

Automating Industrial Bakery Production Lines: Benefits and Tips



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This book covers the benefits of automation for industrial processors of artisanal breads, baked goods, confectionary items, snacks, and pizzas.

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"We're able to produce a European-style pastry, which is uncommon in the United States. And we can accomplish that in a very efficient automated way. Those two elements - a unique form and an efficient process - make it a win-win."

Dave Meurer, Meurer Brothers Bakery
On Automation with Naegele Inc Bakery Systems

7 Benefits of Automation for Bakery Processing Lines



“Automate or die.” This phrase has been applied to a variety of industries as companies seek to optimize their business operations while also cutting costs. As a relatively late adopter of automation technologies, the food industry hasn’t quite reached this ultimatum yet. But, as more companies proceed along the lines of digital transformation, and as the workforce gap continues to grow, we’re getting there.

With [consumer demand leaning more and more toward artisan bread](#), bakery might not seem as ripe for automation as other segments of the food processing industry. In reality, growth in the artisan market is fueling the need for automation across the bakery segment. Let's look at 7 benefits of automating your bakery processing lines.

1. Higher throughput

It shouldn't come as a surprise that boosting throughput is the [top reason many companies seek to automate their lines](#). Humans simply can't work as quickly as machines, which can run 24/7 and don't need breaks.

The throughput gain you can achieve with automation depends on your specific application and process. But [a look at the past 5 years of data from Food Engineering's State of Food Manufacturing Survey](#) suggests that processors typically expect automation to be a key driver of throughput increases of 10-15%.

2. Smaller equipment footprint

The trick about higher throughput is that processors want to achieve it without having to expand their facilities. In fact, many processors are looking to decrease their equipment footprint so they can fit more equipment into their existing buildings.

Automated equipment typically takes up less room than non-automated equipment with equivalent capacity, so you get more bang for your real estate buck.

3. Tighter quality control

Your customers expect every product that comes off of your line to meet specifications. That's because, for consumers, consistent quality is a key determinant of trust in a brand. Rolls that are undercooked or stuffed crust pizzas that are missing their stuffing won't draw repeat consumers.

Automation ensures consistency, which further increases throughput by decreasing yield loss, because fewer off-spec products have to be thrown away.



4. Improved food safety

People are a major cause of cross-contamination in food processing plants. Workers who don't follow Current Good Manufacturing Practices (CGMPs) can easily transfer microorganisms and allergens to food. Even those who do follow CGMPs can disperse bacteria into the air by kicking up dust as they walk or push bins or carts around a plant.

Automation removes people from the processing equation, thus eliminating the risk of human-caused cross-contamination.

5. Reduced labor costs

The manufacturing labor shortage has been weighing on the food industry for several years, and it's showing no signs of letting up.

The bakery industry, in particular, has been suffering. A [2016 study by the American Bakers Association and the American Society of Baking](#) found that “the baking industry is deficient in employees in all areas of production with leadership skills, problem solving and decision making skills, as well as baking-industry specific technical skills” and that they expect “a rise in shortages among hourly machine operator and unskilled production positions, and salaried scientist and R&D positions.”

Automation reduces the labor requirements — and associated costs — along your production line so you have more HR budget to put toward higher-skilled positions.

6. Worker health and safety

For the workers that do remain on the line, automation significantly boosts health and safety. Working in a bakery facility is hard work — it often involves heavy lifting and physically challenging tasks.

Automation eliminates (or at least reduces) the difficult and repetitive tasks that can easily lead to ergonomic injuries. Fewer injuries means less productivity lost due to absenteeism.

7. Traceability and compliance

Finally, automation helps processors achieve traceability and compliance, first, by minimizing the risk of human error and, second, by making data collection much easier.

Not only does this help when FDA inspectors come knocking, it becomes invaluable if something goes wrong. Having process data at your fingertips will help you identify and head off a food safety incident before it escalates into a recall.



When to Automate Your Bakery Production Line

If you're looking to expand your baking business, you've probably thought about automating your line. But is now the right time? New equipment is an investment. How can you know that automation will provide the [benefits](#) you want?

There is no hard-and-fast formula to tell you when to automate. The benefits you'll realize depend on your particular application. But, we can provide some guidelines to help you determine when either full or partial automation is right for you.

