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PALLET ENTERPRISE



Energy Savings

A Greener Pallet Mill Through Energy Efficiency

By Ralph Russell

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Improving the energy efficiency of your pallet mill will help you operate more environmentally friendly and will put some green in your wallet. Having an intentional approach to noticing energy waste and turning off equipment when not needed are the top two things you can do to reduce energy costs and improve energy efficiency at your pallet mill.

Why Is Green Good?

Why should any pallet mill owner or general manager be interested in improving the energy efficiency of their equipment? You work hard to keep your plant profitable. It seems like there is a new government regulation or industry standard every time you turn around. Customers are starting to talk about being green and sustainability. A key to addressing many of these issues is the energy efficiency of your mill and pallet equipment. This article will provide several low-cost/no-cost strategies for improving energy efficiency to become more profitable and to become a “greener” operation.

Overcoming the Technology Hurdle

The primary methods that have been used in the past to improve energy efficiency are technological techniques, such as equipment maintenance and more efficient equipment, and economic strategies, such as rate tariff changes and energy contract modifications. Economic strategies were covered in the ar-



ticle “Top Ten Low-Cost/No-Cost Methods for Reducing Energy Costs” which ran in the March 2014 issue of *Pallet Enterprise*.

There is a big hurdle that companies need to get past before using these techniques and strategies. The first big hurdle is human behavior. Management and employees must have a positive mental attitude towards energy efficiency. They need to realize the value in it and be willing to make it a priority. This positive mental attitude needs to start at the top of the company. If the

owner of the pallet facility doesn’t buy into the concept of energy efficiency, most of the techniques will not be successful.

After confirming a positive mental attitude towards energy efficiency, the next step is to create an energy team that will select the best strategies for your operation and will help implement them.

Equipment Focus Areas

Let’s review the following types of equipment that can deliver the most energy efficiency if addressed appropri-

ately. According to energy services firm Advanced Energy, motors as a group are by far the largest single category of electrical energy use in the world, and they convert an estimated 50% of all electrical energy into mechanical energy. Motors are most likely the biggest consumer of electricity at your pallet mill. Other energy consuming areas that we will address are dry kilns, air compressors and lighting.

Motors & Drives

Motors are the largest single category of energy consumption in most industrial applications. Industrial plants can often reduce their current electricity use and costs by about 5% to 15% or more by improving the efficiency of their motor-driven systems according to the Department of Energy's Office of Energy Efficiency and Renewable Energy.

The energy efficiency of a motor and its drive system can be impacted during three phases of its life cycle. The first opportunity for influencing the energy efficiency is during the design and purchase phase. The temptation to oversize the motor initially is strong at this point.

Top Ten Steps to Compressed Air Savings

1. Turn It Off
2. Fix Existing Leaks
3. Prevent New Leaks
4. Reduce Pressure
5. Check Drains
6. Review Piping Infrastructure.
Many systems are not optimized.
7. Change Filters Systematically.
Not every once in a while.
8. Recover Heat. Compressing air generates heat – reuse it!
9. Emphasize Proper Maintenance. Ignoring maintenance costs more.
10. Identify & Eliminate Inappropriate uses of compressed air.

(Source: *The Compressed Air & Gas Institute*)

Bigger is not always better. Weighing motor efficiency versus life cycle cost is part of the design and purchasing phase. Use of Motor Master+ <http://goo.gl/esvot2> can be a resource in making the right selection. If you are buying a pallet manufacturing piece of equipment that includes motors, ask the vendor for options to improve the efficiency of the motors.

The second energy efficiency opportunity during the life of a motor at your facility is while it is in operation. Motor efficiency can be improved when they are teamed up with a variable frequency drive. This is an extra cost but weigh the option. Many motors are part of a belt driven system. Tension on the belts is critical for continued efficient performance. Replacement of v-belts with cogged or synchronous belt drives can improve efficiency of the system. In some cases, replacement of working standard efficiency motors with premium efficiency models can be justified with an acceptable return on investment. Look at your largest motors that operate the most hours first. You may be surprised at the potential savings for replacement.

The last phase of a motors life is when it needs to be replaced or repaired. While a motor is still in operational condition, develop a plan for its repair or replacement. Evaluate near-by motor repair facilities. Set standards of repair with the facility for items such as motor insulation, balancing and vibration. Develop a purchasing policy for motors that need to be replaced. Make the decision ahead of time as to whether a more energy efficient motor is justified. Will you be keeping a spare motor in inventory? If so, is the spare a more efficient model?

Mahendran Naidu, vice president of business development for EESI Global (www.eesiglobal.com), provided additional information on opportunities to reduce the cost of operating a motor. Mahendran said, "Most buildings have electrical systems that have inherent heat and line loss. This causes power quality issues resulting in poor performance of the motors and other loads. We address the heat and line loss using custom devices that have a combination of capacitors and harmonic filters customized to the load. This not only provides

clean power but also improves the power factor."

Devices provided by EESI Global can be added at any time and are installed next to the power load. These devices reduce the kW consumed and to make motors run much cooler due to the supply of clean power.

