**Equipment Location – Layouts and Cells**

Many times, companies buy equipment and try to find a place where they can put it in their shop. After a few years, the flow in the shop is a complete mess. Excess moves are one of the seven wastes in lean. Not only that, but with longer moves, usually there is wait time associated, often to the point that the work in process is put on a shelf until the next operation is ready to work on it. This results in excess WIP, *many* unnecessary expenses, wasted space for storing products and less space for producing them. More inventory, longer lead times, worse cash flow, more expenses, less productive space. Not the ideal conditions for making money.

Periodically, a reset is needed. Change the layout to support the flows. There are two easy ways to determine if your flows are good or bad. The first is to go out and observe the flow as it happens and see if you can follow it from start to finish without walking around. Another is to do a spaghetti diagram of the typical flows in the shop and see how clear the diagram is after you are done. Then ask your management team, if we had to design a flow, would we ever come up with something that looks like this?

Understand that you will probably not be able to optimize every production flow that has happened in your shop. I hear so many times, “But we have so many different flows that we cannot possibly make the shop flow any better. It is what it is.” That is said by someone that doesn’t want to try. Remember, if you think you can or if you think you cannot, you are right.

One printer I worked with had 28 printing presses of various types, but five of them ultimately started the production flow for 84% of the company’s revenue. So, we started with those five presses and using routers or work process steps for the most common customer orders, we put together a summary listing the most common flows. This took less than two hours to accomplish, so don’t overthink this.

Using those prioritized flows, we then understood what equipment was needed to complete an order. That equipment belongs together, as close as it can get, without creating quality issues (like dust from the die cutters), safety issues (like inadequate space for workers or putting them into unsafe areas) or space issues if fork trucks are needed to move. If items are put close enough together, frequently move quantities can be small enough that fork trucks are no longer needed, only pallet jacks.

When possible, put the off-loading part of the press in a position where the product can be readily moved to the next operation. The same with subsequent ops. All the while, you have to consider the moves and how they will get done. Also, the rate of production pops up, as a lithographic printer frequently outpaces die-cutting and really, almost any other subsequent operation. But this can be mitigated in certain circumstances by determining how to schedule the die cutter. Let’s say die cutting is the constraint, so the goal is to keep it as productive as possible – fewer set ups, the operator does not leave the machine to get dies or to get printed materials, etc. Shipping product outside the building to a subcontractor is one way to make up the disparity in production rates, but then the move and wait times become significantly longer.

The next thing a lot of printers do is kitting, and there are many different types of products and volumes that are involved in kitting. Again, what are the main activities that are completed in kitting? Start by identifying those. And treat the kitting area as a piece of equipment – do a set-up reduction for kitting. How long does it take to convert the kitting area from one job flow to the next. Again, kitting probably cannot keep up with the flow from a lithographic press, so to prevent WIP, moves, storage and wait time, the time in kitting needs to be optimized as well. Have mobile equipment when possible and locate it near the work area and put it into the flow when needed and remove it from the flow when it is not needed.

Safety in a layout or cell is vital. So is the ability to move things in and out of the cell or the work area. You have to have a safe and clean flow method to all of the critical work areas, without being excessive. One client I worked with had over 80 fork trucks, a complete “highway system” in their shop with stop signs, cross arms, painted lines. An amazing amount of work was put in to become great at an activity that they should not be doing.

Layouts and cells can be designed in many different ways. I have worked with companies using magnetic boards, engineering software platforms like a cad system, *Legos*, Excel and flow modeling software. I personally use Excel because most companies have it and a lot of people know how to use it - and it actually works quite well. To me there is little sense in having your cell or layout on a platform that takes up too much space or is only accessible by one or two people. Keep it simple, efficient and effective.

There are key factors to consider with cells and layouts overall, like knowing the three footprints that are needed for a machine. Where major electrical systems are. Sloping floors for drains. Pillars. Doors for semi’s and delivery trucks. But doing a layout is not overwhelming; you just need to be organized. The payback from doing this right is huge and definitely worth the time and investment if you have not done one in four or five years.

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**About the Author:** Bob Krausert is the owner of STRATE***X***, a Twin Cities based firm that works nationwide. Bob is the author of the book, ***Extreme Lean***, published in 2018. Bob has worked with over 60 printing companies, mostly mid-sized companies, but also with larger companies like Jostens and Banta, now part of RR Donnelly. During his career, Bob has trained over 12,000 people at both public and private events. Bob has been working with PIM since 2010, periodically providing educational seminars for its members. Bob can be reached at [stratexlean20@gmail.com](mailto:stratexlean20@gmail.com) or by phone at 612-743-8706. If you would like to have a specific question or topic covered in one of the articles, feel free to make the suggestion.