When you want to increase production capacity

Increasing production capacity is the most common reason bakers start thinking about automation. Machines work faster than people (and they never call in sick!).

Obviously, for industrial-scale production, you need automation. What might surprise you is how much even smaller facilities can benefit from semi-automation, i.e., adding just a few pieces of automated equipment.

The table below identifies capacity thresholds at which automation will start to provide benefits.

When you want to reduce your labor requirements

Let's face it, finding bakery workers today isn't easy. In the past, companies often sought out automation to save money by decreasing their labor force, especially in parts of the country where wages are higher. That's still true. But now, many companies are being forced to automate just to keep their plants running.

The amount of labor you can save depends on your product and what part of your line requires the most human resources. Typically, the makeup portion of the line is the most demanding. Here are a couple of examples of when automation is called for from a labor savings perspective:

- If you produce cakes or cupcakes and you have five people assigned to the task of applying frosting, a decorating machine will save you significant time and money.
- If you produce franks in a blanket, [a dough folding machine](#) can cut the number of people you need on the line from 10 or 12 down to 5 or 6.
- If you produce boule bread, adding a semi-automatic divider/rounder to your line will eliminate the need for a worker to divide and weigh the dough balls.
- If you produce pan bread, semi-automation can decrease your labor requirements by as much as 60%.

When your main ingredients are expensive

On some lines, one of the biggest expenses comes in the form of ingredients, like the butter (or other fat) used in laminated doughs and the fruit fillings for danishes. In these cases, automation can save you a lot of money via more accurate portioning. A person might put a little extra filling in each pastry, which can add up over time. A machine will always dispense exactly the amount that you specify.



The Hidden Costs of NOT Automating Your Bakery Production Line

Our [last chapter](#) outlined several scenarios that suggest it's time for automation. And an article we published earlier this year identified [seven major benefits of automation](#) for bakery processing lines.

But there's another factor that isn't talked about often enough: the hidden costs of manual production.

Here are three hidden costs that likely don't appear in your operating budget, but can have a massive impact on your bottom line.

Absenteeism

Unplanned worker absences, such as when someone calls in sick, can hurt your productivity. According to [data from the Bureau of Labor Statistics](#), the non-durable goods manufacturing industry had an absence rate of 2.9% in 2018. That means that in any given week, almost 3% of the workforce was absent at some point when they were expected to be at work (vacations and other planned absences were excluded).

The number likely varies seasonally, peaking during cold and flu season. But a plant that employs 500 people can expect an average of 15 people to take some unplanned time off every week.

Productivity losses due to absenteeism can have a ripple effect. Not only are workers not doing their jobs, but other people have to compensate for those absences. A [2014 study by the Society for Human Resource Management \(SHRM\)](#) found that supervisors spend 4.2 hours every week dealing with absences (e.g., finding replacements, adjusting workflows, etc.). Not only that, but when replacement workers cover for absent workers, the average productivity loss is huge: 36.6%. That makes unplanned absences “the greatest cause for concern in controlling costs,” according to SHRM.

Automation eliminates the costs of absenteeism because machines don't call in sick. As long as they're maintained properly, they just keep on running.

OSHA penalties and inspections

We're coming off of a record year for OSHA inspections. In fiscal year 2019, the agency conducted 33,401 inspections, which was more than in the previous three years. OSHA penalties are also going up – as of 2016, [OSHA penalties](#) are now adjusted every year for inflation.

Six-figure OSHA fines in the bakery industry are not uncommon. A quick Google search will reveal recent large citations for a variety of violations, from a lack of proper machine safeguarding to combustible dust accumulation to repetitive motion work activities.

But here's another consequence of OSHA inspections you might not have considered: even if the agency doesn't issue a citation, it could still require you to change your operations. For example, if your plant has a high number of complaints about injuries due to repetitive motions, OSHA may require you to decrease the speed of your line for ergonomic reasons. And once you're on OSHA's radar for a particular matter, you can expect inspectors to visit your plant on a more regular basis.

Machines prevent these types of problems by taking over the repetitive tasks that can cause injuries. As an added bonus of automation, when workers don't perform physically challenging tasks, they're less likely to get injured, which means they're less likely to take unplanned absences from work.