Mahendran added, "Our solutions come with specific ROI and payback periods. The payback period is guaranteed via third party insurance company. We have had no claims against our policies since 2001. That should be a very good indicator of the efficacy of our solution."

Dry Kilns

Pallet kilns are used to both heat treat and dry pallets. There are many variables such as climate, type of material used in pallets and the nature of pallets (new or refurbished) that impact the cost of energy to operate a kiln according to Kiln-direct.com's Patrick J. Dean. When Dean was asked what simple low-cost/no-cost strategies can a pallet mill use to reduce energy consumption of their kiln, he replied: "First and foremost, a kiln is nothing more than an industrial oven. For that reason, any comprehensive energy strategy must focus upon maintaining efficient operation of the burner with routine clean, inspection and repair of all gaskets & routine replacement of worn parts."

When Dean was asked when kiln maintenance should be performed, he recommended: "Schedule maintenance per the manufacturer – take the time to read the operator maintenance manual – establish a maintenance schedule based upon the manufacturer's direction – and be sure to choose a vendor who has demonstrated a historical commitment to supporting its customer base."

A kiln uses energy for moisture evaporation, heating kiln and lumber, kiln ventilation, thermal losses, air leakage, and air dehumidification. Look at these areas of energy consumption for additional energy conservation measures.

A few energy efficiency suggestions for the kiln include:

1. Install speed control on the kiln ventilation fans.
2. Confirm that the kiln ventilation fans are working. They could be turning



Key Takeaways

Having a positive attitude toward the program and turning off equipment when not needed are critical to the success of any program to reduce energy costs. We also learned the following key points:

- Select the right size equipment.
- Select the more efficient equipment such as lighting, motors and dry kilns. Consider life cycle cost.
- Perform regular maintenance such as fixing air leaks, maintaining dry kiln inlet and outlet gaskets.
- Consider adding variable frequency drives, cog belts and power factor correction equipment.
- Use utility energy efficiency program incentives and rebates to upgrade systems such as air compressor systems, motors and lighting.

just from convection.

3. Maintain door seals, inlet and outlet vent gaskets, and door & wall insulation.

4. When purchasing a new kiln, consider energy efficiency. Some kilns are more energy efficient than others.

Air Compressor System

You use compressed air every day in your pallet operation. It powers the nailers, pneumatic equipment, automation equipment, conveyors, controls and actuators. You can probably hear the escaping air when leaks occur. When you hear those air leaks, just think of it as money being taken from your bottom line. Even a small leak can cost thousands of dollars per year in wasted energy costs.

A compressed air system is composed of a compressor, controls, tanks and a highway of pipes throughout your facility. The top two suggestions for reducing the energy cost of operating a compressed air system are to turn it off and to fix existing leaks.

Turn It Off: There are 168 hours every week but your plant probably only operates a fraction of these hours. Is the air compressor being turned off overnight, weekends and holidays? Is the last person out the door responsible for turning off the compressor? A simple timer or existing building automation system can be used to effectively control the operation of the compressed air system. Don't forget the holidays when programming the controls.

Fix Existing Leaks: Locating air leaks may require test equipment to locate but the common problem areas are: cou-

plings, pressure regulators, condensate traps & shutoff valves and pipe joints. Leaks are a significant source of wasted energy of the compressor's output.

Other suggestions to improve compressed air system efficiency include: reducing inlet air temperature, reducing operating pressure and recovering waste heat.

The Compressed Air & Gas Institute (www.cagi.org) has compiled its own "Top Ten Steps to Savings." See information on previous page.

Most of us take lighting for granted and don't even think about it until the lamp burns out or there is a power outage. A significant portion of your energy costs go towards the operation of the lighting system. The simplest low-cost/no-cost technique for reducing lighting energy cost is to use smart controls in selected space to control when and where lighting is needed.

Use a timer or an existing building automation system to turn off lights on work nights and weekends and use occupancy sensors to turn off lights in warehouses and storage areas when not needed. Take a look at your outside lights to see if they are coming on earlier than expected or staying on longer than expected. The photocell on the outdoor lighting fixture may need cleaning.

Allen Kirk, project manager for XtraLight Energy-Efficient Lighting Solutions (www.xlm.com) offers tips for lighting energy efficiency. Kirk said that everyone from the top boss to maintenance managers to production managers, purchasers and chief financial officers should be concerned with improved

efficiency from replacing or retrofitting the lighting system.

In recent years lighting has become more affordable and sharp looking. The best time to consider lighting upgrades is when rebates become available, at the end any T8 Solution 3 years or more, if you still have T12 Lamps or HID Fixtures, according to Kirk.

In general the best place to start replacing or retrofitting is areas where the lights are on most of the time. Usually outdoor lighting is one of the last places to focus.

While there are many reasons to consider replacing or retrofitting, Kirk said that saving money, extending the life of lights and improved morale are all very good reasons as well as the existence of rebates for many installations.

Kirk added, "Utility rebates increase the ROI by over 50% in almost every case, making LED lighting solutions the best option."

Check with your local utility to see if it offers programs or incentives exist to improve your lighting efficiency. eDiscoveri is prepared to help you identify solutions to become more energy efficient and to reduce energy costs. Please let us know if we can help.

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