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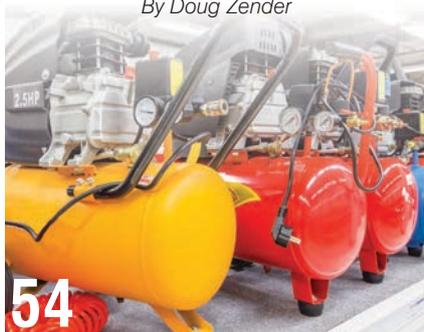
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“Wrapping vehicles requires hands-on training, research, and monetary investments in equipment and materials.”

CHARITY JACKSON
from *Getting Started in Wraps*
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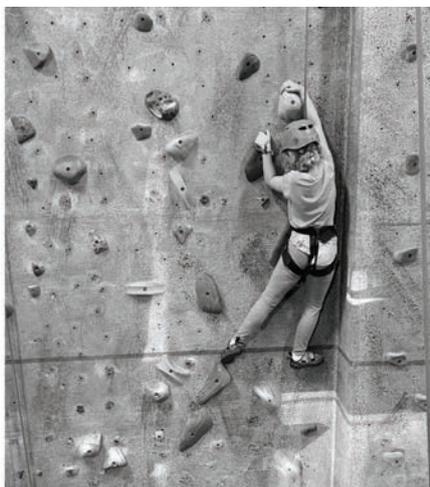
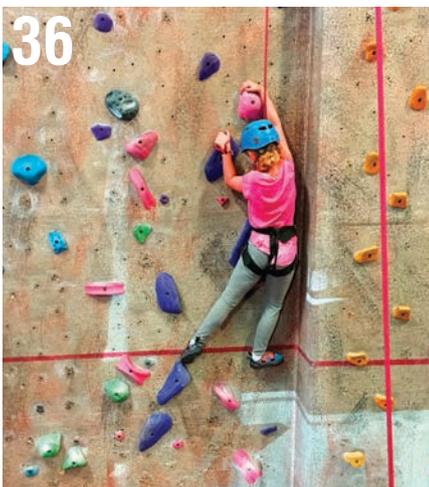
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ON OUR COVER

Vinyl film manufacturers offer products that allow interior graphics to be installed on a variety of different surfaces including brick and flooring. Page 12. Image courtesy of **3M**. Bottom right: Team sports are a constant market for apparel decorating, and there are always demands for a great new look. Page 66. Image courtesy of **STAHL'S**.

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TERMS AND CONDITIONS

Winter is a time for staying indoors with a delicious beverage, and occasionally that means running to the local beverage store for supplies. As it turns out, I recently received a flyer from my favorite local beverage store in the mail that had what at first glance looked like an incredible coupon. “Save 20% on Any Purchase Over \$40!”

Well, we tend to clear \$40 pretty easily on our trips, so this was a no-brainer of a deal. My favorite beverage store, which is my favorite because of their excellent product selection and solid customer service, was hooking me up with a sweet deal. Obviously because they like me so much and appreciate my regular business, and certainly not just because I lived in a specific geographic location included in their direct mail marketing plan.

But then I saw the fine print. Is there ever good news in fine print? A minimum purchase of six bottles of wine was required as part of the terms and conditions of the deal. Immediately that great deal wasn't so great because now to get the deal, we would have to shop on the store's terms and not my own. I could get the deal and limit my options, or just toss the coupon.

There's a reason that direct mail, especially locally, is still one of the best buys when it comes to advertising — because I still went through the mental gymnastics to see if there was a way to take advantage of this deal. Like I said, it's my favorite store.

But did I need six bottles of wine? Well, as it turns out, I'm part of a wine club. And for those of you who are also in a wine club, you know that they call it a club because they beat you over the head with wine shipments and you really need to put in time and effort to run low on supply. And suffice it to say, I was good on wine for a bit. So, purchasing six bottles of wine, no matter how good the deal, was out of the question.

So that left me with the option to just recycle the coupon, with my last thought about the store being negative because of their terms and conditions. Or as my wife so eloquently said, “This coupon is bull\$#&@.”

But what if this hadn't been my favorite store? What if this was my introduction to this store? Is the best way to build business a non-inclusive deal? Is the first impression you want to make a few lines of fine print that make your customer feel like you're trying to pull a fast one? In a world where people are constantly asking, “What's the catch?” how embarrassing is it to actually have a catch?

Customers like to take advantage of deals. They don't like to feel taken advantage of while trying to find deals. So, keep that in mind when you do anything that involves fine print. If you think you're benefiting yourself by including some kind of “gotcha” in your great deals, you're doing it wrong. **GP**



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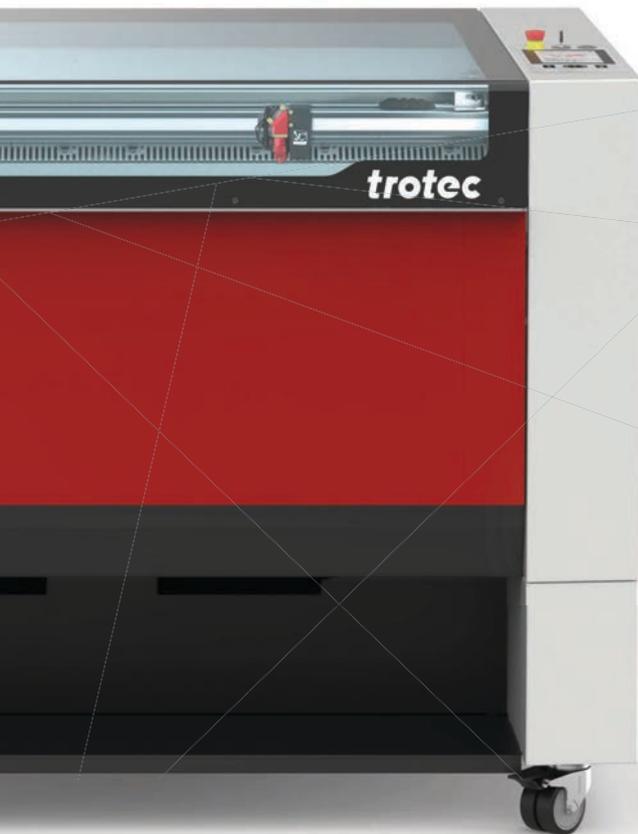
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NEVER TOO YOUNG

Some years ago, after attending a trade show in Columbus, I drove my rental car out into the countryside northeast of the Ohio capital, where my son and I had made friends with a sign maker named Maryellen, her husband Gene, and their three daughters. Maryellen had attended an all-day screen-printing workshop I taught there a few years before, and this wasn't my first visit to their beautiful rural homestead outside of Danville, Ohio.

When I arrived, Hannah, their youngest daughter, volunteered to take me on a four-wheeler ride on that beautiful late spring day, and I gladly accepted. Our first stop was a nearby hilltop that overlooked

that beautiful landscape. Her second stop was a working farm that their neighbors, a large Amish family owned and operated.

At that moment, most of the family members had traveled by wagon to visit nearby friends, so the home place was being overseen by their two elementary age sons, Eli and Levi.

These handsome little boys, dressed in overalls and small straw hats, were kind enough to give their neighbor and her much older friend a tour of the place, first the well-made home, then the fields, and finally the 100-year-old barn. In one of the rooms of the barn, the boys explained that this was where they did a part of their daily chores, as we were standing in the

cow milking area that had just been used a short while before we arrived.

One of them described how they got up early every morning and started milking around 5:30 a.m., then repeated the task at 5:30 each evening. It was about 6:30 in the evening right then, so they must have been pretty fast at it.

"Boys," I said, "if you have to be up that early every single day, at what time do you normally go to bed?"

"Oh, just about any time now," they both responded.

Their "anytime now" answer made me smile, thinking about these two little fellows who already knew how to work and keep a tight schedule. They wouldn't be



going to bed with the chickens, they'd be asleep before the chickens.

