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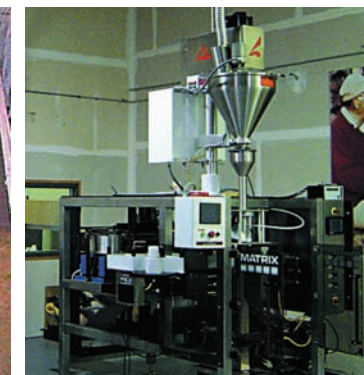
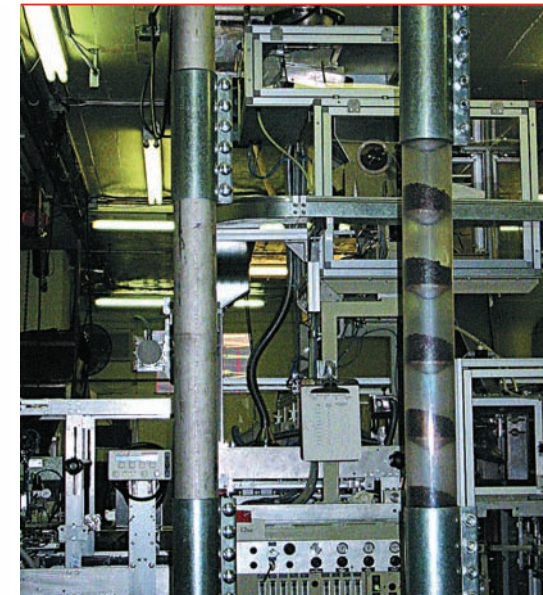
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# Process Automation

BY TIMOTHY J. CASTLE  
AND DEBORAH DE CUIR  
AND KARL SEIDEL



Assorted roasting and conveying equipment: Top, left – Diedrich; Top, right – Cablevey. Middle Row: Cablevey installations; Bottom: Diedrich

Upgrading your roasting plant is tricky business. On the one hand, the advantages of upgrading are always very palpable before any new equipment acquisitions are made. The entire plant may seem inefficient, outmoded and running hopelessly over its capacity. Labor costs, too, seem way too high and other roasters are telling your customers how their newer plants roast better and ensure freshness through greater efficiency and competency at every stage of the roasting and packaging process.

But, on the other hand, horror stories abound of roasters installing plants only to find later that certain components don't mesh with each other. Once you're set up, you come to find that after all the daily tinkering, calibrating and readjusting, not to mention the missed shifts and overtime due to plant downtime, labor costs actually increased. Not only that, the new packaging schemes you've adopted, while shiny and new, are unpopular with your customers because the new format doesn't fit in the allocated shelf space and the bags are easily crumpled (the retail customer likes your new product so much they paw and manhandle every single bag before making a purchase decision — thus, you guessed it, wrinkling each and every bag before they walk down the aisle with 12 oz. of coffee.

#### SOME RULES OF THUMB:

Remember, the equipment you buy today may be the used equipment you've outgrown and want to sell tomorrow. Just like a car, resale value, the reputation and longevity of the vendor, and the standards to which your equipment is built are all important. It may not matter to you that your equipment meets international standards, for instance, but it may be to a future buyer, and this can give you a wider market when the day comes to sell. Are parts readily available? Any chance parts will be available 20 years from now?

Make sure that the equipment pieces that you're buying get along with each other. If you've got one company overseeing your installation, they're responsible, if not, you need to make sure



**Diedrich installation.**

Diedrich sells an automation called the Diedrich Automated Roast Control System. It can be used on any roaster, not just Diedrich roasters. Their system for in-store roasters looks like a tall box with a touch screen on the top. It can save or edit over 40 roast profiles and duplicate exact parameters. It has a nifty “teach function” that saves manually roasted profiles on the spot, and has other features like password protection. The commercial version looks more like a slimmed-down monitor on a mount arm, with a 10 or 12-inch color touch screen. “These features give the roastmaster precise control. We developed these criteria to modify any roasting system. We’ll overbuild before we take any shortcuts. We could retrofit roasters, but you still have the same grade of equipment unless you start with the auto system.”

