



How to fight rising energy costs

By John Kohl

Energy costs up dramatically

Energy costs for a box plant have always been a small percentage of the fixed cost a plant has included in the cost of the finished boxes it sells. These costs have been rising rapidly in the past few years due to the supply and demand influences of the market. The cost of these energy sources has risen by 93% for crude oil since 2003 from \$30 Bbl up to \$58 Bbl today. This has driven the cost of No. 2 fuel oil up from \$0.80/gal to \$1.60/gal today. Also there has been a 100% increase in natural gas prices for the same period of time from \$6/MMBtu to more than \$12/MMBtu today. Now the once stable cost for a plant to produce steam for the corrugator has become a major concern since the fixed cost has recently doubled.

Both fuel oil and natural gas are energy sources used for generating steam in the box plant. Many plants have converted to natural gas as their primary fuel source since it has had a stable price for many years. In recent years utility companies have been building small electricity generating plants run on natural gas due to the ease of environmental permits and low emissions from natural gas. With more than 100 of these small generating plants going on line in the last 10 years, the demand for natural gas has also risen 70 percent. These escalating energy costs have forced some paper producers to announce recently fuel surcharges up to a \$35 per ton to future sales.

The best defense: modernize and maintain

Faced with the 70% to 100% increase in energy costs all box plants should become more proactive in maintenance, upkeep, and modernization of their steam system. The two largest steam losses come from leaks in the system and steam traps that have steam blow-by that lower overall system efficiency. When system efficiency is reduced the boiler has to work harder to maintain vessel temperature which results in higher fuel consumption.

There is also an intangible savings in the board quality when your steam system maintains the ideal vessel temperatures for your corrugator for consistent heat transfer. If the vessels cool too much, bond quality can suffer and the finished board may have a marginal bond that may cause it to be scrapped or returned from the customer. Also insulating all steam lines prevents large amounts of energy

Upgraded equipment and diligent maintenance help minimize the impact of energy costs on your prices and profitability

losses and improves system efficiency.

Overall boiler efficiency is critical in maintaining the lowest possible cost to produce steam. A 350 hp boiler operating at 80% efficiency burning No. 2 oil at \$1.60 per gallon for 7400 hours per year costs approximately \$1,220,000 per year to operate. Just a 1% increase in boiler efficiency can save a plant \$15,000. For the same boiler burning natural gas at \$1.20 per therm, the 1% efficiency increase saves more than \$16,000 per year.

Another way to reduce the cost to produce steam is to convert older systems to a system that uses a high pressure condensate return. This will enable the condensate to be used as boiler feed water, offsetting the water and chemical charges along with reducing the Btus needed to heat colder water. This type of system can reduce a plants overall energy cost to produce steam by 15% to 20% per year.

Calculating energy costs

It is difficult to calculate an exact value for the cost of energy consumed per Msf of corrugated produced due to the difference between a plant's boiler efficiency and steam system efficiency. There is also the factor that the actual amount of Btus consumed by each roll of paper will vary. A more accurate measure of energy cost per Msf is to average the cost over many months of consumption and production.

The cost to generate steam can be calculated with the equation:

$$C_G = C_F (1+0.30)$$

C_F = Cost of fuel calculated by: $a_f \times (H_s - h_w) / 1000 / _B$

Where a_f = fuel cost (\$/MMBtu) =

H_s = enthalpy of steam, Btu/lb

h_w = enthalpy of boiler feed water, Btu/lb

$_B$ = overall boiler efficiency, fractional

0.30 = Total operating cost of boiler including feed water, boiler feed water treatment, feed water pump power,

Energy costs, continued

combustion fan power, sewer charges, emissions controls, maintenance, and labor. This shows that the true cost to generate steam is actually more than 30% higher than the cost per Btu of the fuel purchased. With today's high fuel costs, \$10 per 1000 pounds of steam is a low average generating cost.

It doesn't take many small leaks or trap malfunctions to add up to huge costs to a plant that go directly against plant profitability. Maintaining and upgrading your steam system can offset a portion of the cost and help keep your plant profitable.

Compressed air costs, too

Another area that consumes electrical energy that is rising due to generating costs is compressed air. All plants consume large amounts of compressed air to operate machines and all plants have air leaks.

Air leaks are expensive. A leak with a 1/16" orifice can cost up to \$250 per year; a leak orifice of 3/8" can add up to almost \$9,000!

Most plant maintenance personnel try to keep up with air leaks, but there usually are more than they are aware of. Leaks often waste as much as 20% to 30% of the compressor's output. These leaks can also be detrimental to equipment efficiency from low or fluctuating pressures that cost down time and poor product manufacturing. The majority of air leaks are easily fixed by tightening fittings, replacing couplings or repairing worn hoses.

The total cost for poor maintenance and neglected leaks in both air and steam systems, along with poor boiler efficiency can cost box plants large sums of money that reduce profitability. Conducting air leak audits twice a year is an easy way to reduce plant electric usage and is well worth the time for the maintenance to perform. With current energy costs rising dramatically, it is important to repair, maintain, and most important, modernize or upgrade your current steam system to minimize the impact.



*John Kohl
Technical Director*

The Right Formula

By Roger Holzmeyer

Your plant's adhesive program touches every piece of board you produce. It involves not just the adhesive formula itself, but how your program is monitored and managed, as well. Here are some checklists to help you assess where you are and where you need to go.

How do you know if your adhesive formula is right?

- Does it have the right amount of water so the starch will flow and transfer properly?
- Does it have the right amount of starch to allow bonding at high speeds?
- Does it have the right amount of caustic to give you the correct gel point needed for your machine?
- Does it have the right amount of borax to give the needed tack on heavyweight combinations?
- Does it have the right amount of additive or wet strength resin to give you the optimal performance or test results that you need?
- Is all the carrier cooking out properly to give you stable viscosity?
- Is your batch being mixed properly to assure consistent running and storage viscosity?
- Are you optimizing your type of mixing equipment?

