

# PLANNING YOUR SHOP

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Shop layout can limit the amount of work you can do. Through the years we find ways to adapt to the hardships imposed by the positioning and location of equipment and supplies, just as prisoners of war must get used to torture. Shop design is something you can do something about, but it requires imagination and planning. Start by trying to see what's possible, or the reverse, look at what exists and you know what can be done better. This gut feeling, this intuition, is what drives us to design better shops.

Last year I visited a plant to evaluate it for the owner. I stood for less than 5 minutes, watching the workers, my hands in my pockets, my heart full of dread. I felt the same dread doctors must feel when they know they must tell their patient bad news. I could see in my head, in my imagination, that all three automatic presses, and their dryers, were faced in the wrong direction. They told me they had studied the layout and were certain their way was best. I asked the owner to trust my vision, but I was very surprised when he announced to employee groans that we would move the presses and dryers on Saturday. They grumbled as they moved the equipment, but by the end of the day, they could see the sense behind my plan. I saw in my head that people were walking too far to get supplies and the path of blank shirts to the press was very complicated. With my new plan, we moved all the presses an equal distance from the screen and ink departments and changed where we stored the blank shirts to a place convenient to each press.

## DRAW A PICTURE

If you don't have experience, you should study and experiment before deciding what to do. Start by drawing a picture of your plant and locate all the doors, walls, windows, and utilities on the drawing. Make overlays with polyester film or tracing paper of separate flows such as how art, screens, shirts or ink will travel through the building. Use different colored pens to diagram each different path. You will see conflicts when paths cross or they circle around repeat themselves. Cut out scale drawings of press equipment you use and get an idea of where they should fit and how products will flow through them. Get an overview of the building layout and ask your self these questions:

1) How will the people get in and out? Customers will need to get to the offices and employees need to get to the printing departments. If possible, they should be two different doors so the employees and customers don't distract each other.

2) Shirts will shirts get in and out? Shirts are usually delivered by truck. It's helpful to be able to back a truck up to a large door that's at the same level as the truck. Consider the security of this loading and shipping area if you keep the door open to cool the shop in the summer.

3) How will you get printing equipment into the shop? Beware of the difficulty of delivering modern printing equipment. Presses and dryers are bulky and heavy. They may not fit through 3 foot wide doors or may be too heavy to move around your shop without a crane or forklift. No equipment sale is complete until it is uncrated and delivered to it's new home on the print floor. If you have never removed a large piece of equipment from it's crate, you may be in for

surprises. You must question your salesperson about this final phase of delivery. Most companies don't include this critical step in their planning.

4) Where are the water drains? Don't worry about fresh water. It can run in 1/2" or 3/4" pipes in the ceiling because it comes from the city under pressure. Drains work with gravity. You'll need a floor drain to catch water that misses the screen processing sinks, but actual sink drains can run through walls at a slight angle into a common sewer pipe.

### **FOLLOW THE WORK ORDER**

Plot how work (using the work order like a passport to each department) goes through the shop. List each step and put them in numerical order to help you decide how the rooms, department and desks should link up.

Break each room or department into its components. Create a form for each room with columns for collecting everything that's needed for that department: tools, lighting, electricity, plumbing, heating, ventilation, air conditioning, furniture, phones and construction. List how many desks or people will work in this area. Plan for growth now, it will be too late next year.

Use the popular architectural planning process of writing each need or desire for your shop on a 3 x 5 card to collect all the ideas. Pin them on a wall and you'll be able to organize these ideas into patterns and lists that will help you study the flow of product through the plant. You'll find there's all sorts of lists, and everyone will see things differently. The screen maker knows what's most important for them, but their view may differ from the print or ink departments. Get all of them to describe their needs, then fit them together in the order that they happen in the work order process.

### **DEPARTMENT TIPS**

**Offices** - We're in the business of selling shirts. Make sure your offices and sales areas are showing off your best work and wet the appetite of new customers. They don't know anything about how to buy shirts and it's your job to help them. Make it a happy bright environment with plenty of samples and sales tools close at hand so you don't have to run all over the plant, playing detective. Don't have cartons around, keep samples on shelves or hangers. Once the sales is made, plan the route the order will take so it doesn't have to leap frog all over the office.

**Production Control** - Scheduling and planning should be central to all departments, usually in an office with a window to see the presses. Think about building a mezzanine over existing offices. Schedules are what make things happen in a factory. If you don't have someone who schedules art, screens, inventory and printing you probably have a shop that's out of control.

**Art and Camera** - Art needs plenty of color corrected light, Air conditioning to keep the artist's arms from sticking to the paper and distracting them from working. Dedicate plenty of room for storage of positives and flat files for original art. The Dark Room must be just that, light tight with red 'safe lights' (real photographic safelights, not Christmas tree bulbs) and environmentally controlled to protect the film that's kept there. Remember a light safe ventilator to let fumes escape.

**Ink** - Most shops don't have a dedicated 'room' for the ink department, just shelves and a work space for mixing. Put up metal shelves against the wall. Use metal, because it's easier to clean.