Not for one moment did I think that Eli and Levi were somehow being mistreated. On the contrary, they were learning how to work and how to assume real responsibility at an early age. It's my guess that most American kids, living normal urban lifestyles, are taught how to work, and are given productive work to do, way too late in their lives. And there are negative consequences that go with that very common reality.

My parents were only a little ahead of that process, but for me it didn't matter as my best friend, Bob, now a pretty important fellow around the offices of NBM Inc., the company that publishes this magazine, practically dragged me into the workforce with him at the age of 12 or 13. But by then, he was a seasoned veteran compared to me.

Coming from a large family of very modest means, he had determined if he was to have much more than food, clothes, and a roof over his head, he'd have to buy what he wanted himself. Little Bobbie started to work at the age of 10 and has never stopped.

We competed for the top spot on a subscription sales crew of boys who sold the local morning journal for three months each summer. Our newspaper was distributed in every town within a 50-mile radius, and we walked the streets of each one, delivered there by our boss in one old car containing himself and four or five sweaty little boys. I rarely beat my best bud at selling the most subscriptions any given day or week, but we both had more spending money all summer than any two kids in our neighborhood, or in our school for that matter.

But much more valuable than that, as

just adolescents, we learned to work, to earn our own money, and to speak convincingly to just about anyone. Moreover, were introduced to a new world at an early age. It was not the world of farm animals like little Eli and Levi. What we received was an early entry into a whole new world, a very important world, *the world of adults.*

When it came time for us to make our own way in that realm, in the real adult world we all have to live in, and the world of business, we were ready. Not every young person is, especially these days. Not

even close. I am thankful for the influence of a little sandy haired boy, who had a great future ahead of him, and helped me get ready for my future as well.

Rick

RICK WILLIAMS owns Rick's Sign Company, a commercial sign shop in Longview, Texas. He has been in the sign industry since 1973 and has been a contributing editor to *Sign Business* and *Sign & Digital Graphics* since 1986. Contact Rick via email at ricksignco@aol.com.

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THE INSIDE JOB

How interior graphics can enhance the business of wraps shops



BY RYAN FUGLER

It is said that beauty lies within. The phrase points to a deeper, more profound value than what can be found on the outside. In the graphics world, it's hard to imagine judging beauty by anything other than external appearances. However, looking within a wrap shop, one will find there is more involved than just ink printed to a piece of vinyl film. This is especially true when noticing a shop's interior walls and how it represents its business.

"What better way to fine tune your skills and show off your skills than to wrap your own shop," says Brian Piper, partner at Sykes Printing. "We test everything in-house prior to offering it to our clients. And find it makes for a great conversation with our neighbors."

Outdoor graphics will always have a place in the market since they are typically installed in prevalent, high-trafficked areas. But indoor graphics have steadily become more popular in places like offices, on

windows, floors and other surfaces. These are the spots where shops can build brand identity or create a more inviting environment for customers and visitors.

"Indoor projects are typically in predictable environments," adds Nicholas Lowry, president of Brand Ink.

But "predictable" doesn't always translate to "easy." There are several steps and guidelines to follow to complete a successful interior wrap.



Vinyl film manufacturers offer products that allow interior graphics to be installed on a variety of different surfaces including brick and flooring. (Image courtesy 3M)

a film that is made specifically for it. Other considerations might include how long to expect the graphics to last – even if UV exposure and weather conditions don't play a factor indoors.

“Indoor graphics seem easier without the weather element, but you have to think about the human element,” says Brittany Eppley, corporate marketing communications manager for Mactac. “Will the installation interrupt the customer’s workday? What kind of cleaning will be needed for the area before the graphic is installed? The print shop will also need to think about how the indoor lighting might affect the graphic. Will a matte or gloss laminate create glare in the space?”

For those shops attempting to boost their indoor graphics work, there are often quite a few matters to consider that may not initially come to mind. For example, there are many elements to plan out before the graphics even touch the surface.

“Taking away the concern about exposure to weather allows for more freedom when using media to enhance the design of a space,” according to Jay Kroll, product manager, cut and craft films, wall and transit media, General Formulations. “It is important to consider the surface where the graphic is being installed and ensure both primer and paint are sound, that the wall is clean, and that you’ve tested the material on the surface for adequate bond.”

SELECTION & SURVEYING

With advancements in vinyl film production comes a wide range of selection. Film is available in different thicknesses, flexibilities, and finishes. To install interior wraps, it is important to assess the conditions of the surfaces and determine where graphics can and cannot be placed. Many film manufacturers offer products that are fit for both indoor and outdoor use, however, if the surface is rough – like an exposed brick wall – shops should choose

Preparing for the work is key, and it is a step that should never be skipped.

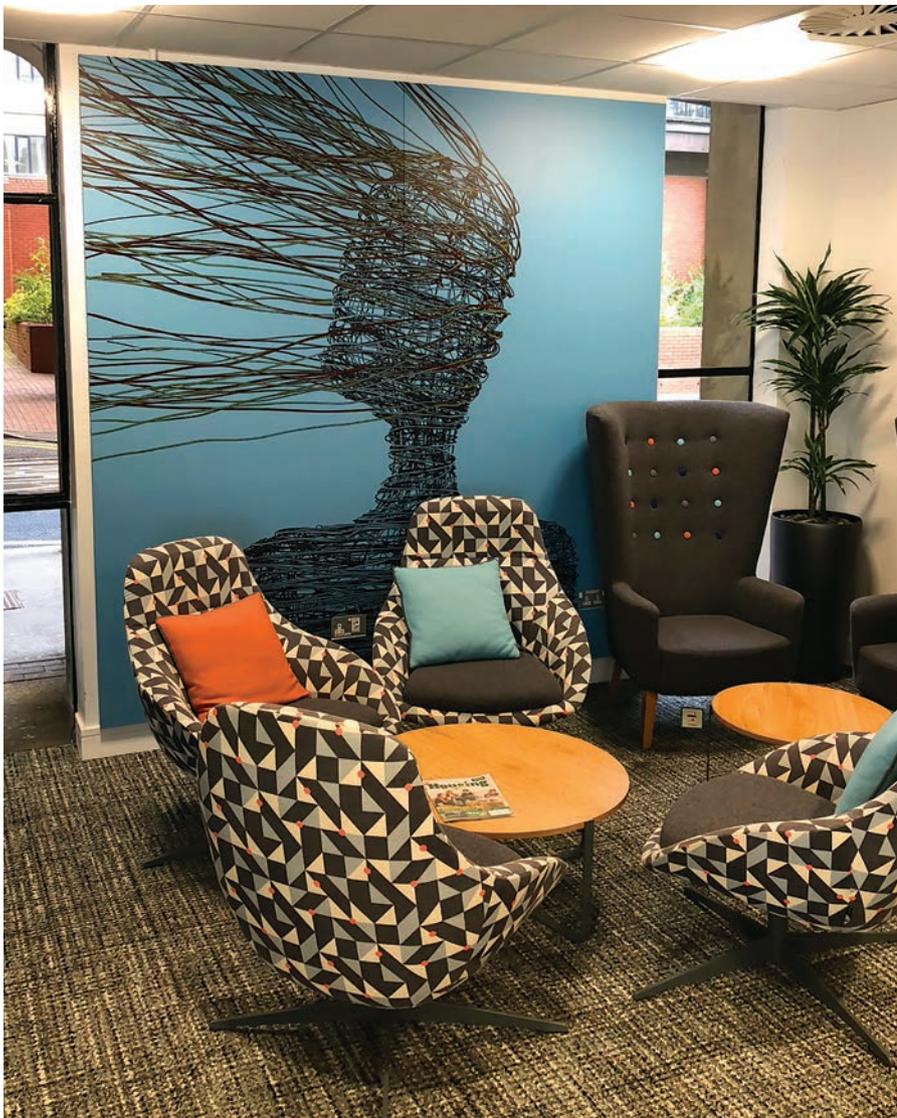
“When considering doing an interior wrap application, an installer needs to do a lot of pre-work before recommending a film to be used,” says Joey Heiob, technical service representative, Avery Dennison Graphics Solutions. “It is the responsibility of the installer to test and qualify the film on any interior surface. Today’s paint systems (low VOC) do not typically promote good adhesion for pressure-sensitive adhesive films so they must see if the film

will properly anchor prior to doing any full-blown application.”