How did Diedrich’s automation of roast profiles evolve? “Having to work with a live biological product like coffee made it necessary. We were concerned with duplicating things like temperature, airflow, and timing. We had a Siemens engineer who helped us out. Automation used to be a modulating gas system where only two or three target temperatures get developed for the roasts.” The Diedrich system doesn’t have those limitations. “It records in milliseconds and reports the roast profile in progress every 15 seconds” via a digital display. “It can store many profiles. We’re pretty relentless about the pursuit of precision, detail, and quality.”

We also spoke with Tim Reardon, product marketing manager at Key Technology in Walla Walla, Washington. In business since 1948, they specialize in automated innovations for processing food, tobacco, plastics, and other products. Their solutions include optical sorting, shape-based sorting, and systems that are able to make rapid decisions on

large volumes, sometimes where channel sorters cannot. They’ve been working in the coffee trade for about nine years but not so much with individual roasters as with plants and manufacturing (a fascinating technology that will be discussed further in a follow-up article).

We then spoke with Gary Hall, c.e.o. of Cablevey, Iowa, in business since 1974. They specialize in conveyor systems for the industrial and agriculture sectors. Hall’s father and uncle started in agribusiness, and today Cablevey is involved with all aspects of enclosed tubular drag conveyor systems.


“Our system is very flexible,” said Hall. “It enables clients to use their processing space. As they grow, they can add onto their conveyors. There is an acrylic tube to view the process and the client can handle the material without degrading the coffee product. The coffee business took a long time to appreciate this kind of automation. But Cablevey also didn’t see the coffee industry as a market — at first. Now many installations have occurred for coffee roasters, especially in the last 5 years.”

One coffee roasting company, for example, wanted a system that was sealed so that nitrogen could be contained and the aroma quality preserved. They went directly to the Cablevey factory to test flavored and unflavored coffees. The smallest installation they have done so far for coffee roasters is half a million pounds, but they can do installations as inexpensively as \$5,000, perhaps for spices or tea. The roasted bean or ground coffee may move through the plant by conveyor in different ways depending on the necessary sequence (roasting, flavoring, grinding, packaging). Thanks to the Cablevey clean-out disk that passes through the tube as the process unfolds, there is no residual fla-

vor. It’s a urethane disk that is a little larger than the tube itself and wipes the tube clean.

Hall told us about many installations that Cablevey has completed, including for Green Mountain Coffee, Paul Newman’s Shape, Van Houtte’s, Wrigley’s Gum, and Unique Coffee, Staten Island. “But no tea applications have come in yet!” He also told us about Cablevey’s work with breweries, pet food systems, pellet integrity, the Bong Brothers in Hawaii. “One of the first installations Cablevey ever did in coffee was for a small roastery in Kansas City.” The owner had seen Cablevey in Boston two years earlier and was so taken he wanted it for himself.

“Our tubular drag conveyor system has a slow, slow speed. Every six inches a hockey-puck sized device gets dragged through the line. And we have two inch, four inch, and six inch systems.” Those options offer a lot of flexibility for both small and large coffee/tea applications. “What the coffee industry especially likes is that there is less than 1% breakage with our system as compared to 5-6% breakage using a bucket system. I’ve been in a roaster where they are still using bucket elevators and pneumatic conveying systems for their operations. Our system works because of the disks. They act like a rail car. And when the car stops, the product has arrived, undamaged!” he exclaimed enthusiastically.

Equipment purchases are, by definition, capital intensive, even the decision to research an equipment purchase can munch up considerable resources of time and energy. Once it becomes absolutely necessary to buy a piece of equipment it is then essential to go forward, carefully and with all the diligence you can muster. It may seem extravagant, for example, to fly half way around the world to see a piece of equipment in action. But, on the other hand, not nearly as profligate as installing machinery in your plant that may haunt you and your employees for years to come...and not because there was anything wrong with it, but because it didn’t work in your plant. 

