

BUILDING *a MID- to LARGE-SCALE* SPECIALTY COFFEE ROASTING PLANT

A Practical Approach to an Epic Challenge



PART 1 OF 2 * PREPARING *to* WORK

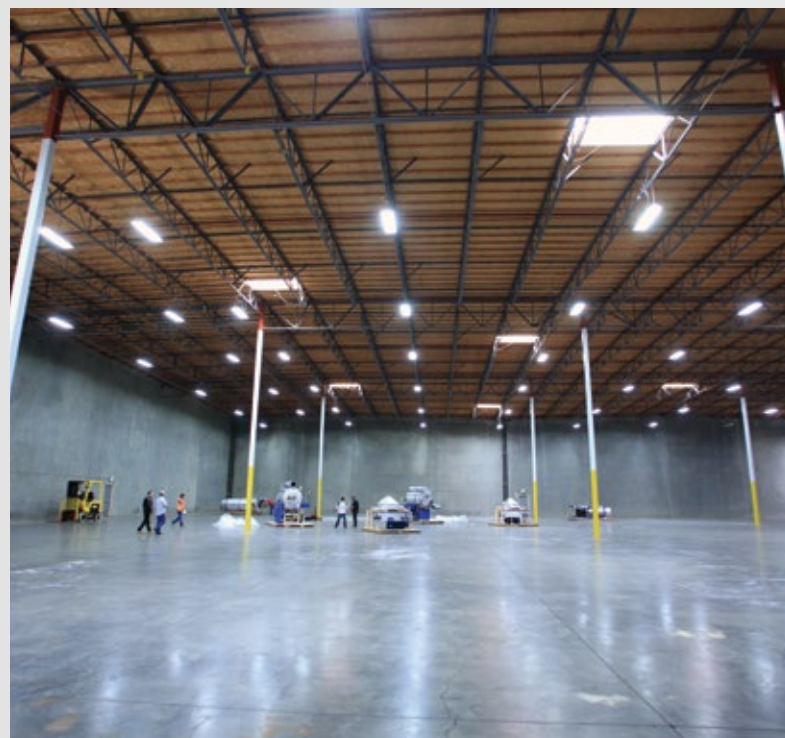
By Andi Trindle Mersch

MORE THAN 2,000 YEARS AGO, one of history's greatest thinkers somehow cut the master key to successful project planning when he wrote, "First, have a definite clear, practical ideal; a goal, an objective. Second, have the necessary means to achieve your ends; wisdom, money, materials and methods. Third, adjust all your means to that end."

This straightforward directive, attributed to the ancient Greek philosopher and scientist Aristotle, aptly

applies to the monumental task of building a specialty coffee roasting plant. If you follow it, drink a lot of coffee along the way, and heed the words of Brett Israelson of Kaldi's Coffee Roasting Company in St. Louis to "prepare to hyper-age at a rate previously unknown to mankind," you may actually be prepared—practically and emotionally—to survive the inevitably longer-than-you-think journey.

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The crew at Philz Coffee during construction of the company's Oakland, California, roastery. | Photos by Ramin Lee



La Colombe head roaster Chris Miller inside the company's new roaster. Photos courtesy of La Colombe Coffee Roasters

Assuming that most who embark on this journey want to do more than simply survive, this two-part series is intended to provide a practical methodology to guide you as expeditiously as possible from the idea of building a roasting plant to the reality of operating one. This first installment details the initial steps of the planning process—developing a master vision plan and preparing to begin work. Part 2, which will appear in *Roast's* March/April 2017 issue, will cover budget development, design, and the multiple components involved in implementing that design.

Our focus in this series is on mid- to large-sized specialty coffee roasting plants expecting to process 1 million or more pounds annually, roasting plants where green and roasted handling systems are generally required in addition to roasting machines. That said, I expect there's plenty of overlap in preparation, planning and pitfall avoidance between these companies and smaller ones.

Some commercial roasting companies may roast as much as 100 million pounds per year, according to Dan Ephraim, president of Modern Process Equipment (MPE), based in Chicago. This article is not targeted toward facilities that massive.

✦ PHASE 1 ✦ CREATE A MASTER VISION PLAN

According to Karl Schmidt, former president of Probat USA, the starting point "is not about your roasting machine; finding a roaster is the easy part." Many passionate and often highly experienced coffee roasters assume that choosing a roasting machine, which surely will hold the heart of your new or expanded operation, is the first and most essential task. I did. In retrospect, I see Schmidt is right when he recommends writing a master vision plan as the first crucial order of business.