Take it from a wrap shop owner, the work upfront pays off in the end.

“When visiting the site in advance of the work, we use a 3M wall test kit,” says Lowry. “It doesn’t matter how good the graphics look on install day if they start falling off the wall in a couple of weeks or can’t be cleaned with commercial cleaning products repeatedly.”

When cleaning graphics, laminates can help keep the surface protected and du-



Interior wraps can set the tone where meetings take place with potential customers. (Image courtesy Mactac)

Print shops are becoming more creative about where to install interior graphics such as staircases, desks and more. (Image courtesy 3M)



table. Lamination is usually recommended for outdoor graphics applications; however, indoor graphics do not always follow the same protocol.

“Floor graphics, high-touch surface graphics, and other graphics which are expected to experience frequent surface contact should always be laminated, as the printed ink layer will not withstand these mechanical abrasions,” says Andrew Smith, application engineer, 3M Commercial Solutions Laboratory. “Wall graphics and other low-touch surfaces do not always need a laminate, particularly in more temporary applications where the durability requirement is less than six months.”



Kroll has a similar suggestion, stating, “The use of laminates depends on the location and intended use of the graphic. If you’re wrapping the hallway of a school or children’s wing of a church, a protective laminate will help extend the life of your wrap and make cleaning that much easier. With textured wall films, liquid laminate coatings provide an excellent option for protection, and several even have functional additives available to give anti-microbial or anti-graffiti properties.” However, for most installations, laminates are a nice element to have, but they aren’t always necessary.

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INSTALLATION CONSIDERATIONS

Once the surface space is chosen and the right film has been selected, installation steps can commence. A benefit of indoor graphics is not having to contend with inconsistent lighting as sunlight doesn't typically present a problem. But that also means that any flaws in the graphics or installation will be ever visible without variations in the lighting.

Joey Heiob at Avery Dennison Graphics Solutions lists some questions that installers can use as a checklist regarding their pre-work preparation as well as choosing films and laminates. The typical information you need to gather before recommending a film and beginning installation is:

- a) What is the substrate (surface) where the film will be applied? Is it smooth/flat or is it textured?
- b) What kind of paint is on the substrate (surface) being applied to and when was the surface last painted?
- c) What printing capability does the converter have if you are going to digitally print the graphics?

And whether interior wraps are laminated can depend on a few factors:

- 1) What film is being used?
- 2) How long does the client expect the graphics to last or want them to last?
- 3) Will the graphics be located where they can be touched or felt by human hands?



By decorating offices with wraps, shops can tout their design and install skills to all visitors of their buildings. (Image courtesy A&M Graphic Wraps)



Shops can test out different kinds of graphics to fit the office environment, changing the theme as often as necessary. (Image courtesy Avery Dennison)



Using interior graphics correctly and creatively can turn a normally drab white wall into an artistic mural. (Image courtesy A&M Graphic Wraps)



Overlaminates are recommended when “a space will have UV exposure, if the area will be cleaned regularly with cleaning sprays or if there is a worry about damage from human interaction,” says Brittany Eppley, Corporate Marketing Communications Manager, Mactac. (Image courtesy Mactac)

“For interior colors if there are shadows and low light conditions, we use brighter colors and colors that enhance the room,” says Andrew Napoleon, owner of A&M Graphic Wraps. “Colors are key in all aspects of advertising from being loud to being soft. They can set the mood from the very beginning.”

Perfecting the seams and edges is another way to make sure no flaws are easily visible. Installers should take measurements and plan where graphic panels will be affixed.

“When installers do large interior wraps there are typically going to be multiple panels involved which means they will have to seam the panels,” says Heiob. “The recommended overlap seam width is one inch. When working with textured films, the use of either adhesive promoter or banner hem tape is required to provide extra hold for those types of film seams.”

Kroll warns to also watch for “any shrinking of the media or relaxing of tension on the graphic. This (seam) overlap will also make it easier for lining up panels or parts of a larger graphic.”

When installing interior graphics and working inside of buildings and potentially shared space, there could be regulations to follow.

“As an example, indoor graphics may need to be GreenGuard certified, depending on the relevant local building codes,” tells Smith. “The 3M Envision line of graphic films are certified as GreenGuard Gold, and construction teams can receive LEED credits for their building by using these 3M Envision films in place of a more standard PVC film combination.”

For more non-traditional graphics, such as floor graphics, there are other rules to consider that help to eliminate safety concerns.

“Another certification that comes to mind is UL 410, which governs the use of different materials for floor surfaces,” adds Smith. “Because graphics placed on a walking surface may represent a trip or slipping hazard, 3M recommends installers use a UL 410-listed overlaminate.”

OUTSIDE THE BOX

Floor graphics are just one example of several non-traditional indoor wraps. Through the years, shop owners have wrapped elevator doors, tables, and even refrigerators. When working indoors, there is a creativity factor that is often enhanced by the nature of the environment.

“Our creative studio has all the walls and floor vinyl-wrapped with fun colorful graphics,” says Katherine Arama, creative director, FASTSIGNS Boca Raton. “Our office is on a second floor so we also vinyl-wrapped the stairs with Pantone colors on each step which makes an impression at the time our clients walk in.”

No matter what is being wrapped, it is important to convey a consistent overall message. If there isn't a final plan in mind, then it's just another wrap job that loses its allure.

“It is common to see an accent wall in a foyer, or a vinyl decal behind the re-

ception desk,” says Kroll, “but the most memorable installs I have seen are those that follow a theme and takeover the whole space. Graphics that run from wall to door to floor.”

In many instances, a section of unused space can be transformed into a graphics-laden work of art. Office eye sores can become stunning spectacles as brands and images come to life.

“Something to also consider is how you can take a non-perfect environment and use it as an upsell opportunity,” says Lowry. “(Do you) have a client with dry-wall walls that isn't willing to get them to a nice class 5 surface in advance of the graphics install? That can be a great opportunity to introduce one of 3M's 8600M series overlaminates, which will give the surface a unique finish but also hide the imperfections of the wall.”

Of course, nobody ever wants to push forward a stale message. After a certain

amount of time, a business will want to switch out its graphics so they can keep their campaign fresh. They may also seek out some other areas and structures to wrap.

“Interior glass (e.g., office dividing windows), brick walls, and concrete pillars are a few examples of surfaces that aren't always fully utilized in office spaces,” says Smith. “These are surfaces that the office management may not be aware can even be wrapped, but all three can provide an office space with a lot of unique flare.”

As far as when to change out graphics, most shops agree that “regularly” is a good plan.

“Ideally every three months, no matter the kind of business,” says Arama. “You want to keep your store fresh and updated with new graphics that can inform, direct, enhance brand visibility or simply create a nice atmosphere.”



Interior graphics can carry a theme from floor to ceiling unlike any type of typical media. (Image courtesy Avery Dennison)

At A&M Graphic Wraps, Napoleon prefers to shift with the seasons.

“If it’s Christmas, we do a Christmas theme. If it’s Halloween, we do the same,” he says. “It keeps us in season and constantly educates the customer to the different abilities we have without having to do a sales pitch.”

SHOP TIPS

At the end of the day, wrap shops should design their interiors to highlight their strengths while also using products that bring out the best in them. It’s something they can discuss with their clients when they are inside the building.

“What percentage of customers are coming into your space, and at what point in the sales cycle?” asks Lowry. “Are they the kind of customers that are likely to be swayed by the environment you create for your clients and team, or are they purely interested in the bottom-line cost of things?”

How customers interpret the graphics inside a shop’s walls might hint toward how they would like a job done for them. One set of graphics can be an instant conversation starter with a client.

“We always approach every single job differently as dimensions, walls, textures and paints are never the same,” explains Arama.

