

Reduce Risk & Increase Revenue: Wall Panel Production Line Layout & Design

(Part 2 of 6)

by Jim Boyle

Advice on what to consider when designing your new panel plant.

In part 1 of "Reduce Risk and Increase Revenue When Starting a Wall Panel Manufacturing Facility," I discussed the importance of beginning with a professionally written business plan. In this article, I will discuss several elements that should be considered during layout and design of a new wall panel plant, and the production assembly line.

Let's begin by discussing the "size" and "configuration" requirements for an average sized panel operation producing 1,500 to 2,000 linear feet of mixed interior, exterior and "specials" wall panels per 8- to 10-hour shift.

Ask yourself: "What is it that I'm trying to achieve; and what kind of area will be required to achieve those goals?" Also, don't forget to estimate how your production requirements might change or increase over the next three to five years. (I'll talk about why this is important a little later.) Take a look at the big picture material flow of the operation, starting with trucks bringing material in and out of the property. Consider space for and the flow of raw material storage inside and out of the plant. Think about the amount of space needed to maneuver in and around the cutting area and tables.

Listed below are several workstation activities and space requirements that should be considered when planning your manufacturing facility. You will need to design/build covered and/or completely enclosed building accommodations for the following activities.

General Facility/Operation(s)

- Office space—enough for administration, design, and estimating work spaces, office equipment (i.e., copier, printer, fax machine, plotter, etc.), and storage of administrative supplies, customer plans, and archived production drawings, etc.)
- Lockable storage rooms/areas (maintenance area, hand tools, fasteners, compressor, and miscellaneous parts and production supplies)
- Break-room/lunch-room
- Restrooms (male/female)

Production Material Flow

- Raw material storage area
- Finished goods wall panel storage area
- Production/assembly workstations:
 - Cutting/layout
 - Sub-component assembly
 - Rough openings (ROs), corners, L's, ladders (if used), king/trimmer assemblies, built-up posts, beam pockets, sills, cripples, etc.
 - Exterior, interior or combination "flat top" wall panel line(s)
 - "Specials" wall assembly (balloon and rake walls, etc.)
 - Final inspection, off-loading, panel unitizing (bundling)

Some of the items on this list might seem obvious, but you'd be surprised how many start-ups I've worked with that haven't remembered something as basic as a restroom!

Ideally, the size and configuration of the main manufacturing building required for all production activities is a rectangular building 100' wide (clear span) x 200' long x 22'

(interior) height; with two 20' x 20' overhead doors, and 1 man door at each end.

This information should simply be your guideline. You may be limited in the amount of production or raw material storage space you have. In these cases, it will be critical in your planning process to carefully analyze your space, make conservative estimations about the volume you intend to run through the facility, and determine how the material will flow most efficiently. In other words, get creative (yet stay realistic!) about optimizing the space you have.

Use a separate covered canopy style storage area about 50' x 200' x 24' (at the eave) for storing completed wall panels.

Long Line or Short Line

Now let's look at the production line design: long line or short line. What makes the best sense for a start-up wall panel company producing a mix of sheathed exterior walls, open cavity interior walls, and "special" walls (balloon and rake walls)?

A short line is where more than one assembly task is performed at a workstation. A long line is where each assembly task has its own workstation, and there are "accumulation conveyors" separating each workstation.

In an effort to keep start-up costs down and to achieve a desirable return-on-investment (ROI), starting with a short production line may provide better results. Why a short line? Short machinery lines are less expensive than long lines and production personnel requirements are also less (three vs. nine people). While it's true that you won't get as much production out of three workers as you would out of nine, many start-ups don't have the capacity to bring on nine employees. Fewer people on the line makes cross-training production personnel on multiple assembly tasks a necessity, which ultimately makes them more versatile to your company.

An additional advantage to a short line is that there is never anyone on the line waiting for an upstream task to be completed if production becomes bottlenecked. Also, as your production requirements increase, it's pretty easy to add another short line. And if there is a lag in business, it's much easier to shut down a short line.

Know that both line methods have their advantages and disadvantages, and your challenge is to determine which serves your shop best. Do you mind running a short line with fewer laborers, but capping your overall volume? Is it better to apply more laborers on a long line, while risking having to re-arrange production if volume slows?



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Manual or Automated?

Another key choice is the wall panel machinery that you are going to use—manual, semi-automated, automated or event driven. I often recommend that new companies start with a more manual machine production line. There are three reasons for this:

- Start-up machinery costs are lower.
- Generally, there is a better ROI.
- Personnel are cross-trained, becoming more of a company asset.
- You are given a chance in the start-up phase to understand the flow of work from the office to the plant. This becomes important when you're ready to start automating.

Training production personnel how to manually assemble wall panels makes them more valuable employees. What happens when a semi-automated, automated or event driven machinery has a mechanical or computer/software glitch; and shuts down production? The people already trained to assemble panels manually can continue to build panels!

I should point out, however; there are two workstations where automation might facilitate an acceptable ROI. This would depend entirely on the average daily throughput (minimum of 1,500 lf per shift). The cutting/layout and sheathing workstations each have the potential of showing a respectable ROI by reducing direct labor costs while (at the same time) increasing throughput. Of course this would also depend on the type of machinery and their cost, as there are several to choose from in the marketplace. Also, don't be opposed to mixing and matching machinery manufacturers to get the results that work best for the plant.

