INTRODUCTION

Planning a kitchen and arranging work areas to minimize operating costs and maximize productivity is an important activity for a foodservice manager. Planning a kitchen involves both design and layout components as well as consideration of flow principles. Flow, the movement of product or people in an operation, should be an important consideration in the planning process as well. Design focuses on the overall space planning and includes defining the shape, size, style, and decoration of a space. This design includes three main parts of the kitchen: the ceiling, the production area, and the flooring. Whether building or remodeling a kitchen, great design must not only look good on paper, but the kitchen must function efficiently and productively (1). The size or design budget doesn’t necessarily determine whether greatness is attainable. Enhancements to kitchen design, such as improvements to floors, lighting, and equipment, will ease the workflow and increase the efficiency of the kitchen.

Institutional kitchen design concepts should aspire to create free movement for kitchen professionals. This allows employees to carry out tasks in a trouble-free manner. Hence, the kitchen layout should allocate space for various areas with respect to its importance in a kitchen and most importantly, should make sense to the chefs as well as the service staff. The layout and design of a kitchen must be organized carefully to provide each kitchen station adequate space, size, and proper placement with regards to the overall flow of the whole kitchen. It also must be organized in a way that employees can manage to produce large outputs of food. This is achieved by considering how each kitchen stations flows as an individual station and how it flows with the rest of the kitchen. Optimal workflows for kitchens have materials and staff move smoothly through various levels of the production area, whether they are stores, pre-preparation, cooking areas, service areas, or the service tables (1). Achieving excellent kitchen design and
layout will increase kitchen productivity and flow resulting in decreased operating costs, increased employee morale, and increased food and employee safety.

**DESIGN**

**Lighting**

When enhancing a kitchen, don’t forget to look up. Ceilings may be above the action of the kitchen, but it certainly contributes to environment of the work space. Lighting is a great way to increase employee productivity while also making efforts for conserving energy. If lighting is properly placed, it is not needed to cover every space of the ceilings in kitchens. Putting lighting only in critical points of the kitchen will reduce the amount of light bulbs being paid for (2). Minimizing the cost of lighting will decrease operating costs. When considering lighting placement, look for places where the employees work the most and where lighting is important. One must also consider where additional lighting fixtures are needed in a kitchen. Such places could include over the stoves in the cooks area, above the assembly line in a hospital, or above the prep table. Proper lighting will keep employees more alert, aware, and helps contribute to the environment of the kitchen (3). A well-lit kitchen makes the workplace bright and can likely make workers feel happier about working. Once again, if employees are happier with where they work, they are more likely less stressed and satisfied with their job which will lead to higher productivity. The ceiling makes an impact on production but, most of the action that takes place in a kitchen is lower from the ceiling, in the production area.

**Equipment**

Efficient production has employees that work fast to produce large outputs. This is achieved by making sure utensils, cooking tools, ingredients, and equipment can be easily
attained by the employee. With kitchen design, every detail must be considered, even the equipment that your facility uses. Equipment that is too complex, has higher capacity, or is higher-powered than needed can impede productivity because staff don’t want to or can’t use the equipment efficiently (4). Do not just consider what type of equipment it is, but also consider the height or length of the equipment. Does it meet production needs? Sure it might make sense to have tall stacked ovens in your facility but if employees can’t reach the top shelves of the top oven, will it ever get used? Probably not often. In this case a facility will have decreased employee productivity and increased operating costs. If three pans of lasagna can be cooked in the top oven but only one pan is being cooked because employees don’t want to use the top oven shelves, you are losing money by paying to heat empty space that could be filled with product to sell. Equipment can consume valuable space that could be used more effectively. If employees aren’t using the additional range in the cook’s area, but the pre-preparation area complains to never have enough space, why not use space more efficiently? Get to know the equipment the operation uses and the options for reducing consumption for each piece of equipment.

Improving the quality and kind of equipment is also an effective improvement. Certain pieces of equipment might yield the same results, but not require the same amount of energy, time, or space as the equipment you are currently using. Manufacturers are constantly altering products to become more resourceful by using less energy. Technology can be used to reduce the time, utility use, and labor required to produce a menu, without any compromise to kitchen efficiency or productivity (5). While the production area serves as the main area to make enhancements to make a kitchen more efficient, employees cannot work quickly and efficiently without proper flooring.
Floors

“Wet” Kitchens

The design of a floor can have a tremendous impact on the functionality of a facility. Floors should be designed to be durable for the amount of work that is done on them. They should also be created with floor drains in certain areas and non-slip flooring so the kitchen is safe from slipping and hazards. Interest in improving work environment and work safety during foodservice operation has become a major concern for facilities. Most current foodservice facilities operate with a “wet kitchen.” These kitchens are labeled as wet kitchens because they do not have proper draining throughout the floors. So, when something is spilled, appliances leak, or a certain area of the kitchen produces a lot of liquid waste, it can make keeping a kitchen dry and safe to work in more difficult. Wet kitchens have floors that are not designed to keep a floor dry or get rid of water quickly (6). These floors have the potential to become covered in water during operation. If a facility is a busy operation with wet floors, employees are more likely to be stressed that they will get injured by slipping or falling due to the wet floors. This will increase stress, decrease safety, and therefore decrease employee morale and safety. If an employee is worried about getting injured while working then they are less likely to enjoy their job and are less likely to produce efficient, quality work.