This advice is echoed by Ephraim, who recommends clients start with a "5,000-foot view" of the overall project, allowing them to "develop an order of magnitude on the kind of space and resources necessary to move forward."

Michael Whitley, a consultant with Alliance Service Network and Spark Coffee Technologies who has helped many companies design and build roasting facilities, adds that "failure to invest the time needed for planning the entire project" is the most common mistake he sees companies making.

So, how does one write a master vision plan for a roasting plant?

Before you do anything else, heed the advice of Launtia Taylor, former vice president of marketing and communications for Probat USA, and prepare to "plan out for 10 years or more." A common pitfall companies make is investing substantial time and money in a new roasting plant only to realize within the first one to three years of operation—a shorter timeframe than the design and build-out process in some cases—that they already feel squeezed. Don't fall prey to such nearsighted vision.

After you get your long-term thinking lens on, identifying the "five Ws"—who, what, where, when and why—will offer a straightforward and useful approach to writing your master plan. As you'll see, many of your big decisions can be knocked off simply by taking the time to systematically address the five Ws.

Let's start with the "why." Why are you building a roasting plant? Consider your overall company vision and mission, and let them guide your vision for your roasting plant. Whatever vision you have for your company—market dominance, excellence, customer service, profitability or something else—"have a clear, practical ideal" (as Aristotle suggested) of how a roasting plant fits into that vision. Will it help you scale your business, give you ownership of your quality, bring prestige, or save you money? Potentially, it will do all of these.

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BUILDING ✦ Part 1 of 2: Preparing to Work | CONTINUED

but it's important to identify the key reason you are building your plant so you can make sure everyone involved in the process is in alignment with this project vision. Clarifying your definitive endgame will help guide you through many decisions along the way.

For example, if your ultimate goal—your “why”—is to elevate quality, you might make a different decision about equipment than you would if your primary goal is to save money. While it seems obvious to use that lens when considering equipment choices, things muddy quickly in a project this big, and it's easy to compromise your ultimate vision for a secondary one or for in-the-moment concerns, like a relatively minor budget or time overage.



Remember to include space for a cupping lab and other quality assurance and research and development activities when planning your new facility. | Photo by Ramin Lee

Identifying the “who” is a good next step in developing your master plan. Who are your customers? Are you planning to serve your own retail customers, grocery store customers, offices or distributors? Are you a private-label roaster, roasting beans to your clients' specifications and product vision? Some companies serve a combination of these customers, while others focus exclusively on one type. Knowing your target customer(s) before designing your plant can help expedite decision making.

As an example, if you're roasting predominantly for your own retail customers and have a quality-driven vision, you might choose to purchase multiple smaller roasting machines to allow greater flexibility, smaller batch sizes and an artisanal approach to roasting. On the other hand, if you're roasting principally to supply grocery stores, a need for efficiency and absolute consistency may drive you to select a single larger machine. The style of roasting machine—i.e., drum, infrared, continuous, etc.—may be directed by similar considerations. (Note that part 2 of this series will address equipment selection criteria in detail; the above examples are merely meant to illustrate how considering your “who” might frame your early thinking.)

The “what” comes into play as you consider your final product. What will you produce in your roasting plant? Think beyond roasted beans to how you're going to package and distribute your coffee. See “Crafting a Product Plan” on page 30 for a list of product-defining questions, and incorporate

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your answers into your business plan. Each response will impact numerous choices throughout the design process.

The "where" question is considered by many as the most critical consideration. Where will you locate your roastery? As Schmidt says, the adage "location, location, location" that applies in retail is equally, though not as obviously, important in choosing the

location for your roasting plant. For a large-scale roasting plant, location isn't going to be motivated by heavy foot traffic (though it might be for smaller ones), but it should be inspired by careful consideration of the list that follows.

It's important to note that it can be difficult to pinpoint the ideal location before you complete the design of your facility. It's

possible that you won't be able to settle on a specific building until you're farther along in the design process. Keep in mind, however, that the right real estate can be difficult to find, depending on your general location, and the search can add many months to your timeline. At a minimum, home in on an area or areas that will work for you based on the following parameters, and start talking to a real estate partner early.