And when it comes down to it, nothing is out of bounds with indoor wraps. As Eppley states, “Now, you can basically wrap anything around you. A once ordinary wall can be brought to life by adding a large wall graphic to brighten the room and add that pop.”

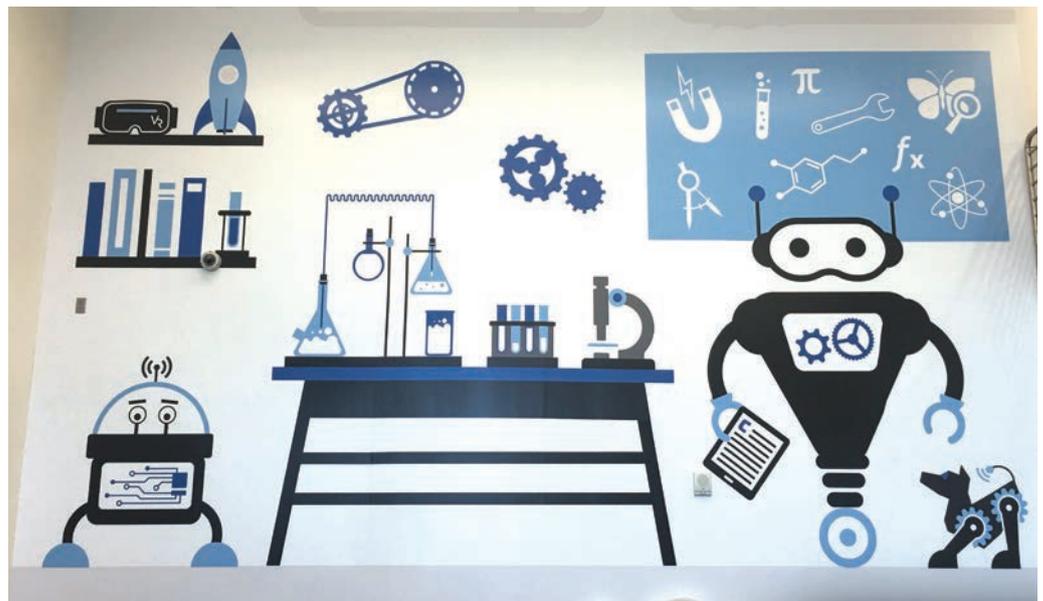
So, when wrap businesses are considering their next projects, they might not need to look any further than their own shops. **GP**

RYAN N. FUGLER is a former editor of WRAPS magazine and has been covering the signage industry since 2006.



Left: Navigating around corners and obstacles on walls or overhead is always a consideration when installing indoor graphics. (Image courtesy General Formulations)

Below: Sykes Printing uses GF 226 HTR film for lobby walls, taking measurements to ensure proper fit and finish. (Image courtesy Sykes Printing)



Wrap shops can push the envelope of their talents by incorporating messages and brand identity into their interior graphics. (Image courtesy Sykes Printing)

Getting Started in Wraps

CONSIDERATIONS FOR A WORTHWHILE INVESTMENT

BY CHARITY JACKSON

When we first started offering vehicle wraps, we had already been in business for about eight years, and wraps were a natural progression from the vehicle lettering we were already doing. We bought one of the first large-format digital printers in our town and were very early adopters; this meant we also dealt with a lot of the early headaches as we worked through material and ink issues.

There was a lot of trial and error, wasted material, and product failure in those early years. Training resources were pretty limited back then, so we had to do most of the figuring out on our own. Fast forward about 19 years, and the industry has completely changed. The print quality of printers has vastly



improved, while the cost of machines has significantly dropped. There are more manufacturers to choose from, each with a line of products that meet various needs while incorporating improved technology. It's a great time to get started in the wrap industry, but there are some things you need to consider before making the jump.



This full wrap was designed to work around obstacles and for the background design to look good from one surface of the vehicle to another. (All images courtesy Charity Jackson)



Wrapping cars doesn't always mean a full wrap. Partial wraps can meet both the customer's advertising needs and their budget.

DON'T DABBLE

To offer high-quality workmanship and to maximize your profitability, you can't dabble in this industry. It's not like choosing to add in banners when you're already doing signs. Wrapping vehicles requires hands-on training, research, and monetary investments in equipment and materials.

There is a ton of information available on the market – videos, manufacturer bulletins, supplier training courses, and hands-on education and certification programs. I highly recommend taking the time to do some research. See what areas interest you most, check into training programs, and list what your shop would need to add to offer vehicle wraps, so you have a clear picture of what your costs will be.

Do you want to specialize in color-change wraps or commercial advertising wraps? Or both? Do you plan to print and install, or do

you want to specialize in installation only? Will you outsource your graphics while working directly with your customer or specialize in contract installation for other print shops? Do you want to be a certified installer for one or multiple manufacturers?

To break down the path we took – our shop specializes in commercial wraps and partial color-change wraps. We print in-house for most of our wraps while also offering installation for large print houses with nationwide contracts, and I'm an accredited 3M preferred installer.

IN-HOUSE OR OUTSOURCE

If you're already doing full-color printing in-house, you have a printer, laminator, worktable, computer, RIP software, and design programs. You may need to add to your current equipment or software, but you've already made some initial investments.

If you're just getting into the industry or are branching out on your own, you have a couple of options. You can choose to print in-house, which means you'll need to invest in the equipment necessary to do so, or you can outsource the graphics while you do the installation.

If you decide to outsource your graphics, you'll need to find a reliable source for your printed graphics. Make sure you have a solid understanding of the materials



Rolls of color-change media can be purchased from a wholesaler and are ready to install.

you want to use, including the proper overlamine, so that you know what to look for from your supplier.

If you do outsource, consider you'll have less control over color management, and you won't be able to do quick reprints for messed up or ill-fitting panels. Also, consider whether you'll be designing the wraps and providing the artwork to the printer or if that will also be outsourced.

As previously mentioned, it's important to research the path you want to take in this industry because if you plan to specialize in color-change wraps, then you won't need to worry about outsourcing printed graphics. Rolls of color-change media can be purchased from a wholesaler and are ready to install. Vinyl samples are available for your customer to choose from, so you don't have to worry about color discrepancies either.

TOOLS AND EQUIPMENT

So, as you consider the path you'll take in the wraps market, here's a partial list of equipment and tools you may need to invest in. Some are necessary, and some are handy. This is not an exhaustive list, but as you choose what to add to your arsenal, make sure that the investment improves the quality of your workmanship, makes you more efficient, or does both. That's how you know whether the tool or equipment is worth the cost.

If you plan to print your graphics in-house, you'll need to invest in a large-format printer that can print at least 48" to 60" wide panels. You'll also need a cold, pressure-sensitive laminator that accommodates laminates at the same widths as your print media.

Many large-format printers also have a cutter built in, so you may not need to invest in a separate cutter initially. As your volume of work increases, you may consider a separate cutter that's compatible with your printer so that you can be contour cutting graphics without interrupting the workflow on the printer itself.

We've invested in a back-lit application table that we use in conjunction with our laminator for laminating and prepping graphics. We love our table for sign application especially, so it's not necessary for just starting in the wraps industry but may be a worthy invest-



Large vans and vehicles with deep recesses can be tricky to wrap. Education and hands-on training ensure a quality install.

ment down the line. Initially, though, you will need a large work surface, preferably at least 5' X 12', with a cutting surface for trimming laminated graphics.

You will also need a fast computer, RIP software, and design software for creating and outputting your graphics. Racks for storing media rolls and drying your printed graphics will also need to be purchased.

For contour cut graphics, you'll also need to apply application tape. You can purchase or build an application tape dispenser, or if you invest in an application table, there is a built-in bar that you can mount application tape rolls on for easy masking. You'll also need a safety straight-edge and heavy-duty box cutter-style snap blade knife for cutting down panels.

Tools involved in the wrapping process can be a pretty long list, and many of them come down to personal preference. Here's what I'll

call a partial list because you'll need to decide what tools meet your quality and efficiency checklist.