**WEBSITE LINKS:**

- <http://www.scolarieng.com/>
- <http://www.diedrichroasters.com/>
- <http://www.key.net/>
- <http://www.cablevey.com/>

*Timothy J. Castle, a California-based broker of coffee and tea is a past president of the SCAA and has also been awarded “Distinguished Author” by the SCAA. He has written several books and contributes to various trade publications. 7*

that your conveyor doesn’t convey faster than your roaster can roast.

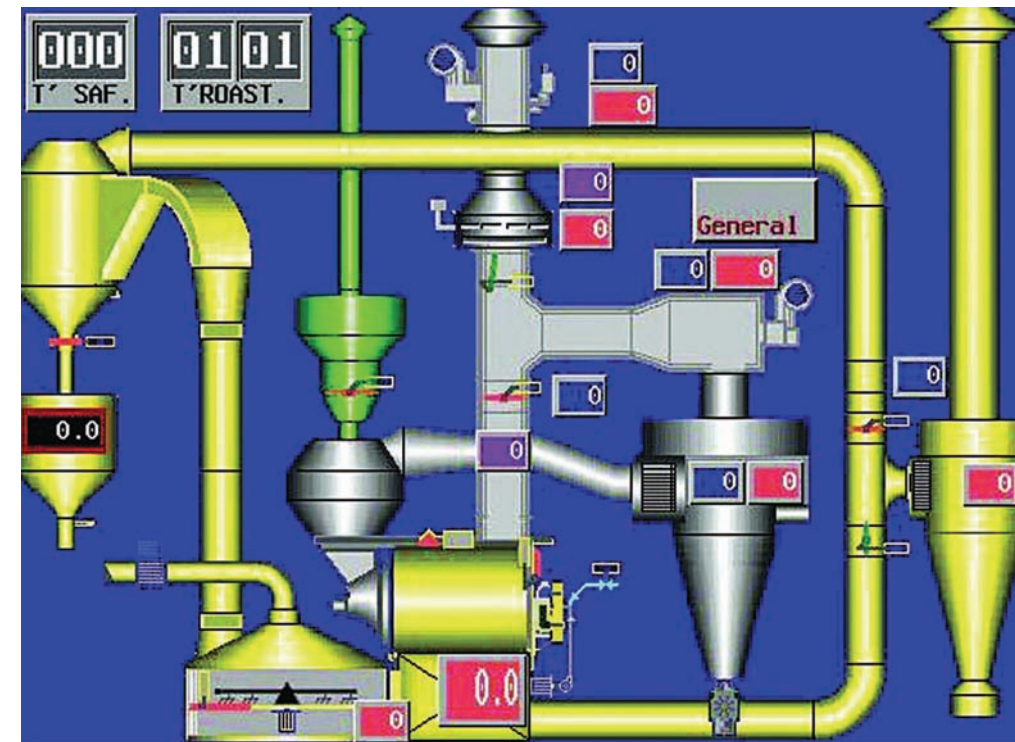
Get references from your potential vendors and contact them, don’t assume that they will all be glowing referrals, some contacts may not even know they’re on the list.

Since, as we all know, the roasting community is all one big happy family, ask to visit and observe, perhaps even operate the equipment you’re contemplating at another plant. Seriously, coffee roasters are the most sharing people on earth.

All that said, we spoke with a few well-known equipment vendors to get their take on what’s going on in the industry. While they all had a different perspective, each of those perspectives was from the right now, and each recommended a thorough, well-researched and systematic approach toward the purchase and installation of ANY new equipment.

We first spoke with Howard Weiss, the general manager of Texpak Incorporated, which exclusively represents Scolari Engineering in the USA and Canada. Before World War II, Scolari had bought a company that produced roasting machines for various roasting needs but now they concentrate on coffee. Weiss explains that Scolari Engineering (in Milan, Italy) was the first company to sell commercial roasters driven by PCs. They got into that business more deeply after the IBM personal computer was developed. “Our systems have a lot of information that is important to clients. We have factory integration that ties into the enterprise’s own operational software and affects everything from sales and packaging materials to different types of coffee.”

