MANAGING TIMES
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The Right-Sized Paint Booth

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Of all the monuments I've known in manufacturing, paint booths have to be my favorite. During 10 years at Ford Motor Co. and Nissan Motors, managing paint production and engineering, I used to say I loved the smell of solvent in the morning.

But the smell isn't my favorite part. Mostly, I love the justifications we create for our mammoth paint operations. We talk about economic order quantities, devise creative scheduling techniques and convince ourselves that there are too many SKUs to warrant anything other than a monster paint line. In the end however, even the most creatively scheduled, well-justified bottleneck is just a bottleneck.

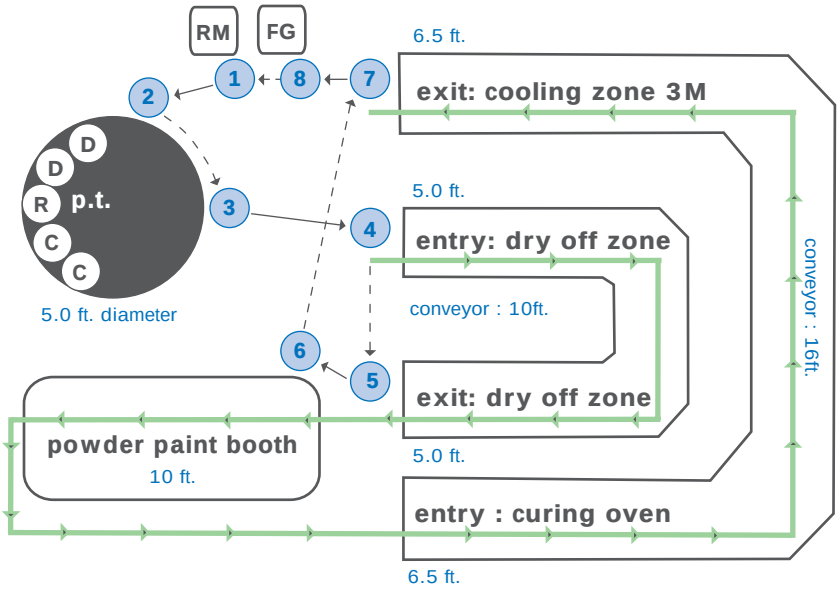
When the company grows, expanding past the capacity of its current paint system, what are we to do? Buy another monument. A company in Bombay, India had arrived at that same answer recently and was ready to purchase another $300,000 system to meet the demand projected through 2007. It was a huge capital expense based on forecasting, which always makes us uncomfortable. So, I was put on a plane.

This project turned out to be a classic example of the most intelligent, economic way to create paint systems – and the difficulty we have in changing our monumental mindsets.

To really see a paint system, we have to begin by breaking it down. In India, we began with the right team: besides our own engineers and operators, we had suppliers for pre-treatment, powder paint, the booth itself and the oven. These were all technical experts (nobody from sales) who had relationships with the company and were committed for the full kaizen week. Having these experts, well versed in the latest technology, was critical. The team spent the first day – and a good part of the second – solely observing the process and noting waste.

We saw that the time operators spent adding value by spraying metal or die cast parts was actually very little. Mostly, the operators loaded, unloaded, inspected, scrapped bad parts and checked equipment. Then we noted utility costs. In a big booth, a lot of energy is used to pre-treat, paint and cure the air in between the parts. In this particular company – which was in need of a new system immediately –

Mini Paint System (19sq ft x 18 sq ft.)



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we found the total paint operation was only 50 percent utilized. Still, it was hard for the team to get out of the "hook mentality." Paint engineers are so used to thinking in hooks that hold multiple pieces – in the batches and scheduling that hooks demand, to say nothing of cleaning the hooks and repairing the damage they do – that it was difficult for many to break that paradigm and imagine one-piece flow.

This observation and visioning takes patience. To convince the team we could out-perform the Goliath, however, we had to know its weaknesses.

Next, we needed to understand the company's growth curve and break down the capacity needs by piece, by color and by monthly buckets. We had to answer what the company truly needed, knowing that there were other pressing needs for the capital budget.

Also, we needed to ask where the company needed paint. Was it somewhere between fabrication and sub-assembly on each line? Or was it all in one distant corner of the building?

When designing the system, we were led by the principles of Design for LeanSigma®. We looked for easy interface between operator and machine, equipment that would enable flow, creativity before capital (no catalogue shopping), flexibility and, of course, incremental capital expenditure to more closely follow the company's actual growth curve, instead of a five-year projection. We also reminded ourselves that, after building this one, we would be able to improve upon the next one.

For a single-coat, high quality, durable finish without the environmental hazards of solvent emissions, we wanted powder paint. Traditional disadvantages to powder paint have been the necessary high temperatures and the long dwell times to melt, flow and cure the powder. Galvanized, electroplated and heat sensitive parts tend to outgas the powder.

Item	Measurement	Current System	Mini System
Painted Parts	Daily Volume 3 Shifts	60,000/day	11,000/day
Labor comparison	Units/Manhour	43 pepl on 3 shifts 174.4 PCS/MHR.	3 people on 3 shifts 450.3 PCS/MHR
Operating Cost	Utility cost/month	$.55/unit	$.50/unit
Material Cost	Material cost/pc.	$.55/unit	$.38/unit
Square footage	Sq. Ft.	5000 sq. ft.	400 sq. ft.
Changeover time	Hrs./Change	.5 hrs x 3 times/day	0 set-up

But new technology has developed UV powder coatings that will flow in an infrared convection process and can be cured in two to 10 minutes. The technology offers greater performance than traditional powders in gloss, staining, salt spray and adhesion. Material costs tend to be higher, but in a lean paint system we can achieve better transfer efficiency, operating costs, and a great advantage in capital investments.

The new system we designed requires only 400 square feet of space and could easily be inserted between a fabrication area and sub-assembly. Instead of two hours for a single piece to get through paint, it will now take 20 minutes. We reduced operating costs, material costs and labor. Of course, the smaller system will handle fewer pieces per day, but it follows more closely the actual company growth. And there is no color changeover time because each mini system is dedicated to a single color and mounted on wheels, so it can be easily wheeled to where it's needed and inserted into the line.

Here's the best part: the new system will cost our friends in Bombay $30,000 instead of $300,000. ■