For wrap comfort and accessibility, you'll need a quality rolling wrap chair with a cushioned seat and attached tool storage. You'll also need work platforms, step ladders, taller ladders, and rolling scaffolding.

Your installation tool chest should include squeegees with hard and felt edges, rivet brushes, retractable knives with snap blades, blade disposal bins, small plastic tools for tight areas, plastic scrapers or specialized tools for emblem removal, scissors or a Snitty, air release tools, heat guns and extension cords, portable propane torches, masking tape, cleaning products and lint-free towels, specialty tools for concave areas and textured surfaces, wrap gloves, tape measures, and magnets for hanging graphics.

PRICING

Getting started in wraps goes beyond the actual installation and equipment as you also learn to price yourself to make a profit. When we're quoting a wrap project, the pricing gets broken down into three areas – graphics, design, and installation. Each of these areas directly affects how you price your wraps.

You're in business to turn a profit, so you must know your material and overhead costs and price your graphics to cover these costs and make you a living. We've cre-



We price our installation based on the vehicle itself and its unique obstacles. We can wrap a large box truck or trailer as fast or faster than a small sedan in some cases.

ated a spreadsheet for all our graphics and signs that breaks the pricing down by the square footage, with price breaks for larger projects.

When pricing installation, there are a couple of approaches. Some companies price out installation based on a per square foot rate – for example, if an install is 200 total square feet, then it's a flat price per square foot whether it's a box truck or a sedan.

We price our installation based on the vehicle itself and its unique obstacles. We can wrap a large box truck or trailer as fast or faster than a small sedan in some cases simply because we're dealing with fewer obstacles and less trimming.

After so many years of installing, we have a pretty good idea of how long it will take to wrap a particular vehicle. If we're wrapping a utility bed truck with many small boxes and handles that will require a lot of trimming, then we take that into account and add a little more time. If it's a Sprinter van, we'll consider the concave areas and small rubber trim areas that need to be trimmed out.

GRAPHICS

As I mentioned, there are three considerations when pricing out our wraps. I wanted to look at each topic and review how important they are as you venture into the wrap industry.

There are so many different manufacturers and media types on the market that it can get overwhelming as you consider your options. My best advice is to choose quality and consistency and avoid cutting corners.

A good quality wrap media will not only be easier to install, but it will look good and last longer. The quality of your wraps will build your reputation; don't risk it on inferior products to make an extra dime upfront because it will cost you in the long run.

We have a problem with graphics quickly browning on horizontal surfaces in our area, so we use 3M 8548 gloss non-PVC laminate on all our vehicle wraps. Through trial and error, research, and testing, we've found this to be a great product. We pair it with IJ180Cv3 or IJ480 wrap media for most of our jobs.

Check out different manufacturers and try out other materials to see what media you like working with; once you find media you like, I recommend sticking with it to create long-term consistency in media type and color output.

Wraps are not only long-term investments; sometimes, a customer needs a short-term advertisement where a transit media or material



While we print in-house, we also do installation work for other companies. These vehicles received door wraps as part of a Wrapify campaign.

with a temporary adhesive is the best choice. Or you might have a project where a reflective or metallic film is required. Be sure you know your options, understand how adhesive differences will affect your installation and removal and consider material costs to meet the customer's needs and budget.

DESIGN

If you choose to go full-service with your wraps, meaning you'll be doing all the graphic design in-house as well, then you need to educate yourself on effective wrap design. Look at examples of other designers and note things you like or don't like about them.

Commercial wraps must meet the customer's needs. The design should not only be effective and professional, but it should also reinforce the company brand. Take the time to learn your printer's color output and create custom color charts in addition to Pantone charts for the customer to choose from.

You need to also learn how to design a wrap from an installer's standpoint – obstacles and planes of the vehicle need to be considered as to how they will affect the installation. A well-thought-out wrap design will make an installation faster and more profitable.

INSTALLATION

Whether you decide to wrap vehicles using in-house printed graphics or by contracting with other companies, this is an area where you must do your homework. Ongoing education and hands-on training are imperative to becoming a top-notch installer.

As you first get into the industry, practice on personal vehicles, your shop truck, breakroom refrigerator, or file cabinets. Play with material types, heat variances, and different tools.

Watch industry videos and then practice the techniques you see. The best way to become a good installer is to glean insight from more experienced installers and practice, practice, practice. You'll find your techniques improve, and your installs get faster the more you do. **GP**

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BRUSHED METAL FINISHES – SIMULATED AND REAL

CREATING A STYLISH LOOK FOR LETTERS AND LOGOS



Above: The raised logo on this podium, made from 1/4" acrylic with a surface of metallic polyester graphic film, looked so much like brushed aluminum that once installed it, I could hardly tell the difference. (All images courtesy Rick Williams)

Right: The graphic film we used, with a brushed aluminum appearance, is often used for truck lettering and so forth, but works well for laser cut graphics.

Several of the jobs passing through the shop lately, and done completely in our shop, were required to have brushed aluminum finishes, or an imitation of the same. The ways we tackle these metallic surface effects, without expensive equipment or subcontracting, may be of interest to other sign makers and graphic folks out there. So, for this month's Shop Talk, let's look at in-house brushed metal or brushed aluminum finishes for letters and logos that any sign shop can accomplish, both in real metal and plastic made to look like real metal.



One of our clients needed two projects done. One was a set of upper- and lowercase plate aluminum letters (1/4" thick), which we could cut easily enough, but producing a professional brushed aluminum finish in-house, in real metal, was a question mark. Belt sanding with a handheld sander had failed us before, but wanting to do the job totally in-house, we would have to come up with a way to do it.

Their other project was a logo involving many letters and a few small graphic elements, which was to be mounted to the front of a speaker's podium in their training room. This project did not have to be real metal, and, in fact, would be best made in a lighter material so the many parts



The transfer tape used to apply the sheet of film is left on while the laser does its work.



With the transfer tape still on each part, to get the edges to look like aluminum, the edges are given a light but overall coat of aluminum colored spray paint.

could more easily be secured in place with glue or double-sided tape, and the cost would be less.

Both jobs needed to be about 1/4" thick. The real metal lettering would be cut on a waterjet from 5052 unfinished plate aluminum and then "brushed" and clear coated. The podium display would be cut on a laser in white 1/4" thick acrylic, which would first be covered with "brushed aluminum" self-adhesive graphic film often used for truck lettering. This film can be used outside or inside and can be plotted. But this time, a sheet of this metallic graphic film was applied to plain white acrylic before any laser cutting was done. The transfer tape

SHOP TALK



Right: Double-sided foam tape, plus very small drops of clear silicone, are used to adhere our faux “brushed aluminum” lettering to the front of the podium.



Left: A poster board pattern, also cut on the laser, is used to align all these small parts accurately.

was squeegeed firmly in place and left on the surface for the step of laser cutting.

Today’s metallic looking graphic films are really good, and quite realistic, but after laser cutting the parts, their edges would certainly not look metallic. So, leaving the transfer tape on all pieces after laser cutting, all the pieces were placed face up on a scrap sheet of corrugated plastic and a light coat of silver spray paint was applied to the edges. Spraying was done from all directions, with care being taken to ensure nothing was missed including the insides of letters like O, R, P, and so forth.

The final “all aluminum” look was quite convincing, yet all these simulated metal parts made from ¼” thick acrylic were super lightweight and easily secured in place with double-sided tape. On the jobsite, we used laser cut poster board pattern for accurate placement of each piece and there were quite a few pieces.

The other part of the project required a partial sheet of plate aluminum, ¼” thick, which the real metal lettering would be cut from. But, before any cutting was done, the sheet was sanded with fine 220 grit sandpaper, using a random orbital sander, to take out any surface scratches and give the sheet of aluminum an evenly etched look with no real pattern at all.

Then, using a maroon Scotch-Brite pad stapled to a small piece of lumber, a pattern of fairly straight strokes was produced simply by hand, pressing down hard on the Scotch-Brite pad and keeping each hand stroke straight and horizontal. The look was pretty convincing and would be more so once these small letters were cut out.