Food safety incidents

Every time a person touches a product, there is a chance of contamination. For example, a worker could:

- Accidentally use a tool that has been in contact with nuts on product that's supposed to be allergen-free
- Fail to properly wash their hands after eating or using the restroom
- Have a bad day and decide to intentionally adulterate a product

By eliminating worker contact with food products, automation significantly reduces the chances that any of these things will happen.

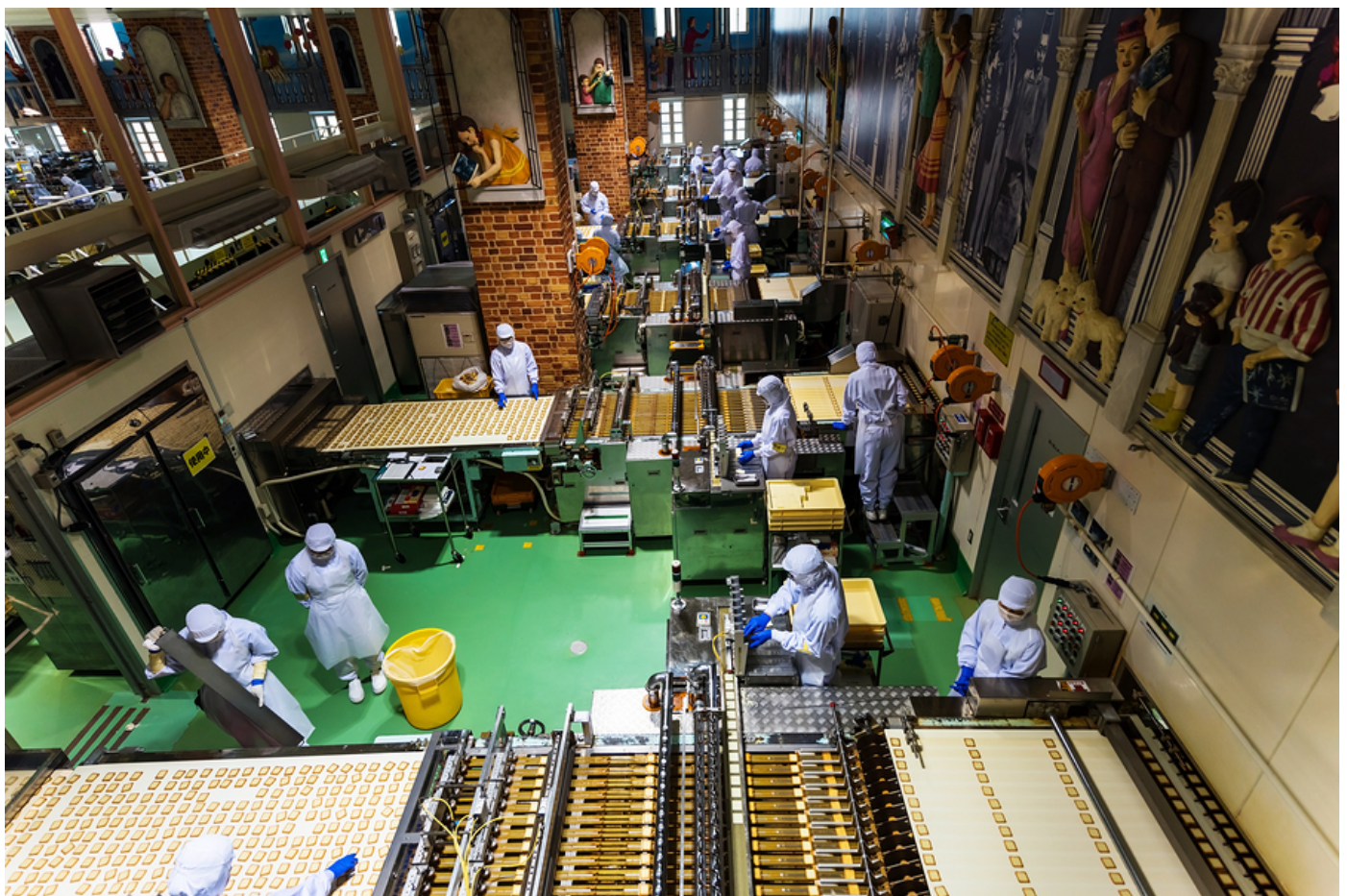


"We count on the Naegele Team significantly. They're a true partner - they're here when we need them, and they provide a lot of engineering knowledge and experience.." ~ Steve Kunkle, President, Miracapo

Strategies for Addressing Labor Shortages in Bakery Manufacturing

Almost **800,000 jobs** power the baking industry, and there could be up to **20% additional job openings** by 2025. That's a lot of helping hands to hire in an industry that's already struggling to fill in workforce gaps.