- Where is your ideal location? Consider distribution channels, current or future employees' commute time and safety, company history and community ties, etc.
- Can you roast coffee in this location? This question is particularly important, and sometimes overlooked. Before you sign a lease, make sure your operation can comply with city and state ordinances and you can meet air-quality permit standards, which might include restrictions on the proximity to schools and residences, or other regulations that could impact your ability to conduct business.
- Are the local planning and building departments easy to work with, or are they known for being difficult to navigate?
- How much square footage do you need? Review your product list and make an educated guess on a minimum amount of space you'll need, as well as a maximum amount you anticipate will be worth the cost. Don't forget to include space for a quality assurance lab, research and development, administrative operations, and other necessary and desirable functions.
- What is the traffic flow into and out of the facility, and can it accommodate your inbound and outbound shipments?
- How much onsite green bean storage do you need/want? How close are you to offsite green coffee storage? Think about the space you'll need for staging green beans, and whether you'll want to segregate your green coffee from other goods.
- Do you need a certain ceiling height? This is one of the criteria that can be difficult

to establish before you've designed your facility, but I recommend from experience that if you anticipate automated green and/or roasted handling systems, a ceiling height of 30 feet or more is not excessive, and may be necessary unless you can significantly increase your square footage or securely mount heavy equipment on the roof.

- Does the facility have adequate gas, electric and plumbing, and/or can you build time into your plan to have them installed? If utility upgrades will be needed, don't underestimate the time this can add to your schedule. Chris Miller, lead roaster at La Colombe Coffee Roasters in Philadelphia, experienced a delay of several months in his company's facility build-out while waiting for the utility company to upgrade gas into the building. At Philz Coffee, we added nearly six months for major electrical upgrades to our new roasting plant in Oakland, California.
- Is the facility capable of meeting food safety standards required under the Food Safety Modernization Act (FSMA)? These regulations require roasters to have a written food safety plan and a hazard analysis and critical control points (HACCP) plan, which involves establishing good manufacturing practices (GMPs). When it comes to selecting a location for your facility, that means making sure the building is solid and secure, there is no issue with standing water, adjacent sites are not rundown or insect- and/or rodent-infested, dock doors seal, there are proper bathrooms and hand-washing facilities, and more.

We're tackling the "when" question last because, frustratingly, it's the one over which you will have the least control. There isn't a pat answer to how long you can expect it to take to get from master plan to design to construction to installation to commissioning to operations. (By the way, that last sentence includes a preview of some of the steps we'll detail as we establish a timeline and project plan.)

What you can and should do, however, is establish a target operational start date, allowing decidedly more time than

you think you will need, then control what you can in the planning phase to keep the project on target for your timeline goal. Israelson, who was involved in relocating and expanding Kaldi's existing roasting plant, notes that his company's timeline was successfully established by starting with an end date in mind.

"We knew we wanted to move late spring

as our business slowed," he says, "so we picked a realistic date and worked backward from there. This approach worked really well for us."

Even for entirely new roasting operations, working backward from a target operational start date is recommended, though it is undoubtedly challenging and often frustrating

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CRAFTING a PRODUCT PLAN



Photo by Ramin Lee

Designing and building your new roasting plant will be more efficient if everyone involved is clear about exactly what you will produce in it. To establish that clarity, answer each of the questions below, then convert your answers into a concise statement to share with your design team and vendors along the way.

- ARE YOU SELLING single-origins, blends or both? If you are selling blends, are you blending before or after roasting?
- ARE YOU SELLING ground coffee, whole-bean or both?
- HOW MANY TOTAL SKUs will you produce? [Schmidt recommends taking this opportunity to consider the question, "Do we need so many?"]
- HOW MUCH OF EACH SKU do you expect you will need to produce daily, weekly, yearly? Remember, think 10 years out or more.
- WHAT SIZE PACKAGING will you be using—bulk (3 to 5 pounds), 12- or 16-ounce bags, fractional packaging, single-serve, canisters, other?
- WHAT SHELF LIFE do you need to achieve, and what packaging do you need to achieve it? Will you nitrogen flush? Remember to incorporate transit time from your plant to your customer in determining shelf life.
- DO YOU HAVE SPECIFIC DESIGN REQUIREMENTS for your packaging? While it may seem early to think about packaging design, visual and text design requirements can impact whether or not a particular packaging machine will work.
- WILL YOU FLAVOR coffee? If so, you'll need dedicated equipment and an isolated room with proper ventilation to keep flavor migration fully contained.
- WILL YOU cold brew?
- WHAT OTHER PRODUCTS will you produce and/or store in this facility?

