1.67 years (1 year, 8 months). For most companies, this would be considered a good investment.

In discussing the issue of ROI, there are some primary things to consider:

1. Is this a new application where the customer is choosing between a fluid power solution and a prime mover/mechanical solution?
2. Is this a new application where the customer is choosing among several fluid power solutions?
3. Is this a retrofit where the customer wants to replace and/or improve an existing fluid power system?
4. Is this a retrofit where an existing electromechanical system is being replaced with a fluid power system?
5. Will the installation of this system simplify or complicate the job of the maintenance staff?
6. Are ***you*** convinced that an efficient fluid power system is the ***best*** solution?

Each one of these points takes a slightly different approach when determining the return on investment. However, each needs to address the issues of:

- Installed cost
- Operating cost
- Repair cost
- Disposal cost
- Environmental impact
- Future value of money

It is also important to think about our own ROI. As we develop new or improved products, train and certify our people, we will be investing in the future of fluid power which is an investment in our own future.

We will be referencing articles written for the Fluid Power Journal. These articles are under the heading, "Watts It All About" and can be found in the binder you received when you arrived.

We will be specifically looking at the articles on Flow Controls, Efficient Hydraulic Systems, A Failed Experiment, Something is Missing, You Made the Mess … , and Quads and the EEHPC.

If we are going to show our customers that there is a reasonable ROI when using fluid power, we have to know how to design efficient systems and explain to our customers why we are choosing what we are choosing. It is important to have customer involvement when choosing a hydraulic system so they can understand the impact of the decisions we help them make.

We will also then talk about the "perfect" hydraulic system.

- This "perfect" system will include the ability to store hydraulic energy at pressures much higher than what is usually expected.

- This power will be released with minimal energy loss.
- Multiple electric motors with varying loads can be replaced with hydraulic motors using this system and actually reduce the energy consumption.
- The installed cost may be lower than when using all electric motors.
- The style of reservoir allows for a reduced fluid volume and better filtration providing reduced installed cost, reduced disposal costs, and longer life for the components.
- The overall higher efficiency will reduce the heat load, extending the life of the fluid, and minimize or eliminate the need for a heat exchanger.