The shelf opening should be 1 in. greater than a bucket with its lid gently placed on the top. As you plan how many shelving units you need, keep in mind the growth of your company. As time goes on, you will need more shelves. As time goes on you will need places for more 5 gallon pails and eventually 30 and 55 gallon drums. Make sure the shelves are braced well or they'll fall over. Save floor space for the very important garbage can. I suggest a used, clean, metal 55 gallon drum which you line with thick (10 to 20 mil) plastic garbage bags. Remember that the lighting in the Ink Department is critical to ink matches. Save room for a light box with several light sources.

### Screen Making

It helps to locate the screen rooms as close to the plumbing drains as possible. Keep in mind that there are distinct areas in the screen making steps.

**STRETCHING AREA** Doesn't need it's own room, but you need a pegboard style rack for tools, smooth flat table and plenty of storage space for frames and bolts of mesh. I like to put mesh in tubes under table but many shops use rods on the wall that hole the mesh like toilet paper.

**COATING ROOM** Must have doors to control climate. You must keep the air temperature moderate with an 80 degree maximum an a dehumidifier to promote evaporation. Keep that door closed to keep out the normal summer humidity (moisture in the air) and the extra moisture in the air from washing out screens. I like to use sliding doors because they take up less space. The size of this room is determined by the size of your screen racks which is determined by the size of your screens. Remember to think of the future when you may by another press that takes different sized screens and of course there will be more of them. Paint the racks to prevent dust and paint the room yellow, not red, not black. Yellow paint will give you the brightest looking room because you need plenty of yellow fluorescent lights (the more the better) which won't expose the diazo emulsions and films we use for screen printing.

**PRE-REGISTRATION ROOM** is an office room where I keep filing cabinets for records but most important a pre-registration table for pre-aligning positives on the screens before exposure. This room should also be paint yellow and have plenty of yellow fluorescent lights.

**EXPOSURE ROOM** needs to keep the Ultra Violet light used fro exposure away from the Pre-Registration Room. You don't need an actual room with ceilings, but you do need a door, curtain or light trap for protection. A light trap is two walls that don't allow light (which must travel a straight path) to have straight access to rooms that have unexposed screens in them.

**DEVELOPMENT** can be done in the open room of the print shop with white light. You should have a backlit washout sink to help see what is and isn't washed out. The water should be at skin temperature, about 90 degrees

**Shirt storage** - Isn't it amazing how much space shirts take up? When you upgrade to a second press or add the ability of a speed table to your existing press, you can handle more shirts, but your press has become a shirt eating shark that must be fed. Smooth floors will allow you to move carts on rolling tables right up to the press. Pay very strict attention to the route the shirts take from Storage to Layout to the press, through the dryer and then to packing and shipping. This is a critical path the should be plotted in color on your tracing paper overlay of the plant

drawing. If the shirts are stacked up in critical aisle space, or they stand and wait blocking the path of other critical goods, you torture your employees with the inconvenience.

**Print Department** - Presses should be lined up at equal distances from the service areas of ink and screen. Shirts should come from the opposite direction, so shirts (clean) and ink (dirty) never gets a chance to cross paths.

Mentally draw a line across your printing press. This mental line divides your printing department into two parts; the dirty and the clean. Clean departments should be located on the side of the loader, take-off and the oven. Dirty departments (ink and screen clean) should be against the wall, on one side of the room. I allow 30 in. of free area between the press and ink department (once you lay out a floor plan) so a 24 in. metal ink cart with wheels on the bottom can move around the press.

The purpose of this cart is to provide a single location to look for ink, keep buckets off the floor (a jail-able offense) and make it easy to move ink around the shop. One cart should be at the press servicing the current job, while the next job is being set up in cart number two. A 24 in. x 36 in. cart can hold 6 gallons of ink and a mineral spirits (or water, for water base inks) plunger can (with a proper Hazardous Communication Standard label) in the middle. The lower shelf can hold rags, aerosol cans, and other ink handling materials.

Lighting is also important at the press, don't scrimp. The better the lighting; the faster the setup. Errors won't go unnoticed. Make sure you understand the energy requirements for your dryer. You will have to bring large cables from your power box for a dedicated line to the dryer. Most states require safety cut-off switches at the dryer to protect electricians and maintenance personnel from accidental electrocution. Meet with your electrician before the equipment arrives. Have them come when your salesman is visiting also because there will be questions you can't answer. This is a chronic problem with installations. Waiting for the right parts, cables or boxes.

Ventilation will be needed to remove fumes from the shirts and make up the air in the shop and in your dryer. Venting straight up is the most efficient, but most landlords and roofing contractors cringe at the thought of cutting a hole in the roof. Don't vent the dryer because it takes too much heat out of the building. Vent the noxious fumes from the shirts that have escaped from the dryer cabinet.

The final steps in the process are the Shipping and Receiving areas. Packing must be done in an orderly area, with staging areas for orders to be labeled and weighed and boxes waiting to be loaded on a truck. The person packing the boxes is directly responsible for the initial (and usually lasting) impression your company will have on a customer. They think of your whole company when they open up the anticipated box of shirts.

Last but not least, don't forget the human comforts of an Employee Break area, bathrooms, customer and employee parking and dedicated areas for the dumpster for trash removal.

Most companies don't have the luxury to plan. They procrastinate, hoping the problem will solve itself, or they will make plans, "later, when they have time". If you don't take the time today, everyday, to constantly improve, you won't have a competitive company. Good Luck!

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