CASE STUDY: GEORGIA-PACIFIC REDUCES OUTSIDE FUEL COSTS AND INCREASES PROCESS EFFICIENCY WITH INSULATION UPGRADE PROGRAM

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ABSTRACT

A Georgia-Pacific plywood plant located in Madison, Georgia recently decided to insulate their steam lines for energy conservation, improved process efficiency and personnel protection. The goal of the project was to eliminate dependency on purchased fuel. Georgia-Pacific realized immediate and significant results and reduced fuel cost by about one third over a one year period.

OVERVIEW

Among Georgia-Pacific's environmental goals and principles is conservation and sustainable use of resources, including energy efficiency. Georgia-Pacific is committed to reducing the amount of fossil fuel and purchased electricity consumed per unit for product produced. The company seeks to improve efficiency through careful planning and increased use of self-generated and renewable fuels.

MADISON PLYWOOD PLANT

Built in 1979, the Madison plant uses Loblolly pine to manufacture the plywood. The tree is abundant in the area. Most of the trees harvested are from within a 180 mile radius of the mill. About 20% of the trees are grown on land owned by Georgia-Pacific and about 80% come from other privately owned land. The plant runs 24 hours, 7 days a week and employs approximately 400 people.

VENEER PLYWOOD PROCESS

The process of making the veneer layers in a plywood panel begins when logs arrive at the mill in sections. They are immediately debarked and soaked in water at 180°F for six hours. This softens the logs and enables them to peel better. The softening process also allows the logs to pass through the lathe much easier and delivers the veneer layers at the right temperature to the dryer where they are dried at temperatures of 405°F.

From the dryers, the veneer layers go to the glue line where layers are sandwiched with glue and then pressed into a panel. From there the panels go to the saw line for trimming before banding and shipping.

Because the steam lines to the dryer were uninsulated, heat was radiating out and BTUs were being lost. A loss of heat means a loss in pressure. And, because the lines were losing pressure, the result was reduced temperature.

GOAL: REDUCE DEPENDENCE ON PURCHASED FUEL

One of Georgia-Pacific's goals was to eliminate dependency on purchased fuel. Madison normally uses wood bark and wood by-products for fuel. However, at certain times of the year the bark is too thin for adequate fuel so additional fuel had to be purchased from an outside source.

DETERMINING THE THICKNESS OF INSULATION REQUIRED TO MEET GOALS

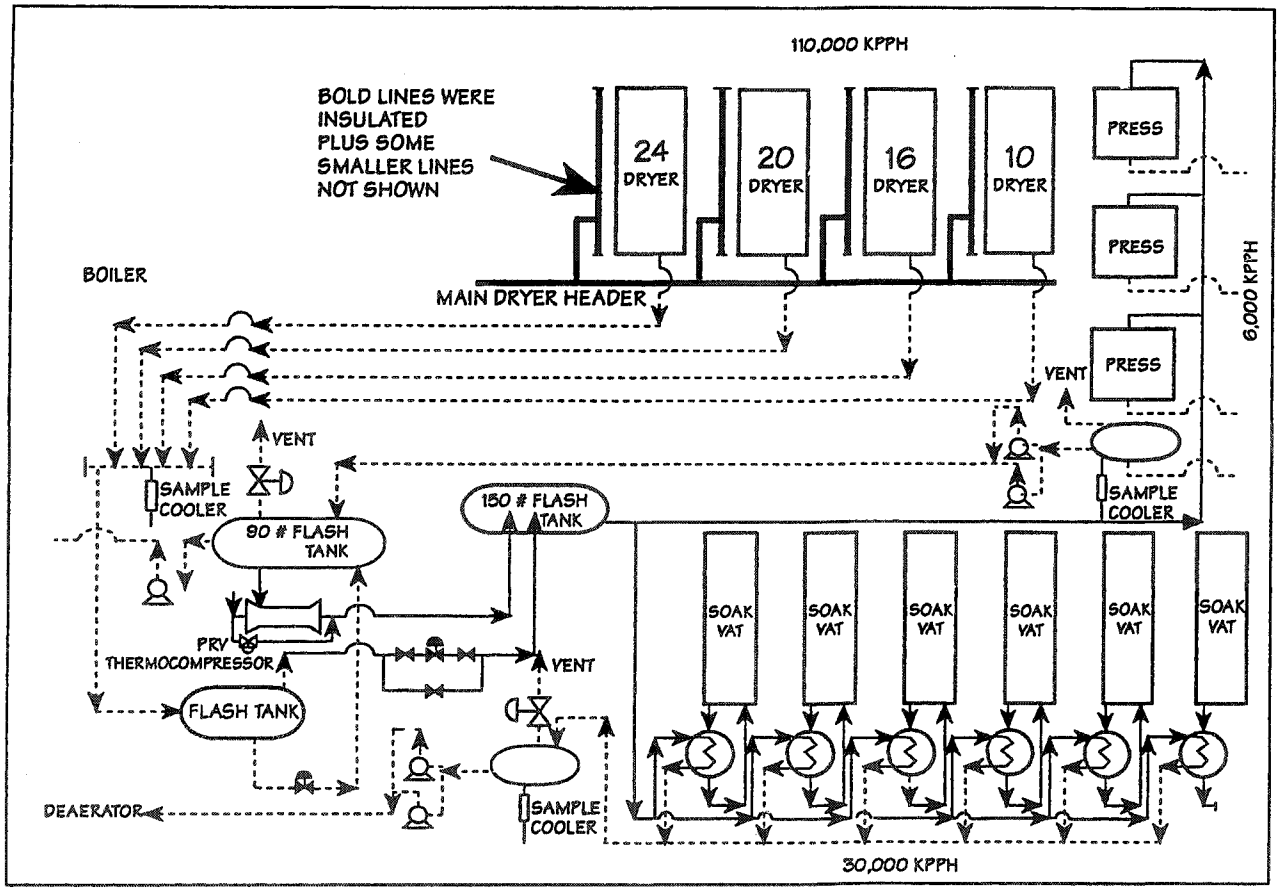
A computer program called 3E Plus from the North American Insulation Manufacturers Association (NAIMA) was used to determine the insulation thickness required to insulate the 1500 feet of saturated steam lines with temperatures operating at 437°F. Computer projections estimated that insulation would reduce the heat (BTU) loss along the steam lines leading to the dryers. This reduction in heat loss alone could increase the operating temperature by 15° and maintain the process temperature along the length of the lines. The combination of a