These kitchens also have insufficient drainage provision for dealing in waste water. These factors contribute to the increase of temperature in the kitchen environment and a higher level of humidity in the kitchen. Higher temperatures and humidity will decrease the labor efficiency of employees as well as increase the harmful effects of microbial growth even in sanitary food production. If a workplace has high temperatures to work in, employees will be uncomfortable from working in high temperatures. This will likely affect their work efficiency.
Increased temperatures and high humidity also contribute to an ideal atmosphere for bacteria to grow, making food potentially unsafe to consume. In addition to decreased labor efficiency, wet kitchens cause an increased risk for hazards associated with an electric leakage due excess water on floors or surrounding operating equipment (6). If water is being spilled from work areas onto the floor and are not constantly wiped up, then puddles will form. Obviously a worker is can just dry up the water and continue on working. However, this is a serious problem if these puddles are underneath tables or ovens in places unseen by workers. These particular places are where electrical cords and outlets are, which can cause a severe risk for hazards in the kitchen.

Dieticians have rated wet kitchens significantly higher for leakage, which has proven to whole kitchen less functional. Wet kitchens have also been suggested to have a significantly higher level of noise which contributes stress to the environment of the facility. In wet kitchens, muscular pain, arthritis, hard-of-hearing, and psychological stress levels were increased and experienced by employees more than once a month (6). These factors that increase stress can decrease employee morale which in turn can decrease the productivity of the kitchen and increase operating costs because employees are not working as efficiently as they can.

“Dry” Kitchens

In order to create a worker-friendly environment for institutional food service, facilities operating with a “dry kitchen” system are recommended. Dry kitchen facilities are classified as having a higher construction cost and more finishing floors with anti-slip tiles that have special design points that allow the floors to remain dry. This includes an area of the kitchen that has a depression in the flooring with a drain under specific work tables that create for an easier disposable of liquid waste or excess water that congregates by equipment. Dry kitchen facilities also require that employees wear non-slip footwear to further prevent falling onsite (6). Without
the fear of falling or safety threats, employees will be less stressed, improving employee morale. If there is less water in the kitchen area, it will help control the temperature and humidity of the kitchen. Employees are more likely to contribute more efficient work if their work environment temperature and humidity is bearable to operate in. Factors that decrease stress and provide safety will increase employee productivity which will decrease your operating costs. Having proper flooring will allow for employees to move quickly around the kitchen, however the proper location of items is needed to allow for employees to efficiently move quickly around the kitchen.

**Location**

Smart operators seek to create the best match between menu needs and the type and location of cooking and prep equipment used to create their menu items. Take time to analyze how the staff produces each item, where they have to travel throughout the kitchen, and what improvements would be ideal for that particular work station. Production bottlenecks are defined as places in the kitchen where different work stations are clashing with each other as they are trying to accomplish their own tasks in a work area. You want to make sure there is a value stream from the pre prep area all the way through the serving line. Smart operators may choose to consolidate production to a single location, closing down other, less efficient ones. Employees can work faster if everything they need to produce product is close to them and is in one work area. These operators can significantly lower cost, while improving the consistency and quality of their menu offerings.

**FLOW**

Flow is defined as a work flow plan is an ergonomic, food safety orientated plan for efficient use of the workspace. If a workplace has a good work flow, the kitchen can be
efficient. But, many different aspects of a kitchen contribute to a good work flow. Work areas that are properly organized and have the right amount and type of equipment and lighting will allow employees to produce food faster. Having safe flooring that is non–slip and allows for proper draining to ensure safety of employees will help boost productivity and will allow employees to be able to maneuver safely around the kitchen areas during busy times. Lastly, having equipment, kitchen tools, and work areas in the proper location will allow employees to be able to produce their product faster by traveling throughout the kitchen less. If kitchens are able to produce large outputs quickly, able to avoid bottleneck work areas, and able to have a smooth transition to different work areas, an efficient kitchen will be an end result.

CONCLUSION

Smart kitchens only remain smart kitchens when they are managed by smart operators. If a facility wants to maximize productivity while minimizing operating costs, kitchen design and layout is an essential characteristic. By applying these kitchen principles, foodservice operators and designers can work together to design kitchens that work for each individual facility. An efficient kitchen is built from the ceiling down to the flooring and must be constantly evaluated for improvements in design and flow as time progresses. Though a lot of time, planning, and evaluation is involved with this process, it takes a manager who has drive not to settle for mediocre design because it’s easy. One must have the passion to always look for what improvements can make a kitchen the most efficient.
REFERENCES