because there are so many unknowns. It's nearly impossible to construct a realistic timeline before you secure your space, complete your facility design, and select and place purchase orders for major equipment. Those tasks are particularly influential on your timeline and, without them, in many ways you are simply throwing a dart. Nonetheless, in almost every business environment with budgets and ROIs

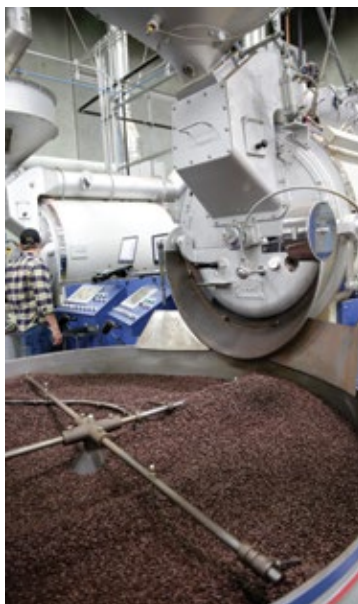


Photo by Ramin Lee

(return on investments) to meet, you'll have to throw the dart before you're ready. The best advice is simply to prepare to embrace mystery and endure ambiguity, as the when is difficult to pinpoint early on.

The good news is that if you take the time to craft a detailed project plan, breaking out the various phases of your project, you will be able to fine-tune realistic timelines for particular phases. From there, at some point, you'll hit the bullseye on a date for day one of operations.

✧ PHASE 2 ✧ PREPARING FOR THE WORK

Once you've envisioned your roasting plant, documented it in a master vision plan and secured alignment throughout your organization, you can dive in and design your plant, right?

Not quite yet. Take one more important "thinking before doing" pause to plan the all-important "how."

Planning how you will work and settling a few philosophical design questions is a critical, final pre-work phase. It's easy to get antsy for action and pull the trigger on a lease or long-lead-time equipment purchase orders, especially if you've spent significant time writing a master plan.

Darryl Blunk, president and CEO of Apffel's Fine Coffees in Santa Fe Springs, California, has counseled a number of other companies after the successful build-out of Apffel's 90,000-square-foot roasting plant in 2004. He and Taylor both note that the biggest mistake they see other companies make is not taking enough time at this stage of project planning. So, as frustrating as it may be, take the time to complete the following steps before you draw up your blueprints.

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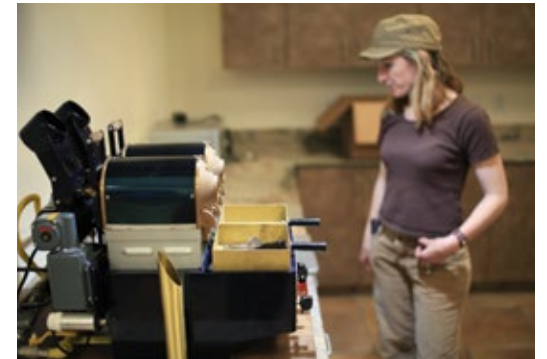
The Philz Coffee team at work. | Photo by Ramin Lee

STEP 1 | DETERMINE YOUR DESIGN APPROACH

There are two overarching ways to approach facility design. One option is to work with a single engineering/equipment vendor to design all of your roasting and handling systems. Alternatively, you may want to take a more piecemeal approach and choose different vendors for different areas—one for roasting equipment, one for handling system, another for packaging equipment, and so on.

There are pros and cons to each approach and no definitive answer on which is more expensive in the end. In short, a total package design is generally more efficient during the design phase, with fewer options and fewer vendor decisions to make. Furthermore, one firm is responsible for ensuring that all the systems work together, which can save you headaches during the commissioning and startup phases.

On the other hand, the piecemeal approach allows for more flexibility in your design, more opportunities for cost savings, and more project partners with deeper layers of experience in their particular areas. If your business is unique, you may find you need to work with different vendors to achieve the design that fits your business and operations model. There isn't a right or wrong design approach; you just need to make a choice based on your company's needs and prepare yourself to live with the consequences.