Here is where I made one mistake, however. After sanding and graining the sheet, I covered it with HP lettering vinyl to protect it from any visible scuff marks the waterjet pierces might make when cutting out the parts. In the end, this step was not necessary and just made more work of having to remove the vinyl, which is green colored in the pictures.

After cutting, our plate metal letters were drilled and tapped from behind for stud mounting. Having saved the scrap sheet these letters were cut from, a final brush pattern



Above: This close-up shows the spray painted “metal edges” of each piece and the convincing faux finish of each letter and logo element.

Right: For our set of real plate aluminum letters, with a “brushed aluminum” finish, the process was started by random orbital sanding our ¼” thick raw material, then by hand creating an amount of directional grain with a Scotch-Brite pad stapled to a wooden block.



was put in the letters with the same board covered in Scotch-Brite, by merely dropping each letter back in the hole where it came from, and several firmer strokes on the faces of each letter made the straight grain brushed metal finish a bit more visible.

Very small nuts were placed in each hole before inserting a letter, so the letters would be slightly raised above the surface of the sheet. The final look was very much like they might have looked if grained with a “Time Saver” deburring and surfacing machine. But those wonderful machines cost nearly \$200,000 and are not going to be found in any commercial sign shop I know of.

I was pleased with the look we could achieve with a block of wood and a Scotch-Brite pad. My powder coating fellow put a heavy coat of clear over them, but the thinner the clear coat the more the brushed finish will show and reflect light. They still looked OK, and our client was very pleased with them after stud mounting them on their wall, though the area on the wall where they went was poorly lit.

Another simulated metal finish we had to produce lately, though this time on real metal, was a chrome look on a logo and set of letters that had to be installed in our local county courthouse. In the hallway of the second floor were some polished stainless-steel letters that someone had installed years before. They basically looked like chrome plated metal against a medium gray section of wall above large plate glass windows.

Our job was to produce a waterjet cut set of letters and a “county seal” logo, including a dimensional five-pointed star, most common in the Lone Star State. These would go on an adjoining wall and needed to have a very similar look. Our small sign shop had no real way to produce these parts in polished stainless steel. But we could copy the look of chrome with powder coating, and the powder coating shop is right across the street.



Left: To protect our sheet from piercing scuffs from waterjet cutting, the material was temporarily covered with vinyl, but this step was likely not needed. **Right:** The set of letters was waterjet cut, and then we had to remove the protective vinyl.



The letters were held stationary by dropping in the matching voids in our scrap material. Very small nuts were set in the holes to raise each letter above the surface of the sheet.



The final grain was created from making several straight-line strokes with our Scotch-Brite block, while applying firm downward pressure.

SHOP TALK



In recent years, powder manufacturers have created some powder that simulates chrome very well, but for durability outside the finish, needs a clear coat to keep it protected which dulling the effect a bit. However, this logo and set of letters were going inside, and did not need a topcoat, which meant the final look would be even better.

This simulated “chrome” finish is not expensive, and no more trouble to spray than any other powder, so there is nothing unusual about the

Above: With a maroon Scotch-Brite pad, we could get a medium to fine grain of brushed aluminum look, but we might have gotten even more texture with more coarse grit pads.

Top right: Here is the set of brushed grained letters before going to the powder coating shop for a clear topcoat.

Right: The letters were stud mounted onto an interior wall, but lighting in that area was a bit poor.





process, and any powder coating shop could do it.

The cost was way less than polished stainless steel, but once installed our display had a very high-end look. The final product was much approved by our client, which is our local county sheriff, so we certainly don't want to let him down.

So, whether we need to produce a straight grained brushed aluminum finish in a set of shop-made metal letters on a budget, a similar look in completely faux aluminum letters, or even get a finish much like polished stainless or chrome on parts we also made in our sign shop, there are ways to get these things done. Keeping more of the work in-house helps our bottom line and our timeline. And we know our clients will be happy with the results and their reasonable costs. What's not to like about that? **GP**

RICK WILLIAMS owns Rick's Sign Company, a commercial sign shop in Longview, Texas. He has been in the sign industry since 1973 and has been a contributing editor to *Sign Business* and *Sign & Digital Graphics* since 1986. Contact Rick via email at ricksignco@aol.com.



The Time Saver machine is made for deburring and graining of plate metal objects. Few sign shops could afford this equipment but can create real brushed aluminum letters by hand.



Another metal finish we needed to use lately, was a type of chrome or polished stainless look, which in this case was done with a fake but quite convincing powder coating "chrome" powder.



This "R" is a sample of one of the smallest sets of real metal letters we've ever had to work with. The size was only 1.25" tall by .25" thick and was actually stud mounted.



THE NEW AND IMPROVED 6 CORE DISCIPLINES OF SIGN DESIGN

HOW TO APPROACH THE DESIGN OF A SIGN FOR READABILITY

Are you in the sign business? Do you help your customers get their message out to their viewers (audience, team, students, employees, customers, prospects, etc.) by helping them create banners and placards and vehicle graphics that have their logo and additional information incorporated into the design?

Remember, signage means communication. Design enhances the delivery of the communication. No matter how great the design may be, if it doesn't communicate a message, it's only a design.

Words are optional. Symbols can count as signage if an intended message/thought/warning/direction/condition/identification/etc., is being communicated.

Below I have listed my **6 Core Disciplines of Sign Design**, and you may notice that my approach to each is a bit different and deeper than what you have previously considered. I try to consider the psychographic effectiveness of sign design and when possible, I try to incorporate elements that might appeal to the viewers cognitive behavior.

Designing a safety or warning sign for use at Disneyland requires a much different approach than designing the same safety sign for inmates at a prison.

DISCLAIMER

Yes, I know there are always a few exceptions that cross the lines and make the design a very challenging project that sometimes has no options but to ignore one or more of the rules. I get it, I've been there, and one of those challenging exceptions can sometimes be the client themselves who insists on having a 50% halftone of their mission statement superimposed behind their ornate old-

**BOLD
CONTRAST**

Here we are making sure that the primary message is seen, read, and understood. Or it may be used to call out an ID. It gets your attention! Note: I did not adjust the kerning on these examples. It's close, sort of, but for your sign design, kerning should always be mentioned, or applied as it occurs so that it is not overlooked. (All images courtesy Matt Charboneau)

**MEDIUM
CONTRAST**

Perhaps the message is absolutely needed on the sign, but not necessarily the focus of the message. This might be used for listing details or services, or benefits offered.

English, all-caps font selection, in red on medium blue with yellow shadow box outlines.

Yes, sometimes the customer's wishes override all common logic and design sense, and you give them the best of what

can be done with that hot mess of clutter they have dumped onto your plate. But this is not about those situations or how to work with a closed-minded client. That is a whole other article for a whole different case study. We are focusing on

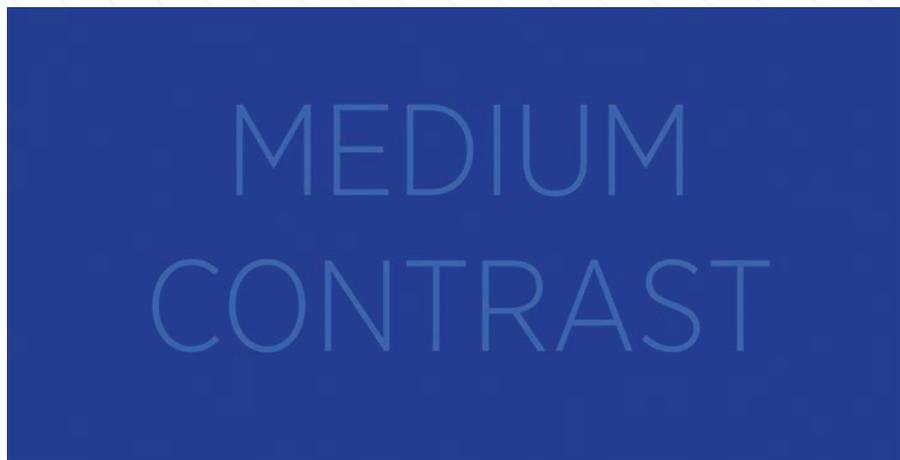
designing signs that are readable at the initial and optimum distances regardless of which sign type you are creating.

