HEAT-TIMER® CORPORATION

CASE NO. 14

BUILDING TYPE: _____

REQUIREMENT: _____

LOCATION: _____

Payback Is SWEET When Fannie May Installs MOD-4 Boiler Control

Problem: Chicago may be known as the city with "Big Shoulders", but it's also known for its soft centers. Chocolates, that is. For over a century, Chicago has been home to the one and only Fannie May Candy Factory—candy provider to the world.

For Paul Martyn, Chief Engineer at Fannie May, churning out chocolates is a bit more complicated than an *I Love Lucy* re-run may have you believe. Maintaining precise temperature control is essential to turning out a quality product. Martyn's job is further complicated by the fact that the same 4-boiler system provides steam for domestic hot water, building heat, and process cooking. As a result, he has to contend with wildly fluctuating demands that vary from day to day, and season to season.

The original control system, installed the same time as the (4) fire tube boilers in 1971, had to be manually controlled. In addition to tying up tremendous manpower, this method of control left the system vulnerable to human error—not to mention loss of product. Boilers were occasionally left on too long—while others grew cold leaving them susceptible to thermal shock. As facility workers struggled to manually sequence the boilers, the inevitable signs of thermal stress began to appear.

Solution: In 1997, the boilers underwent a major overhaul. It was an endeavor that Paul Martyn wanted to ensure was worthwhile. Specifically, he wanted to be able to control and sequence the boilers without incurring undue wear and tear on the equipment. For help, he turned to Chris Koepke of CB-Kramer Sales and Service, the Cleaver-Brooks representative in Illinois. Koepke immediately thought of Larry Maroff, the Heat-Timer Representative in Chicago, and the successes Maroff had had using Heat-Timer boiler controls.

"I first contacted Larry who suggested that we take a trip to the Chicago Fire Department Training Center," said Mr. Koepke. "Larry wanted me to see firsthand how well the Heat-Timer MOD-4 control worked. I was impressed. The next day I went to see Paul with the suggestion."

How Sweet It Is: ***Fuel Reduction Exceeds Expectations***

The 3 gentleman conducted a thorough analysis of the Fannie May factory application and concluded that installing a MOD-4 controller would result in a 10% reduction in fuel cost. That would translate into a payback of less than a year, making the project sufficiently appealing.

How The MOD-4 Works: The MOD-4 combines modulation, sequencing and Automatic Lead Stage rotation in a single control. Upon an initial call for heat the MOD-4 fires the first burner to a pre-selected level. If one boiler can't handle the load and more capacity is required, the control brings on a 2nd boiler, and then a 3rd, etc., always starting from low fire and modulating up. PID type logic allows the control to examine the rate

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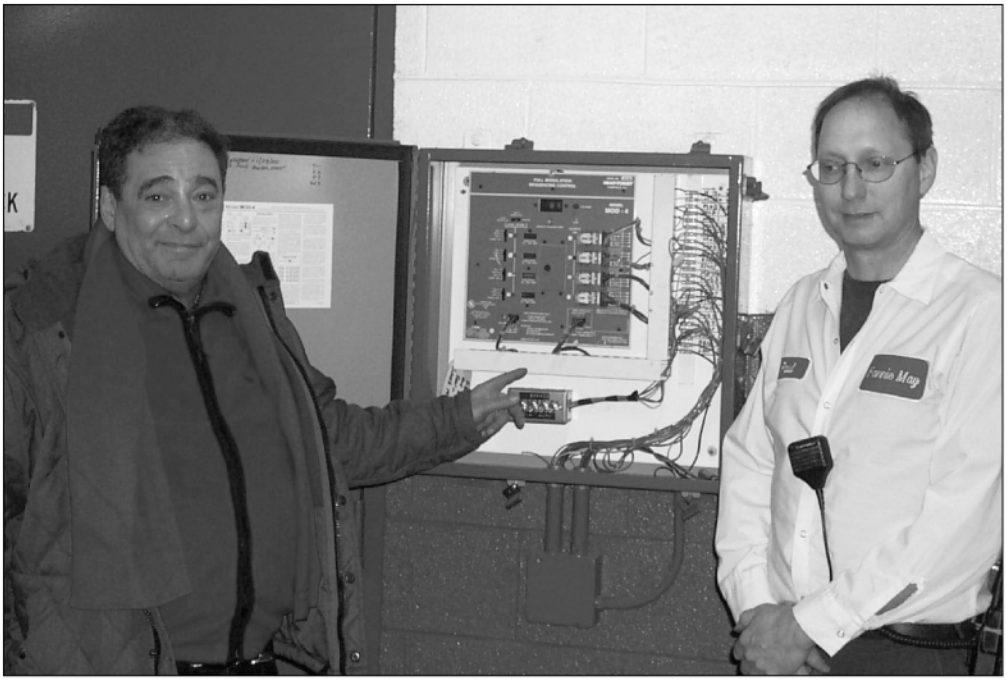