Because of the nature of the industry and the complexity of its labor challenges, it's not an issue that can be solved overnight. But there are many things bakery manufacturers can do to ensure production keeps moving, even when times are tough.



Retain existing employees

Turnover is expensive. It takes significant time and resources to onboard and train new workers, and that's after going through the process of finding, screening, and interviewing them. If a company's workforce is already tight, the last thing they want is to lose existing employees.

There are many reasons employees might consider moving on, including:

- Lack of advancement opportunities
- Lack of compensation and benefits
- Difficult hours or excessive overtime
- Challenging relationships with coworkers
- Lack of support from leadership
- Long commutes
- Hazardous workplace conditions and/or strenuous tasks
- Feeling disengaged, dispensable, and undervalued

Workers may be willing to stay if they know their company is willing to work on solving these issues. After all, switching jobs isn't easy for employees either.

A good start is to create a company culture that's committed to [continually improving occupational safety](#). Building such a culture with employee input can ease fears about accidents and injuries on the job. And, with the help of technology and scheduling software, managers can better distribute the work so that no individuals feel stressed and stretched thin.

Companies that also offer continuing education opportunities can help their employees develop the required skills and qualifications to move into higher-level positions. But even employees who have already advanced in the company (e.g. [front-line leaders](#)) will need ongoing supportive resources, recognition, and growth opportunities to stay connected.

And while it's possible to teach employees new skills via technology (e.g. virtual reality, augmented reality, and tablet-based training modules), it's also important that they learn alongside experienced workers. This helps them build confidence in their work and establish positive relationships with peers. And a strong sense of community in the workplace will encourage employees to stay on board for the long haul.



Attract new, skilled workers

The same factors that encourage current employees to stay are also going to draw in new workers. Things like ongoing training and development opportunities, perks and benefits, and a good work-life balance will interest applicants who are looking for a stable career in the industry.

But even if the job has all these perks and more, it can be a struggle to find candidates who are not only interested in applying, but have the skills necessary to do the job well. This is where it may be helpful to reach out to potential applicants while they're still planning their futures.

With the rise of technology and automation in the industry, many manufacturers are challenged with filling positions that require mechanical skills. In 2016, [78% of baking companies](#) were experiencing a shortage of engineering and maintenance employees, and they expected this to continue to be a critical need in the industry.

Students in these fields, however, are probably not thinking of the food industry when planning their careers. They may not even be aware of how much the industry needs their skills. Outreach efforts and career discovery programs may help get the word out to high schools, training centers, and universities about the variety of positions available in food manufacturing.

For those students who show interest, it may be worth investing in formal training programs to help them acquire the specific skills necessary for the industry. Baking manufacturers may also offer internships and on-site training opportunities to supplement the courses.

Add more automation

Although installing automation equipment often calls for new types of employees, the [benefits](#) are worthwhile, particularly when it comes to tackling labor shortages.

Automated production machinery allows manufacturers to have fewer employees on the line, which is especially advantageous for tasks that are repetitive, difficult, or dangerous. These are the same jobs that cause employees to burn out. And employees who become stressed, injured, and fatigued are more likely to leave as soon as a better opportunity arises.

With machines doing these challenging jobs:

- Employees avoid the heavy lifting and hazardous conditions that lead to injuries
- The company is able to minimize the human mistakes that cause product loss and food safety risks
- Workers won't be stuck doing monotonous, mechanical work and can direct their expertise toward high-value tasks

The end result is improved product quality and consistency, increased productivity along the line, and the ability to use a limited workforce more efficiently. The best part is the machines keep running even when employees call in sick and the company's experiencing turnover.

Partner with industry experts

Filling in employment gaps and adopting automation can take time. But in the interim, production still has to keep running smoothly.

It may be helpful to rely on suppliers, equipment manufacturers, and other outside experts for guidance and support during this time. This is especially true for **small businesses** with limited resources.

