

# Build the right space

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**T**he strength of the U.S. economy has created strong demand for new manufacturing and warehousing space. New cabinet plants in Washington and Utah plus a furniture distribution center in California are some examples. Many other woodworking companies are considering their space needs. Business is good, and good businesses need more room.

If your business is bulging at the seams, consider the following advice.

## Lean processes down

Take a close look at the space you now use. Most companies can rationalize their processes and tighten up their operating space requirements.

Conduct a 5S project to reorganize your shop floor. 5S is a program of five steps: clearing up, arranging, neatness, discipline and continuous improvement. The concept was first practiced by Henry Ford, further developed by Japanese manufacturers and is a key component of the lean manufacturing philosophy.

First, clear up your shop floor by getting rid of unneeded equipment and materials. Find a place for everything and ensure that everything is in its place. Neatness always takes less space than the chaos found in many plants. Call it lean manufacturing or just common sense. You may create enough space to expand without new construction or relocation.

## Calculate space needs.

Put your manufacturing engineers to work developing a *space budget*.

Have them detail the areas required for each function in your process — production, transport, storage, support infrastructure, administration, etc. Often, formal aisles in light industrial layouts consume 10 to 20 percent of total space. Don't forget employee-related facilities like lunchrooms and toilets. Your planning team should fine-tune its estimates with rough layouts of larger key process elements. Speaking with knowledgeable suppliers about space required for any new equipment is also a good idea.

When planning a space budget, don't overlook the usefulness of the cube above the floor level. Accommodating storage racks or mezzanines by extending the height of a new building can be a cost-effective alternative to building more floor space.

You must also consider what the future may hold. Should you allow additional capacity to support future growth? Will additional activities be required for other products? A wise planner will ponder not only how much future space should be reserved but also where that space should be located.

Be as precise as you can at this stage in your planning. And don't overlook the opportunity to correct any space deficiencies in your present operation.

## Develop layout

A key step in building design or selection is determining how the various elements in the space budget fit together. This effort requires a solid understanding of the manufacturing process, what functions must be proximate, what functions must be isolated, etc. This step should result in a well-conceived



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departmental or block layout with an efficient material flow that defines the needed building shape and size.

First define the ideal size and shape of each process activity in the space budget, which should include a rough map of the flow pattern through each activity. Will the flow be U-shaped or straight-line? Will multiple flows occur within a single activity? You can then consider the shape of the activity's area. Should it be square or rectangular? If rectangular, is long and narrow preferable to a smaller aspect ratio of length to width? Knowing the flow pattern and preferred shape for each activity enables you to arrange the process activities intelligently into a full plant layout.

This arrangement process starts by selecting an ideal flow pattern for the entire operation, just like planning the individual activities. Whether straight-line, U-shaped, T-shaped or other variation, this pattern defines how the activities connect.

Often this decision depends on whether to combine or separate receiving and shipping activities. If combined, a U-shaped layout is the answer. In many cases a U-shape allows future expansion of every process activity with minimal disruption.

### **Prepare Conceptual site plan.**

Once you have determined the ideal building size and shape, you can design the ideal site. This procedure involves arranging the activities that take place outside the main building shell. You will need room to maneuver trucks for receiving and

shipping, to park your employees and to position utilities like dust collectors and outside storage buildings. Such planning requires knowledge of local zoning ordinances and restrictive covenants. These rules typically specify coverage ratios (the percentage of building and pavement to the entire site), the maximum height of outside equipment like dust collectors, the

number of parking spaces required and other critical land usage factors.

With a well-designed site plan, you have determined the size and shape of land required for your new operation.

Now you can talk to an architect and/or contractor. A common mistake of owners and managers is to purchase property and begin construction

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before completing the planning steps described above. Such a decision often sacrifices the productivity of the new operation *for the life of the factory*. Once erected, a new building is by and large inflexible. Moving walls, doors and the

like is costly. Inserting more space for a critical operation may be impossible. In short, what goes on inside a structure determines the efficiency of an industrial building, not what the structure looks like. Giving your planning team a head

start on the architects and contractors will pay huge dividends.

If you are considering purchase of an existing building in lieu of new construction, layout perfection is difficult to achieve. The previous owner/tenant may be from another industry with different process considerations. Building height, column placement, interior walls, receiving/shipping arrangements and other elements may affect the efficiency of your proposed operation.

The economics of purchasing an existing building instead of new construction, however, are often compelling. A new single-story building with basic electrical and mechanical utilities costs between \$30 and \$40 per square foot. Process wiring and piping can add another 10 percent. Often a suitable existing building with some process infrastructure can be acquired for \$15 per square foot. It's well worth looking at available buildings in your selected location.

### Final thoughts

Start any major expansion or relocation project early. Allow 18 months from the idea phase to start-up for new construction. Jumping through environmental, zoning and other regulatory hoops takes time. Erecting the building is often not the critical element in the schedule.

Create a project budget as soon as possible. Many people underestimate the cost of major building projects. At the outset of a project, even experienced planners and engineers can overlook required elements. Double that back-of-the-envelope cost estimate you developed when the project was just an idea. The resulting number will be closer to reality.

You only get one chance to get it right. The old adage — *haste makes waste* — never applies more aptly than in major capital projects. Plan your building, and build your plan. ▲

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