The Right Formula for your plant should also include a program to control and monitor important parameters:

- Do you know what your gel point is right now?
- How about your percent solids, your viscosity?
- What is the temperature of your starch at the machine and in storage?
- Is your corrugator speed limited by the adhesive?

The right program should also include qualified individuals to set up, train and guide your team in achieving its goals in starch adhesive management. If you do not have a qualified person available in your company, your starch service supplier can help. Among other things, they can:

- help you oversee your adhesive program and keep things on track.
- set up, monitor, and help make adjustments when needed to keep things running at optimal speeds.
- make sure that you are getting The Right Formula for your plant's needs and your customer's needs.

Take a look at the program you have in place now. Then call your technical representative and have him do an assessment of where you are with your starch adhesive management and what needs to be done to achieve The Right Formula.

Harper/Love in the news

Harper/Love receives second award from Weyerhaeuser



At a September 27, 2005, recognition banquet in Las Vegas, Weyerhaeuser awarded Harper/Love Adhesives Corporation its Supply Chain Visionary Award. It is the second year in a row Harper/Love has been recognized by Weyerhaeuser for its service to the company.

In making the presentation, John Fox, Weyerhaeuser Vice President, Manufacturing/Quality commented, "Harper/Love provides outstanding service and support; they are clearly leaders in supply chain creativity and innovation, and very deserving of our recognition."

Harper/Love General Manager Bill Kahn responded, "Nothing gives us more satisfaction than helping our customers succeed. We're honored by this recognition."



Harper/Love associates celebrate Weyerhaeuser award. Left to right: Lou Cuccia, Bill Kahn, Gary Rowland, Bill Gerard, and Chris Polster.

Harper/Love supports Katrina relief effort

Following the devastation of hurricane Katrina, Harper/Love Adhesives made a direct cash donation of \$20,000 to support relief and relocating efforts. Donations of \$10,000 each were donated to the American Red Cross Disaster Relief Fund and the Salvation Army Disaster Relief fund to benefit storm victims in Louisiana, Mississippi and Alabama. Said Bill Kahn, general manager, "Our hearts go out to all the families affected by this tragedy. We hope the many stories of compassion and giving will long be remembered."

Watch out, NASCAR, here comes Harper/Love!

TimBar Packaging and Display recently celebrated its 50th anniversary in Oxford, Pennsylvania. A highlight of the celebration was a race of gravity-powered corrugated cars entered by TimBar divisions in seven states. The car sponsored by Harper/Love for the Oxford Container Division led the field. Congratulations, guys, and thanks for proving yet again you'll run faster with Harper/Love!



Oxford Container Division team with winning car. Team members, left to right: Gene Snyder, Tom Hoffman, Jason Cottrill, Scott Manahan (captain), Fred Loudermilk, and Anita Bosserman (driver).

Bill Kahn receives TAPPI 2005 Leadership Service Award



William T. Kahn, vice president and general manager of Harper/Love Adhesives Corporation was selected to receive the 2005 TAPPI Corrugated Packaging Division Leadership and Service Award. The award was presented at the Corrugated Packaging Conference, September 26-27, 2005, in Las Vegas.

Bill has been a TAPPI member since 1978. He has served as secretary, vice chair, and chairman of the Production Committee and as secretary, first and second vice chair, and chairman of the division. He also served as chairman of the Planning and Advisory Committee and as a member of the Supplier Advisory Committee. He was elected to the Corrugating Packaging Council in 2003.

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ADVANCED ADHESIVES REPORT

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Leaders in the science
of making
good adhesives better™



Use Calciban™ to keep your glue rolls clean and efficient.

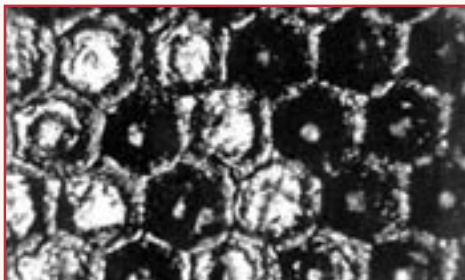
Calciban prevents calcium buildup that can cause adhesive transfer problems.

Inorganic compounds in your adhesive water can cause calcium buildup on your glue rolls. These deposits, which appear as a milky-white haze on the roll surface, clog cells and reduce the amount of adhesive the cells can carry. This creates a risk of bonding problems and increased waste.

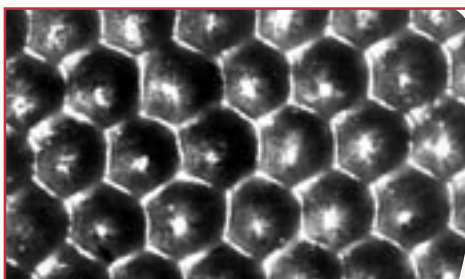
It also means lost productivity when you need to shut down for time-consuming cleaning operations.

Just 3 to 6 ounces of Calciban in a 700-gallon batch of adhesive can prevent this buildup and the problems it creates. It can be post-added to the batch, or to starch in a storage tank.

At just \$3.95 per pound, Calciban is low-cost insurance against the problems of calcium buildup.



The problem: Inorganic compounds in adhesive mix water can clog cells in your glue transfer rolls.



The solution: Used regularly, Calciban keeps glue-roll cells clean and efficient, for proper adhesive transfer.

Other uses for Calciban:

- Add to cooling water in closed-loop systems
- Add to flexo wash water
- Add to boiler feed water

To order, contact your local Harper/Love representative or call us toll free at 800-438-3066.