OEMs and their distributors, in particular, can offer support for planning equipment and facility upgrades, servicing and repairing existing equipment, and training new hires. They often have access to the latest technology and are backed by a team of skilled engineers, mechanics, and programmers. Your suppliers may also have new ideas for expanding your business, as well as different strategies for dealing with workforce limitations.

While current labor challenges may seem colossal, some creative thinking, technology, and support from other industry professionals will go a long way toward winning the battle.



"Our focus is on quality, we make our own fillings from scratch, and we pay attention to the quality details that I think a lot of high-volume manufacturers have lost sight of. It's who we are." ~ Dave Meurer, Meurer Brothers Bakery



Automating Your Bakery for Maximum Impact

Automation isn't as widespread in bakery processing as it is in other areas of food manufacturing.

But, it's making inroads. The need to increase production coupled with a shrinking workforce is encouraging bakery manufacturers to rethink their processes and integrate new technologies.

Moving from manual processes to automated ones represents a capital investment. Before you spend any money, you'll want to make sure that investment will pay for itself in a reasonable amount of time and allow you to grow your profits over the long term. Whether you're just starting with automation or currently use a semi-automated process, here are some places where you'll get the most bang for your automation buck.

Dough ball dividing

Even small commercial bakeries can benefit from using a [dough ball divider](#) to portion dough. This piece of equipment can improve your process in three main ways:

1. By increasing your throughput – machines work faster than people
2. By ensuring consistency and reducing waste – machines cut accurate portions every time
3. By decreasing the amount of handworking required – exact portions minimize the need for manual adjustments

Molding / forming / rounding

Similar to with dough ball dividing, molding, forming, and rounding machines can be beneficial for bakeries of all sizes. They not only decrease the amount that the dough is worked, but also ensure a consistent-looking product every time. Since people “eat first with their eyes,” a product’s [appearance is a crucial factor](#) in the purchasing decision.

Filling

Fillings (fruit for danishes, meat for Jamaican meat patties, etc.) are often the most expensive ingredients in a product. If you have someone regularly overfilling, even if it’s just a little bit each time, your ingredient costs can easily inflate. Filling machines portion fillings with a high level of accuracy, which keeps costs from getting out of control.

Folding / shaping

Folding and shaping dough is hard, repetitive work. There have been cases where OSHA has required processors to slow down their lines to prevent the workers performing these tasks from getting repetitive stress injuries. Automating this part of your process will help you meet your throughput goals and also [ensure you stay off of OSHA’s radar](#).



Rack loading and unloading

Even many highly automated industrial bakeries still have people manually loading racks and rolling them into an oven. Then, when the baking is done, they have to retrieve the racks and manually unload them. This is a labor-intensive process that, depending on the size of the bakery, can require several employees. If you're [struggling to find and retain workers](#), automating this process will be a boon.

Depanning

Finally, like loading and unloading racks, depanning is a labor-intensive process that can easily be automated to reduce the number of operators needed along your line.

"NAEGELE IS ONE OF THE BEST VENDORS IN OUR FIELD, AND THAT'S WHY WE KEEP GOING BACK TO THEM WITH OUR NEEDS." ~ RANDY CHARLES, ALIVE & KICKIN' PIZZA CRUST



Request Your Consultation

The Naegele team has over 25 years of experience helping bakery companies optimize and automate their processes. If you're ready to embark on an automation project, [request a consultation today to learn how we can support you.](#)

Contact Us Now



About Naegele

In 1994, Dick Naegele founded Naegele, Inc. to perform a variety of engineering services for the baking industry. Providing bakery equipment and technical support for building bakery processing lines is our specialty. We have designed new food processing lines incorporating equipment from several manufacturers and we have upgraded existing production lines with single unit machines. We can offer complete technical support throughout the various phases of such projects from conception and equipment selection to successful implementation. Naegele, Inc. is proud to be providing these services through cooperation with world class bakery equipment manufacturers.

Exclusive North American suppliers of:

- Apple Food Systems
- Form & Frys
- Kaak Group
- Matiss
- Masdac
- Senius Food Equipment

Our promise:

We commit to use our experience with food processing equipment and new technologies to help our clients develop new products and successfully automate their production requirements.

