

It's the process that counts

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In the excitement of a trade show like IWF, one can easily forget that machinery is only part of the woodworking value equation. Creating value effectively requires converting materials by the application of labor and other inputs, including machinery, into an output of higher value. How those required inputs are organized forms a process.

Designing and improving your processes are critical tasks for anyone seeking to succeed in today's hypercompetitive world. Indeed the failure to improve processes has contributed to the recent declines of many U.S. manufacturing industries.

Whether you are designing a new process or improving an existing one, you must fit the moving parts together into a smoothly functioning operation. The enemy of such a performance is friction. Military genius Clausewitz said it well. "Friction is the force that makes the apparently easy so difficult. It creates countless minor problems that combine to lower performance." As these problems involve machines and people, the elimination of this kind of friction requires bits of industrial engineering, computer science and psychology.

Developing answers for these ten questions will assist you in designing or evaluating a process.

Process Outputs

The task of process design actually

starts with the desired outputs and works backwards to determine the inputs.

1. What are the high-level process objectives?

Strategically speaking, the objective of a process is to motivate people to buy your product. Thus process design must start in the boardroom. Your company's business plan should enumerate what is required to acquire and retain customers. Does customer acquisition require a process that enables fast order fulfillment? If so, the needed process may be different than one required to become the lowest cost producer in your market. You must always ask what to do before deciding how to do it. (See Raymond's View in the January 2003 issue of FDM.)

2. What product must the process manufacture?

Beyond question 1, everything else in process design depends on the product. You must perfect your product down to the smallest detail. Lean manufacturing projects often overlook this product engineering prerequisite. If the product is not designed for manufacture, you cannot achieve "lean." A poorly engineered product always results in process friction. The use of standard parts, parametric design, and common tooling are necessities, not niceties.



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Process Attributes

From the objective and product definitions, you can establish three key attributes:

3. What level of capacity is required to meet demand?

The rate of output is the basis for determining the quantity of machinery and labor needed. Take care to consider minimum and maximum capacity needs, not just the average.

4. What degree of flexibility is required to accommodate product/demand changes?

The organization and contents of a process depend heavily on the level of adjustability needed to accommodate variations in volume and product design. A customizable product made in lot sizes of one usually requires a highly flexible, easy-to-change or dedicated process to minimize downtime. The process for a high-volume, fixed product demands less process flexibility.

5. What is the measure of process efficiency?

Processes must achieve a fair level of cost efficiency as defined by labor productivity or material yield. Often you must also pay attention to non-financial measures like on-time delivery and first-pass quality that focus on process effectiveness.

Process Inputs

With answers to questions 1 through 5 in hand, you can finally proceed to decisions on process inputs.

6. What tasks (operations, movements, storage) are required?

Once the product is engineered, you can determine the tasks necessary for its manufacture. These tasks not only include the value-added activities such as sawing, shaping and drilling. You must also account for the non-value adding steps like material handling and in-process storage.

7. What types and forms of materials are required?

Key decisions include the types and form of materials. For example, will you purchase stock sizes to enable flexibility or pre-cut sizes to eliminate the need for a panel saw? Will you buy green or kiln-dried lumber?

8. What capital equipment is required? Answers to questions 1 through 7 will help you determine the types and quantities of machinery the process requires. Your goal in equipment selection is to achieve a sound economic balance between cost and performance. The

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following four simple rules will guide you in this quest:

- ▶ **Consider customizing conventional machines.** Off-the-shelf equipment simply will not solve all of your problems. One certain way to differentiate your process from your competitors' is to employ custom-built or customized machinery that provides the parts you need at the cost required to compete.
- ▶ **View machines touted as bigger and faster with caution.** Such machines are often expensive to purchase, complicated to operate and inflexible. Today's short product life cycles often short circuit the forecasted paybacks for these investments. Be certain that big machines truly operate at lower cost

than simpler, more conventional solutions like work cells.

- ▶ **Beware of bottleneck machines.** Multi-functional machines that process lots of part types often form a process bottleneck. Machining needed parts simultaneously at separate machines often provides fast throughput. A number of simple machines can be a better solution than a single, complex machine through which all parts must flow.
- ▶ **Choose machines that match real volume demands.** Beware of overly optimistic sales forecasts that suggest the need for larger equipment in the name of "economy of scale." You can always invest in bigger machines when the volume necessitates. And don't forget the need for

infrastructure. New processes often require new building space and mechanical/electrical support like dust extraction that can account for 50 percent or more of a capital budget.

9. What type of information system is required?

Information is the glue that binds a process together. Good manufacturing information — the documents and procedures that direct events from order entry to shipping — also reduces process friction:

- ▶ A purchasing system ensures that materials are available when needed.
- ▶ An execution system schedules operations in the correct sequence for on-time completion and

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minimum in-process inventories.

- ▶ A product system delivers critical information to front line workers and machines.
- ▶ A performance measurement

system provides key feedback to managers and front line workers.

10. What labor skills are required to operate and

manage the process? People are often the overlooked process ingredient. While this question is listed last, do not assume that labor is a given. In some cases the lack of the necessary labor skills will demand that you redesign your process or restructure your HR policies.

Once the process is designed, you should compare its economics with a key alternative: letting specialist suppliers provide the product or service. This final design step is not a classic textbook make vs. buy analysis looking only at direct costs. Rather, you must evaluate suppliers' quoted performance against those process efficiency metrics defined in question 5.

Don't look only to the latest, greatest machine to save your bacon.

Anyone with enough money can buy machinery. It's what you do with those machines, how you fit them into an effective process that delivers value to your customers, that makes the difference between profit and loss. This tenet is especially true in woodworking where most machines are largely purchased "off the shelf." In an industry that lacks proprietary equipment, competitive advantage is created primarily by organizational brainpower rather than mechanical engineering prowess.

Bottom Line: Your ability to design frictionless processes to accomplish critical objectives will make or break your company. Don't look only to the latest, greatest machine to save your bacon. A process with average machines and a great organization can outperform one with poorly organized, state-of-the-industry machinery. ▲