THE 6 CORE DISCIPLINES OF SIGN DESIGN

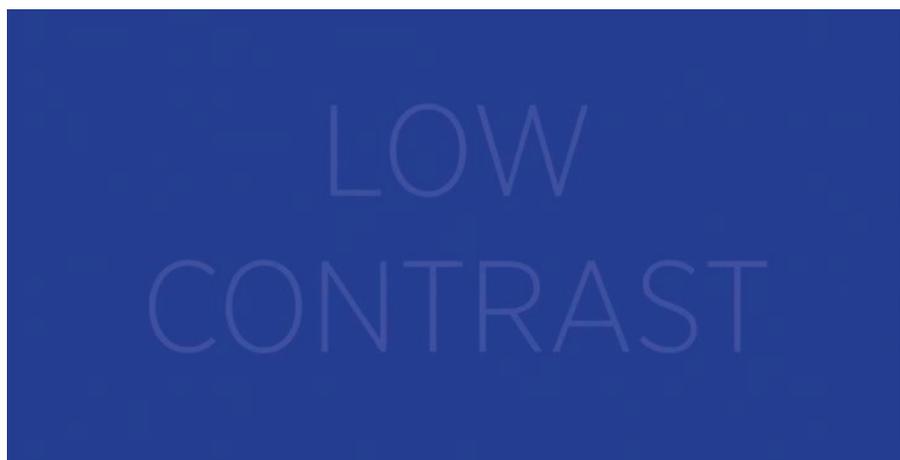
- Define the sign type by identifying its purpose — what is it communicating?
- Identify the read distance — initial and optimal?
- Determine the best size and placement of the sign — can less say more?
- Design with appropriate contrasts
- Choose a font that's readable from the initial and optimal distances
- Create a layout that promotes the proper importance and flow of the message(s)

See, I told you it would be a little different than what you may have seen in the past. This is something I've fine-tuned as a sign designer over the last 37 or so years. You may have seen a list like this online where companies offer up "solutionary" ideas to help their customer understand that there is more to sign design than just "a good-looking sign," but my approach focuses on the core of design disciplines that will provide the customer with a sign that actually does what it is intended to do.

Industry differences have no effect on proper sign design. Cars, boats, houses, dogs, cats, cows, rugs, hats, pillows or beds, effective signage must follow the core design disciplines that consistently produce effective sign designs. Period. And, I have noticed that 99% of most sign design fails have to do with designs that do not consider the appropriate read distance, contrast, or font choice for effective sign design. There's also "thought count," in



Notice how the thin stroke font tones down the visual impact over the heavier font.



For the sign industry, this technique is rarely used but could be if needed. Perfect for a screen display, a display ad and/or websites, e-flyers, etc. The letters are visible, readable, and clear. They just have so little contrast with their backgrounds that they are difficult to read quickly or practically.

which signs try to convey too many ideas to the viewer. No single core element is more important than the others as they all must be implemented for the sign design to do its job.

By the way, I can only presume that you are reading this article because **A)** You are a designer and you are constantly trying to improve your process, or **B)** You have a designer who is described as A. The good news is that this article is exactly what is needed to help guide the creative mind in the right direction for effective sign design.

DEFINE THE SIGN TYPE & PURPOSE

Sign design starts with an overall understanding of the purpose and function of the sign.

To do this effectively you must look at your customer's needs, opportunities, and challenges from a unique mindset that considers more than just the upfront obvious considerations.

Ever had to consider weather as an environmental condition that must be overcome for an effective sign design? Ever designed a sign that is regularly obstructed by light fog

or falling snow? Taking that into account would direct the sign designer to avoid the color white (duh!) and to work with extremely contrasting primary colors to frame the message so that it's "as readable as it possibly can be for the conditions."

Or it may take some selling skills on your part to increase the client's budget to consider an illuminated sign option, if so allowed. This is just a small example of what it looks like to have a sign designer's mindset. Always looking beyond the obvious, asking the questions that nobody else is thinking about for the benefit of maximizing the effectiveness of the sign's design.

IDENTIFY THE READ DISTANCE

There are some very specific "awarenesses" that must take place in recognizing what the differences are between designing a PULL TO OPEN door sign that's mounted on the door glass at eye level, and viewed initially from 72" away, and optimally viewable from 36" and again at 18" away (arm's length distance). Notice I mention the two optimal viewing opportunities. These viewing opportunities are most often overlooked because it's such an easy sign to hold in your hand and view. It's so easy, yet it's on almost every door, and is missed by almost everybody, including me.

Why does this happen? The design may have been pretty good, with lots of contrast, but when stickers of other importance are placed all around the PULL TO OPEN sign, it becomes lost in the visual clutter, and suddenly the sign that appeared to be readable, is nothing more than additional visual clutter on a very busy entry door — its message largely lost, and heeded only by those whose muscle memory is already familiar with the door's operation.

DETERMINE THE BEST SIGN SIZE & PLACEMENT

What was missed? The sign being too small? The sign's color or was it possibly



Here is an example of using bold contrast with heavy fonts. Keeping the fonts all the same size and crowding the sign's face with copy is a style I've seen more of lately. It is a style that offers its own intangible meaning and feelings; however, I do not recommend it for commercial signage as the message is lost within the "stylization" of the sign's copy. It should be the other way around.



Here I have chosen a font that adds a bit of visual interest, along with adding empty blank space around the copy so that it's more readable. I also used color to help the thinner font stand out more without being too overpowering.

the sign's placement — and the allowance of other stickers to interfere with the readability of the sign. An unobstructed surrounding environment is so very important for a sign like this to remain readable.

CONTRAST, FONT & LAYOUT

These are now moot points. No matter how successful your design is, if it's lost in the environment due to crowded con-

ditions by being surrounded by a sea of visual clutter, then it's still considered a sign project that wasn't successful.

Creating a sign like this would solve the visual clutter problem and provide a more visible, more readable, and more effective sign. Understanding what questions to ask for the variety of sign opportunities you may come across only comes from placing yourself mentally or physically (if possible) in the environment where the

sign is being installed to determine the best options for the sign. This, along with asking questions, will provide you and your designers with valuable insight as to the best solution for your customer.

The point I am making is that a PULL TO OPEN sign design approach is much different than the design for a billboard on an interstate highway. Two completely different disciplines, skillsets and considerations, yet so many times we see the core basics of sign design ignored, leaving unknowing clients with signs that “look so awesome” but fail when it comes to performing the job it was originally designed to do.

SIGN TYPE CATEGORIES: A QUICK OVERVIEW

A sign’s effectiveness is governed by both the visual and psychographic effects the sign has on the viewer. The sign’s purpose must first be identified before it can be designed effectively. Once the type is determined, keeping your design within the sign type category is key to it being effective.

- **Warning & Safety Signs:** Created with bold contrasting colors and

clear, recognizable text to focus the viewer on the importance of the message. STAY OUT, DANGER, PULL TO OPEN, WARNING - HIGH VOLTAGE, STAY ON PATH, FIRE EXIT, etc.

- **Informational, Regulatory or Communicative Signs:** Instructs us to stand here, do this, form a line here, or it might even explain the history of what you are viewing, or inform you of what happened on this site 100 years ago. Imagine a tour guide providing you with details of an exhibit; that is what an informational sign is like. These signs tend to offer up a lot of information, yet they still qualify as a sign provided it still meets the criteria of the rules of sign design.
- **Advertising Signs:** Different from informational signs because they typically include a call to action. This can be thought of as the business owner standing on the corner, screaming out the items his company offers to people as they walk past the business. The message is telling the viewer to “come on in” or “sale starts

Saturday” with “the lowest prices of the year.” Clarity and readability are of utmost importance, as critical as it is for safety signs. The more thoughts you have on the sign, the less effective each thought becomes. Too much information with not enough open space and bad flow creates an ineffective sign.