Include members of your production team in the design process to optimize equipment selection, layout and workflow. | Photo by Ramin Lee

STEP 2 | PICK YOUR PERFECT PEOPLE

Regardless of your design approach, you need great people on the project, ideally a mix of internal and external experts. Internally, your team should involve appropriate leadership for vision focus and higher-level budget oversight, an experienced project planner, a coffee product expert and, perhaps most importantly, representation from the production line, if in place.

"Use your production team," Israelson advises. "Ask for their input for layout and process planning in regard to their specific department or process."

Often, the employees doing the work and using the equipment offer the best ideas for designing workflow, which in turn directs the best facility layout and equipment choices.

While it's ideal to incorporate and capitalize on employee knowledge, it's also highly advisable to reach outside your company

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TOP La Colombe owners Todd Carmichael (left) and Jean-Philippe Iberti examine the cooling tray for the company's new roaster. **BOTTOM LEFT** La Colombe's new roaster, during installation. **BOTTOM RIGHT** Parts of La Colombe's new roaster, waiting to be assembled. | Photos courtesy of La Colombe Coffee Roasters

for free and paid guidance in areas where your staff might lack experience. Unless you have already built a roasting facility, there is a high probability you do not have all of the expertise you need to most efficiently manage the project.

Don't be afraid to reach out to industry friends and acquaintances and potential vendors and ask for their opinions and advice. Leverage your industry connections and professional network to visit other plants, both coffee and non-coffee focused, to learn from others' mistakes and avoid pitfalls. While working on the design for Philz Coffee's 50,000-square-foot roasting plant, I relied extensively on the generous time of many industry friends and potential vendors, the latter willing to invest free time in the hope of becoming a partner. Every bit of information I received was useful.

That said, don't limit yourself to free advice. Consider investing in an experienced consultant or consulting team to help you navigate design decisions, assist in project and timeline management, and potentially even engage in discussions with architects, engineers, contractors and city planning officials. In addition to providing needed expertise that will save you time and money, external consultants can help manage the load. The sheer volume of tasks involved in a project of this scope—from the large to the minute—can be overwhelming, particularly if your internal team continues to manage its daily activities. Whitley frequently has seen the "underestimation of time required to manage a project of this scale lead to decision fatigue," he says, resulting in project delays as daily responsibilities and project-based accountabilities compete.

STEP 3 | CHOOSE AND USE SYSTEMS TOOLS

Don't underestimate the need for project-planning and other system tools. This is a massive project with many components. Ideally, use cloud-based project-planning tools such as Wrike, Asana or Trello to manage communications, timelines and budget conversations. With many different components and players still to enter the game, emails quickly become overwhelming and conversations disjointed. At a minimum, as Whitley recommends, establish a collaborative platform such as Dropbox or Google Drive to facilitate participation.

Ephraim also suggests having the latest design resources available, such as 3D modeling, to "eliminate issues down the installation road." He adds that someone on your team needs extensive experience with the software to make the best use of these tools.

STEP 4 | CLARIFY YOUR DESIRED LEVEL OF AUTOMATION

Are you striving for highly automated, semi-automated, or mostly manual operations? This question may have been addressed in your vision plan as you answered the "what" product questions or the "why" motivation questions, but sometimes it isn't clear. Your design team can move much more quickly through its work if all participants fully understand the company's general operational philosophy.

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Consider all the activities your staff will perform when estimating space needs and designing your new plant. | Photo by Ramin Lee

STEP 5 | GO!

Stay tuned for the second installment in this two-part series, which will appear in *Roast's* March/April 2017 issue. Having covered the critical pre-work, visioning, and gathering the right team and tools in this installment, part 2 will move into action as we address budgeting, facility design, equipment and vendor selection, site preparation, installation, commissioning and startup.

ANDI TRINDLE MERSCH *has a varied background within her specialty coffee career, which began behind the espresso bar in 1989 and, since then, includes cupping, training, consulting, green coffee trading and buying, quality control, sales and writing. Mersch currently serves as director of coffee at Philz Coffee. She was elected to the Roasters Guild Executive Council for a two-year term in March 2015, and she volunteers with the Specialty Coffee Association of America (SCAA) developing coffee business curriculum. She is a past board member of the SCAA and the International Women's Coffee Alliance.*

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