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"The drawback (to TQM) is cost," he said, adding that consultants usually are involved at the beginning of the process, staff people on an ongoing basis. "I think some larger contractors can afford it, smaller ones can't."

But a formal TQM program pays off in the long run, Agosta maintained.

"It's all relative," he said. "It is expensive up front but the payback — more work because you will be allowed to be on a bid list, happy customers, you meet a deadline and have less rework — will be more than the cost."

## Momentum picking up

Interest has picked up in the past couple of years and will continue to do so, Agosta said.

"Major customers who put TQM in as a goal for suppliers are now expanding (the concept) to contractors — on any remodeling, new building, major repair work," he said, citing Ford, GM and the U.S. Army Corps of Engineers.

That's the understanding of Katherine Banicki, chief execu-

tive officer of Testing Engineers and Consultants.

She implemented a Quality Improvement Process at her Troy-based company a couple of years ago at a cost of about \$10,000.

"We felt a need to have a focus on our clients," she said. "Basically, all we have to sell is our service. We recognize internal customers as well as external. Many of our departments work together on projects."

"We did a lot of reading on different gurus on the quality management front and basically patterned ours after all of them," she said. "It has to fit. You can have someone come in and do it to you but it doesn't stick."

"You can spend anything from a few thousand to a few hundred thousand dollars," Banicki said. "We did our own, basically, but we did have some consultants come in."

Her company's Quality Improvement Process, which includes regularly-scheduled meetings, recorded minutes and action forms, is now monitored by a longtime staff member, she said.

# EPA mandates wood stove changes

(AP) — There are new environmental rules that lead to cleaner, more efficient wood stoves, according to Building Ideas magazine.

Back in the mid-1970s, wood stoves were as plentiful as whitetailed deer in a Rocky Mountain valley. Burning timber seemed a natural and honest way to heat a home.

But there was a problem. By 8 a.m. on any chilly winter morning, a smoky black haze as bad as a Los Angeles smog attack would chase the blue from the sky.

To combat this kind of pollution, individual states began enacting air-quality standards for wood-burning appliances. Then, in the late 1980s, the Environmental Protection Agency moved to establish national stove emissions standards. The EPA demanded cleaner-burning equipment by limiting the amount of microscopic, unburned hydrocarbon pollutants escaping as smoke.

Propelled by the new requirements, manufacturers of stoves and fireplaces have hammered out a whole new set of options for their customers. Because the

EPA laws took full effect in 1992, the universe of wood heat has expanded. Faced with the need to clean up sooty emissions, manufacturers have re-examined both the stoves and the fuels to find a solution. Their answers are available in stores today:

■ Pellet stoves. Here's a cleaner idea for those who find the concept of cordwood a bit messy. Instead of burning timber, pellet stoves burn stubby, inch-long pieces of recycled waste compressed bits of combustible materials, such as sawdust, sunflower seed hulls and cardboard.

This is the wood stove for folks who dislike all the chopping and carrying. Just load pellets into a bin in the back of the stove, set a thermostat and the slow-burning fuel will be into a fire lasting as long as 60 hours.

This recent addition to the marketplace is catching on with consumers. For 1991, the Hearth Products Association reports that cordwood-burning stove sales were down about 8 percent from the previous year. But sales of the more expensive pellet stove had increased almost 20 percent in the same period. In 1991, 185,000

cordwood stoves and about 60,000 pellet stoves were sold.

■ Catalytic stoves. When automotive engineers looked for a way to dampen noxious car emissions, they bolted the catalytic converter in place. Similar technology is now being designed into wood stoves.

The hurdle for engineers is to lower the temperature of smoke within the stove so more gases will be broken down. A catalytic combustor helps lower smoke temperature from 1,200 degrees to about 600 degrees. The desired result is achieved as far fewer gases go up the chimney and into the atmosphere.

Though these catalytic stoves burn significantly cleaner than most of their noncatalytic rivals, the catalyst must be replaced periodically (in about six years with average use) at a cost of about \$100.

■ Noncatalytic stoves. A number of clean-burning noncatalytic stoves are on the market as well. These effectively handle the smoke by routing it through a series of chambers where it will burn.

■ Gas fireplaces. Among people with more interest in an occasional firelight show than a primary heat source, fireplaces that burn natural gas are gaining popularity. A red glow is ready at the flick of a switch, and it's difficult to tell the difference between these flames and those in a wood fire.

These systems also offer a distinct installation advantage. They can accept a zero-clearance chimney, which fits neatly inside a wall. No bulky, space-consuming brick chimney is necessary.

When considering the purchase of any of these products, you should ask yourself: Is this to be one of my home's primary heat sources? Is cordwood readily available where I live? Are pellets readily available where I live? How involved with heating chores do I want to become? How often will I really use this stove?

For additional information, send for the free booklet "Buying an EPA-Certified Wood Stove." It lists certified stoves and ranks their emissions. Write to Federal Programs Section (EN-541), U.S. EPA, 401 M St., SW, Washington, DC 20460.

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