higher temperature in the dryer lines and a more consistent process line temperature would result in a faster and more efficient veneer plywood process.

INSULATION INSTALLED

The Madison plant installed 2" thick fiber glass pipe insulation. Two inches is the thickness needed to reduce heat loss, maintain process temperature and bring the surface temperatures of the pipes down. Computer calculations showed that 1-1/2" insulation would have been borderline and that a 2" thickness was preferable. Insulation footage was as follows: 120 ft. of insulation on 12" line; 200 ft. on 8" line, 220 feet on 6" line; 80 feet on 4" line and 350 feet on the 1-1/2" line.

Figure 1: The Georgia-Pacific Madison Steam and Condensate System



IMMEDIATE RESULTS

Improved Process Efficiency

While the project is not yet 100% complete, the lines to the mill's four dryers have all been insulated. According to Darryl Jackson, boiler superintendent at the Madison plant, "Gauging the increase in throughput has proven to be a bit more complex than we first thought. A more accurate gauge of the effectiveness of the insulation is the steam usage. The insulation has allowed us to cut our steam usage by approximately 6,000 lbs./hour. This is equivalent to saving about 18 tons of fuel per day. I can track these numbers with a totalizer so I know exactly what the dryers are pulling at any given time."

Dependence on Outside Fuel Eliminated

By insulating the piping, Georgia-Pacific has been able to eliminate the purchase of fuel. Says Jackson, "Currently we are selling some of our excess fuel to a paper company."

Reduction in Pollutants

By reducing fuel consumption, the Madison plant has been able to reduce the amount of ash being generated and landfilled. Georgia-Pacific estimates that the energy saved through insulation has reduced the amount of CO_2 emissions by 5 to 6%.

Increased Personnel Protection

Prior to installing the insulation, the piping in the Madison plant had a surface temperature of approximately 400°F. With insulation, the surface temperature has been reduced to approximately 85°F — a safer level for personnel protection.

ADDITIONAL SAVINGS

In addition to insulating the steam lines, Georgia-Pacific also replaced 70 steam traps. According to Jackson, "We've probably gained 10% condensate return from replacing the thermal dynamic traps. By increasing the condensate by 10% our savings will be approximately $86,000 per year based on an $8 per ton fuel cost."

TOTAL ENERGY SAVINGS

Georgia-Pacific estimates that the amount of energy saved by insulating the steam lines to the dryers and installing new steam traps is approximately 7,212,000 Btus per hour.

PAYBACK ON INITIAL INVESTMENT

Calculating how long it takes to pay back an initial insulation investment is an integral part of Georgia-Pacific's energy management program. Based on the results realized, the payback period at Madison was approximately six months.

NO DOWNTIME REQUIRED

A major advantage of using fiber glass insulation to insulate the steam lines was that no downtime was required. Several areas that could not be insulated while the line was running were insulated on scheduled down days. Says Jackson, "We do dryer maintenance once a week so the dryer is shut down during that time. That's when the insulation was installed on those areas that couldn't be accessed while the dryer was running."