

Industry Article

Does Your Facility Have a Million Dollar Fan?

By Gregory D. Kelder, P.E.

Ouch! High-energy costs are hitting the bottom lines of many manufacturing plants and warehouses. But instead of trying to pass on these costs to customers, smart businesses are positioning for long-term competitive advantage by looking at ways to significantly reduce energy consumption in their facilities. Heating and ventilating systems in older manufacturing plants and warehouses represent an excellent opportunity to save energy, reduce operating costs, improve productivity, and set a good example for responsible corporate environmentalism.

As a manufacturer of energy efficient heating and ventilating equipment used primarily in warehouses and manufacturing facilities, we often see outdated systems that are inefficient and costly to operate. Fans, direct-fired makeup heaters, and other ventilation equipment may have been installed many years ago for specific processes. That equipment may still be used even though the processes that warranted its original installation are no longer there. An unnecessary exhaust fan that is discharging heated air outside during the winter can be costly. How costly? A little bit of calculating will show that if natural gas costs \$8.00 per Mcf, a single 48" fan exhausting 25,000 CFM in Madison, Wisconsin could cost over \$47,000 each year. If natural gas cost escalates by 5% per year, over a 15 year time period, that single unnecessary fan could take over \$1,000,000 from the bottom line profit of the unsuspecting business.

When a plant has a heating or ventilating problem and calls in a contractor, sometimes the proposed solution can cause new problems. Many plan-spec contractors have been conditioned to prepare proposals with an eye toward cheap and easy instead of best and most efficient. While the initial installation cost may be relatively low, the cost of operation to the facility owner can be very high. Unfortunately, the specific cost of operating that piece of equipment is often concealed by other equipment operating in the same building. All the building owner really knows is that the cost for heating and electricity are "too high" but probably doesn't understand why.

High-energy costs offer a good reason to look at the big picture to see if innovative energy conservation ideas should now be considered because of shorter payback periods. Energy conservation ideas that were not deemed feasible when oil or natural gas were less expensive suddenly make good economic sense in the new reality of higher energy prices.



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Many industrial processes represent a potential gold mine for common sense energy recovery. Heat generating processes, which cause some building areas to excessively overheat can often be used to heat other areas that are constantly cold. Cooling towers that reject process heat can also be used to recover waste heat for use in building areas where the heat is needed. Recovering heat from a cooling tower loop can also offer the potential advantage of reducing maintenance costs.

Another potential application for heat recovery exists wherever excess heat is available to heat fresh ventilation air. The "free heat" recovery can improve the Indoor Air Quality and make the building space more comfortable as well. This can be very effective and doesn't require extensive ductwork,

elaborate controls, or expensive heat recovery heat exchangers.

Replacing outdated heating equipment with an energy-efficient heating system can cut heating costs significantly and generate a very acceptable return on the investment. Older industrial facilities and warehouses are commonly heated with unit heaters, infrared, makeup air, boilers, or a combination of those. Temperatures in the facility can vary widely. Usually, it is extremely warm near the ceiling in high areas while some areas near dock doors can be cold and drafty. Any building with stratified heat trapped near the ceiling offers an excellent opportunity to save energy. Today, many facilities are effectively being de-stratified and more efficiently heated with indirect fired Thermo Rotation heating systems. The system



Amorium TC Unit

results in very uniform temperatures - usually only 2-3 degrees of temperature difference throughout the space. It cleans up the building interior by eliminating ductwork or hanging heaters and is much more convenient to service than equipment located at the ceiling or outside on the roof. In addition to a much more comfortable facility, the system often will cut heating costs by 30-50%.

Before selecting any new heating system, it is important for the building owner to carefully research the equipment being considered before making the purchase decision. Different types of heating equipment were originally designed for specific purposes and it is important to understand key operating differences between types of equipment. For example, direct-fired heaters were designed to heat cold outside air to "makeup" or compensate for large amounts of air exhausted by production processes. However, one of the byproducts of combustion is water vapor. In cold climates with tightly constructed, well-insulated buildings, the use of direct-fired equipment that dumps combustion byproducts directly into the building space can increase potential condensation problems. Unlike direct-fired equipment, an indirect fired Thermo Rotation System does not add any moisture to the building and vents flue gases outdoors instead of putting combustion byproducts directly into the building. While direct-fired makeup heaters are effective when large amounts of air are being continuously exhausted by process requirements, Thermo Rotation Systems were designed to be most effective for general building heating in large open buildings such as warehouses.

With winter approaching and energy costs predicted to remain high for several years, now is an excellent time to evaluate existing heating equipment and investigate cost saving alternatives. When the heating equipment is down and the building is cold, the best time to consider new heating equipment has passed. Plan more comfort and less cost into your heating system now to enjoy a warm feeling when cold winter winds start to howl.

Gregory D. Kelder, P.E. is President of Thermo-Cycler Industries Inc., a small family-owned manufacturer of industrial heating equipment that has specialized in energy saving Thermo Rotation Systems since 1984. He can be contacted at tcycler@csinet.net.

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