Larry Maroff (left) and Paul Martyn (right) had estimated a 10% reduction in fuel cost with the installation of this MOD-4 control. They achieved ***20%****.*

of change in the system temperature, so that the control backs off as the temperature approaches set point. This means that demand and energy input remain closely aligned, so that fuel consumption is kept to a minimum.

The installation of the MOD-4 proved a sweeter deal than anyone had anticipated. In fact, fuel reduction far exceeded everyone's expectations. While the plant typically operated at least 3 boilers year round, they found that with the new control system, they could usually meet demand in the summer with a single boiler and 2 or 3 boilers in the winter, plus maintain a more accurate set point. According to Paul Martyn, the fourth boiler is almost never needed.

"We estimated a 10% reduction in fuel cost and got a 20% reduction," said Mr. Martyn.

Operation Is Further Enhanced With New Processing Chip Developed By Heat-Timer

Even though the new control system had improved operation and energy consumption significantly, Mr. Martyn had some ideas for improvement. A change in the pattern of demand at the factory prompted him to inquire about the possibility of "tweaking" the control to make it better suit his purposes. He wanted to be able to rotate lead boilers more frequently than the 24-hour automatic rotation that the standard control provided.

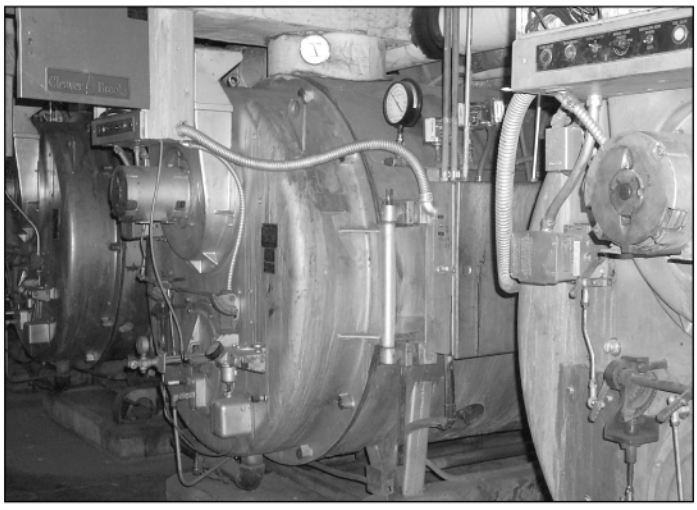
"At first we were rotating the lead boiler every 24 hours," said Mr. Martyn. "This meant that the lead boiler may only be on every 2-4 days, so it would cool way down, increasing the risk of thermal shock."

Mr. Martyn turned to Larry Maroff with his concerns. Maroff immediately began working with Heat-Timer to initiate development of a new chip which would allow Martyn to rotate boilers every 8 hours. Approximately one month later, the process chip was in place at the Fannie May factory.

In addition to more frequent rotation, this new chip extended the amount of time the secondary boiler spends at low fire. Previously, the secondary boiler would hold at low fire for 2-3 minutes before modulating up, or cycling off depending on demand. However, because the factory had such extreme and sudden fluctuations in demand, the secondary boiler was cycling off prematurely only to fire again minutes later because demand would suddenly shoot up. Thanks to Heat-Timer's modifications, the control is even better equipped to satisfy the factory's erratic demand patterns.

Chris Koepke credits Martyn's engineering skills for recognizing the need for additional fine tuning. He also has high praises for Heat-Timer.

"I've never seen a manufacturer respond so quickly to a customer's specific needs—particularly when it came to developing a new part," remarked Koepke. "It was really amazing."



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