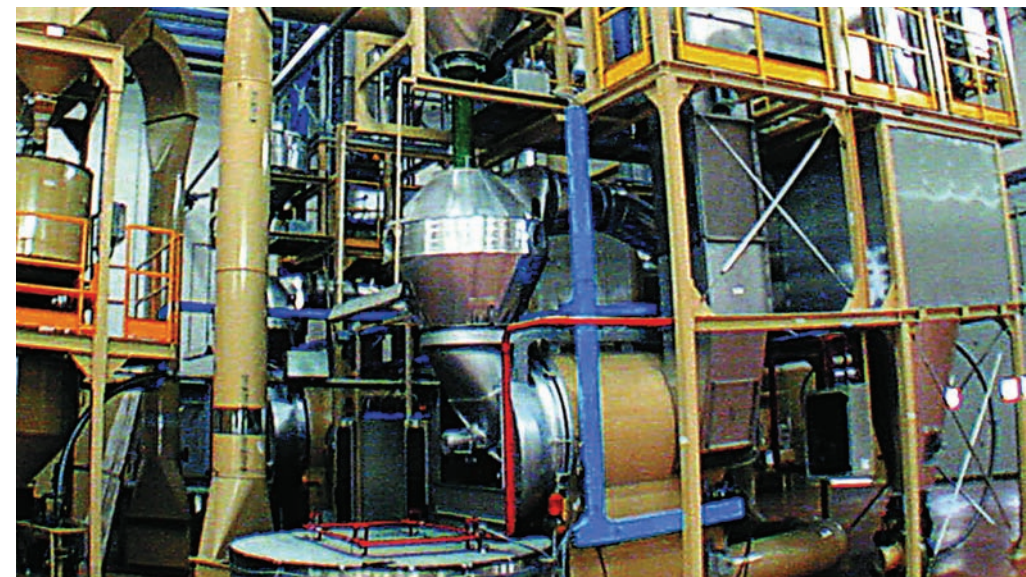
“We make continual improvement on our programs,” said Weiss. “We’ve got several hundred roasters on our PCs that help us improve what we’re doing by giving us input because roasters do things in their own unique way. The computer gives the



**Roasting schematic from Scolari.**

roaster operator a better set of tools. It plays a role even in the consistency of the roast, and in barometric pressure. The roaster may elect to use many or few of the tools, but giving them the tools allows them to do a better job.” A 6-bag drum roaster is not an unusual job size for Scolari, but Weiss said they are proud of the details.

Green and roasted silo systems are computerized so when a green batch of coffee is made, the computer can download the parameters of that particular coffee. “Through the use of the computer we’ve also improved the conveying of coffee,” said Weiss. “The lots are tracked through the entire production process. This is important especially if you’ve ever had product recall. Roasters can be very technical, so the cost of the controls themselves can get expensive.



**Scolari roasting installation.**

But as the coffee moves, it gets tracked, and that gives control. The roaster ultimately will yield a better and much more consistent product because of the tools and technology offered. You’d be surprised at some of the technology that’s still being used out there,” exclaimed Weiss, “80-90 years old!”

Any advice to those contemplating automation? “It’s better if companies go one step at a time to upgrade and update their automated systems. They can do green coffee one year, roasted coffee the next year.” Weiss added that it really isn’t all about bells and whistles: “You know, customers can taste the difference between Scolari grinders and the older style grinders that are not computerized. Our grinder has enough difference that it can be tasted.”

We next spoke with Michael Whitley, director of sales and marketing and acting general manager for Diedrich Roasters in Sandpoint, Idaho. He said that automation helps a roaster duplicate favorite profiles and wear many hats. Diedrich concentrates on how to get the roast profile absolutely consistent. Whitley acknowledged all the fads and trends, but said Diedrich’s is different. “Our standard is for slow, controlled growth. It’s a family business with a passion to develop very high quality roasting profiles. We develop roasters, equipment and roastmasters (through Diedrich training programs) that address the growth of any business as a whole, not just spot training. It’s important to ensure quality and consistency from growing and harvesting, to the roast profile itself. Any roaster can now store, edit, modify and duplicate roast profiles accurately. This really expands the roaster’s and the business owner’s toolbox.”