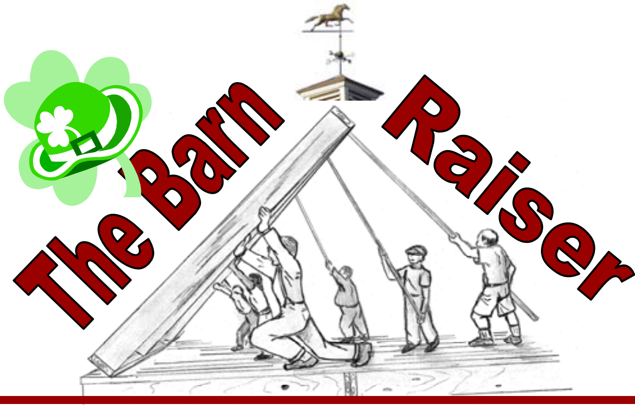

Mid-South Engineering Company

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A Brief Primer on High Intensity Discharge (HID) Lighting

Most industrial plants these days utilize HID (High Intensity Discharge) lighting. HID lamps operate by electrically exciting a gas, causing high-energy visible light to be radiated. By this method, electrical energy is not wasted as heat but is converted into visible light at extremely efficient lumens to watt ratios. HID light sources are much more efficient than fluorescent lamps, halogen or incandescent lamps. Halogen and incandescent lamps work by heating a thin strip of tungsten until it becomes a bright white point source. Most of the energy is used to maintain the temperature of the metal and is lost as heat. Fluorescent lamps have the disadvantage of hum and flicker. This is why HID lamps have become the de facto standard for industrial lighting applications, indoor as well as outdoor.

The light output of a lamp is measured in lumens. A light source has both a color temperature (colors which the light amplifies such as cool, warm, etc.) and a color rendering index (CRI) which is the ability to display colors properly in a given color temperature.

Of the HID lamps available namely: low-pressure sodium, mercury vapor, high-pressure sodium, metal halide, etc. the latter two are the most widely used. The low-pressure sodium fixtures has the disadvantage of poor CRI causing little differentiation between black, gray and orange colors, but fair power usage. Mercury vapor lamps produce white light with mediocre CRI, however these lamps are extremely inefficient in their power usage. High Pressure Sodium (HPS) lamps are the most efficient of all the HID light sources. The main disadvantage is the orange-gold colors they produce. This lamp is a good choice where true color is not critical. These fixtures are used extensively in industrial applications. They produce about 7 times as much light per watt as incandescent and twice as much as the mercury vapor or fluorescent fixtures. They also offer the longest lamp life (24,000 hours). Metal Halide (MH) lamps have a shorter life (7,500 to 20,000 hours) than HPS, but has an excellent color rendition. All HID lamps, have a delay in re-striking after a momentary power interruption.

In conclusion, Metal Halide is generally the choice in areas involving some degree of visual judgement. Where this not a concern, High Pressure Sodium may turn out to be a more economical choice.

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“Thunder is good, thunder is impressive, but it is the lightning that does the work.**”**

Mark Twain

“The Barn” built in the 1930’s to house Welsh ponies, serves as Mid-South’s offices. →

Proper Steam Trap Selection

Of all the heating choices available, steam is still one of the most effective. Steam is made up of sensible and latent heat. Sensible heat is available as raw temperature. If a temperature difference exists in the heat exchanger, sensible heat can be extracted. However, the big advantage of steam is its latent heat, which is given up when the steam goes from a saturated vapor (steam) to a liquid (water), known as a phase change. More heat is provided during the phase change than can typically be obtained from the sensible heat.

Without trapping steam, the vapor would flow through the heat exchanger without giving up its latent heat. Efficiency is drastically reduced when there is a leaking trap or a trap in the wrong application. Knowing which trap to use and how to apply it is very important.

All steam traps are designed to differentiate between liquid and vapor. They accomplish this typically through one of three concepts: thermostatic, mechanical, or thermodynamic. The proper type of trap along with correctly sizing each trap means money to you, sometimes a lot of money. Many steam traps are improperly sized because no standard calculation exists for the procedure. However, the following five steps can help you achieve an accurate fitting:

1. Determine the condensate load
2. Determine the inlet pressure.
3. Determine the outlet's back pressure.
4. Select the proper trap type, depending on the information above the application.
5. Apply a safety factor to pressure and also to the condensate load around the following:

- Float & Thermostatic………...1.5 to 2.5
- Bucket………………………..2.0 to 4.0
- Thermostatic & Bimetal……...2.0 to 4.0
- Thermodynamic……………...1.0 to 1.2

Each steam trap has advantages, but none without its disadvantages. Unfortunately no one type is best in all situations. That's why for maximum efficiency a proper application of science and experience (the school of hard knocks) is needed. The greatest cost is associated with misapplication.

The Battering Ram Principle

During the Middle Ages when armies would lay siege to a city, the common way to break down the gates was with the use of a battering ram, typically made from a log. Early versions consisted of a log supported by several cross members to allow men to carry and beat the log against the gates' exterior. You might imagine the ram with men as resembling a giant centipede. Later versions supported the log with ropes and suspended it from an overhead frame. The frame also had a roof that protected the ram operators from scalding water, falling rocks, arrows, etc. By repeatedly ramming the log against the gate, it would eventually give way, allowing the army to enter the city.

We wood producers have developed a more sophisticated battering ram but the attack is against ourselves and our equipment. It comes in the form of a series of logs being conveyed lineally at speeds far in excess of what men could carry and ram gates. Consider the effect of a log being conveyed on a lineal conveyor that runs into an end bump and is then kicked onto a cross transfer deck or into a pocket. Assume, in today's mill, there are nine (9) logs per minute being processed on a two shift basis. This equates to 2,160,000 logs per year or blows from the battering ram. How many city gates would have collapsed under this siege?

The battering ram effect is only a small factor in considering the abuse taken by log processing equipment. What happens when an infeed deck is charged by an angry 966 or 988 loader operator with his forks lowered and a full load of logs?

What about a truck load of logs being dropped onto the deck from an overhead crane? Log decks and log pockets take continual pounding from logs. There is extreme wear from the constant cycle of logs pounding equipment. A log kicker used 2,160,000 times per year. A lineal chain conveyor running 250 feet per minute has sprockets rotating over 13 million revolutions per year. Each line of chain on a 40 foot long conveyor will travel over 11,000 miles per year. Oh!. Don't forget the abrasive contaminants of sand and rock trapped in the bark of the trees from logging which adds and abrasive element to the moving parts during their travels. Mixed with grease, the contaminants are poison to bearings.

If we properly apply the battering ram principal by considering the cycles and abrasive environment, then many areas of the log processing systems need to be strengthened to withstand the constant abuse we besiege them with on a day to day basis. Experience can be a harsh teacher, and learning from the past is important. Knowing where to strengthen your foundations, frames, and equipment and where you can use better controlled transfers is critical.

Mid-South Engineering Company

1658 Malvern Ave (71901)
P.O. Box 1399
Hot Springs, Arkansas 71902
Telephone: 501-321-BARN (2276)

Contact: **Mark Culpepper**
mculpepper@mseco.com

Web Site: www.mseco.com