Many start-ups find that a blend of automated and manual is the best of both worlds. Wall panel equipment manufacturers have

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at a glance

- When laying out a new plant, consider workstation activities, space requirements and production material flow.
- When designing a production line for the first time, think about the advantages and disadvantages of long lines versus short lines.
- A combination of the batch and just-in-time production systems is ideal for new start-ups.

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supplied the market with many, many levels of automation. This fact alone makes it easy for manufacturers to customize an equipment solution that is best for their unique operation.

Whether you choose automated or manual equipment (or a mixture of the two) should depend in some way on the overall material flow of your plant. A fully automated cutting area will actually seem cumbersome and inefficient if it out-cuts your production station(s). This is just one example of why it's helpful to think about your entire process before making equipment decisions.

Define Your Production System

Now, what about the type of production system? A Modified Just-in-Time system of production works very well for new start-ups. What is that? It's a combination of a "Batch" system and "Just-in-Time" system of manufacturing.

Implement a batch system of pre-cutting and marking plates; and pre-cutting and assembling rough openings and sub-components (channels, L's, corners, ladders, bearing posts, beam pockets and king/trimmer assemblies, etc.).

At the same time, have a Just-in-Time system of attaching studs, ROs and sub-components to plates on interior and exterior walls, and sheathing the exterior walls. Note: "Specials" walls would be assembled off the main production line.

Although you may find success with this mixed process, I recommend that the long range goal of an experienced wall panel plant should be to move toward a Just-in-Time system of manufacturing. Why is this?

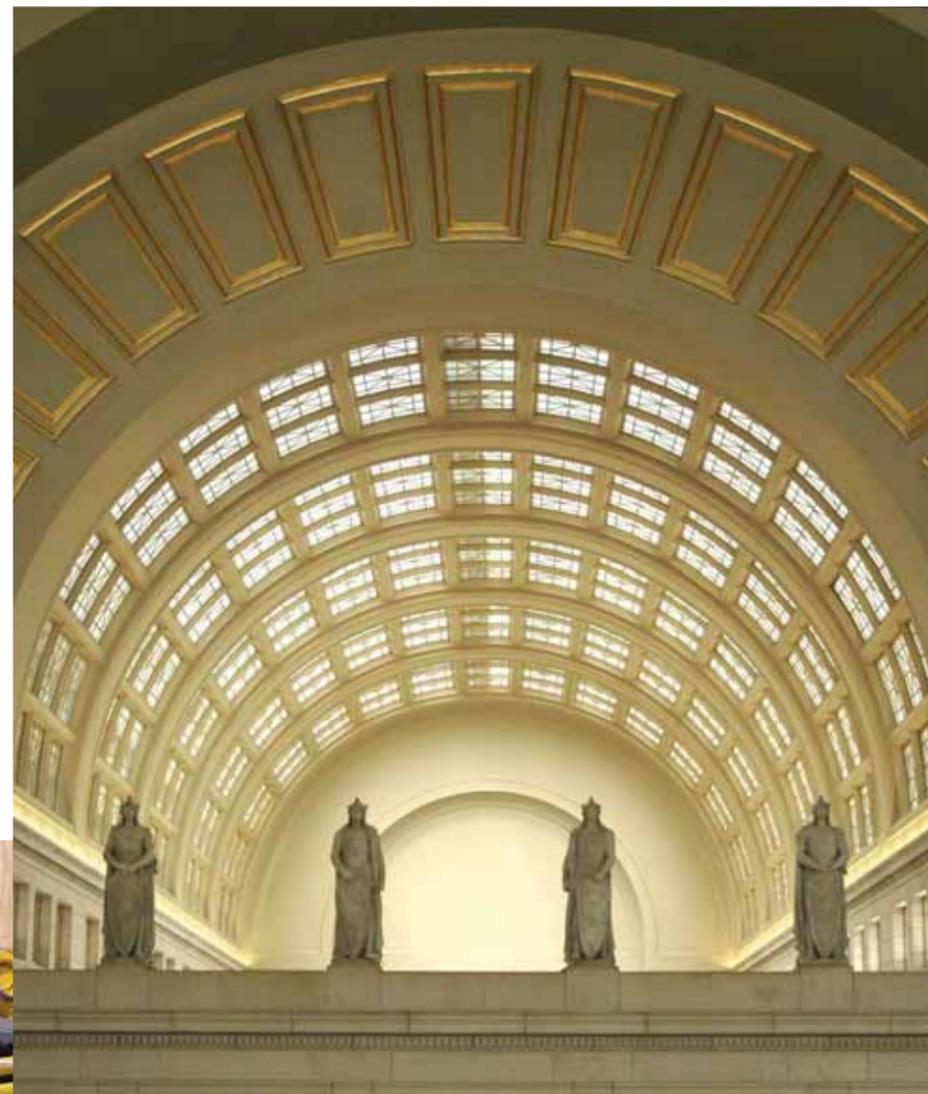
- Wall panel parts are made only as they are needed, and are delivered to the assembly line just in time to prevent the halt of production.
- Keeping inventories low is economically efficient because it reduces the amount of capital tied up in unsold goods.
- It exposes any flaws in the manufacturing process. If any parts are not fitting correctly, they are immediately detected at the assembly line, and the problem is pinpointed for correction. Since the subcomponents aren't being pre-cut, you won't have to re-cut a large batch to fix the error.
- Because you're producing components as needed, there is less waste and loss
- Finished goods inventory can be turned in two or three days.

Next month I will discuss personnel hiring and training; how to minimize hiring mistakes by having an interviewing and evaluation process; and why personnel training is vital for keeping attrition rates low, and product quality high. **SBC**

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