- **Identification Signs:** Mark, label, or indicate what or who is operating within this building or structured area. Logos are typically part of this category as they can provide a host of information in one simple iconic graphic. It might also be a sign that is as simple as a number or letter mounted to a wall, such as a building ID sign at an apartment complex.

NOTE: Yes, there are other sign type categories that are specialized and fit into non-typical industry needs. The sign types I have listed cover the primary types dealt with in day-to-day commercial and electrical situations.

If there were two key aspects to remember for effective sign design, they would be contrast and readability. If you remember this when that occasional, impossible, closed-minded client insists that you include the family crest, the fiery bird graphic and the tattoo-looking intertwined barbed-wire and red roses design into their new ice cream shop sign, you can do so with confidence that at least it’s readable from 300 feet away. You may not be sure of what is being read, but if it’s readable from the right distance, and the message they intended to communicate is clear, then you’ve done your job! **GP**



I still felt the “when” message was not standing out enough. Even for this exercise the “when” is almost as important as the “what” or “who” that might be advertised. Adding the darker bar helps the “when” stand out more, while also providing a better break between thoughts for the viewer. Some viewers may miss the detail of the doors opening at 7 p.m., and that is an example of the things to consider when deciding which bits of copy and info will clutter the message or clarify it.

MATT CHARBONEAU started his career in the sign industry in 1985 as Charboneau Signs. In 2017, he published the Pre-Sale Sign Survey Field Guide. In 2019, he started Storm Mountain Signs and the Sign Design Institute. Contact him at Matt@stormmountainsigns.com; www.stormmountainsigns.com; and 970-481-4151.



FULL COLOR TO MONOCHROME

TECHNIQUES FOR PRODUCING THE BEST MONOCHROMES FROM COLOR IMAGES

A monochromatic image can sometimes be a better choice than color for a specific purpose. Perhaps the picture needs to look old, like it's been sitting in drawer for the past 80 years. Maybe the image requires the dark black shadows and strong highlights for the dramatic look of a "cine noir" movie of the late 1940s. Then again, maybe it needs the grainy mistiness that only a monochrome can provide. And most commonly, the image may have to be prepared for a monochromatic publication. Whatever the purpose, you will no doubt sooner or later encounter the necessity of discarding the color information to produce a black-and-white or monochromatic image. As usual, I'm using Adobe Photoshop CC to demonstrate these techniques.

MONOCHROMES

A monochrome image is composed of a range of a single color. It could be black and white and the various shades of gray that are the product of total desaturation, or it could be a brownish tint like a sepia tone, or any other color from the millions of colors in the extensive RGB color gamut.

GRayscale

Even though the image may look spectacular in color, discarding the color information by changing its color mode from RGB to grayscale usually produces less than perfect results. So too, using the desaturation adjustment often doesn't produce the best results either. Ordinary desaturation can undermine the overall

tonal quality giving the image a flat, lackluster appearance as in **Fig. 1**.

There are several methods for creating a better monochrome. Each method has its own advantages. If one technique doesn't produce brilliant results, try another. All offer more control and the ability to preview the tonal range before discarding the color information.

THE BEST CHANNEL

Initially, this technique is quite easy because it involves looking at each color channel and determining which one looks the best. After the decision is made, a little bit of layer finagling will make the image pop.

Start by opening a full-color RGB image. Choose Window > Channels to

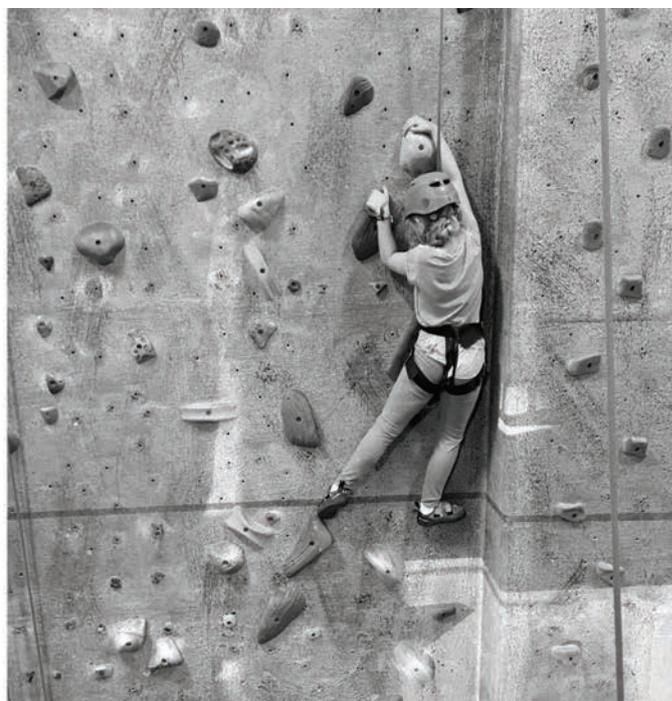
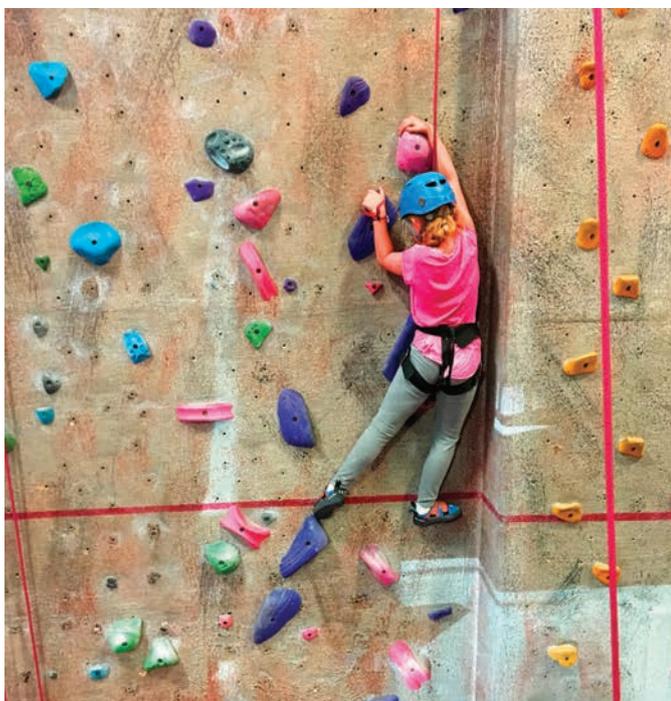


Fig. 1: Ordinary desaturation can undermine the overall tonal quality giving the image a flat, lackluster appearance. (All images courtesy Stephen Romaniello)

display the Channels panel. Scrutinize the color channels by pressing Cmnd/Ctrl-1 to observe the red channel. It should appear as a grayscale. If the channel is tinted red, choose Photoshop (Mac) or Edit (Win) > Preferences > Interface and uncheck the Show Color Channels in the Color checkbox.

Press Cmnd/Ctrl-2 to see the green channel and Cmnd/Cntrl-3 to see the blue channel. Compare the three color channels then click on the one that looks the best. In this case, it's the green channel. (Fig. 2)

COPY THE CHANNEL

In the Channel panel Options menu, choose Duplicate Channel to display the Duplicate Channel dialog box, shown in Fig. 3. In the Document pop-up menu, name the channel. Choose New for the destination to save the channel as a separate document. From the Image menu, choose Mode > Grayscale to convert the image from an Alpha Channel to a grayscale. Display the Layers panel. Click the background layer and choose Duplicate Layer from the Layer Options menu.

TONE AND TINT

From the Blend Mode menu, choose Soft Light to enhance the contrast of the image shown in Fig. 4. Tint the image to slightly warm or cool the image. Go to Image > Mode > RGB to convert the image's color mode so that the image supports color. Next, go to the Adjustments panel and click the Photo Filter icon. Choose a filter from the list on the panel or click on the swatch to display the Color Picker. After choosing a color, drag the slider to control the strength of the filter. (Fig. 5)

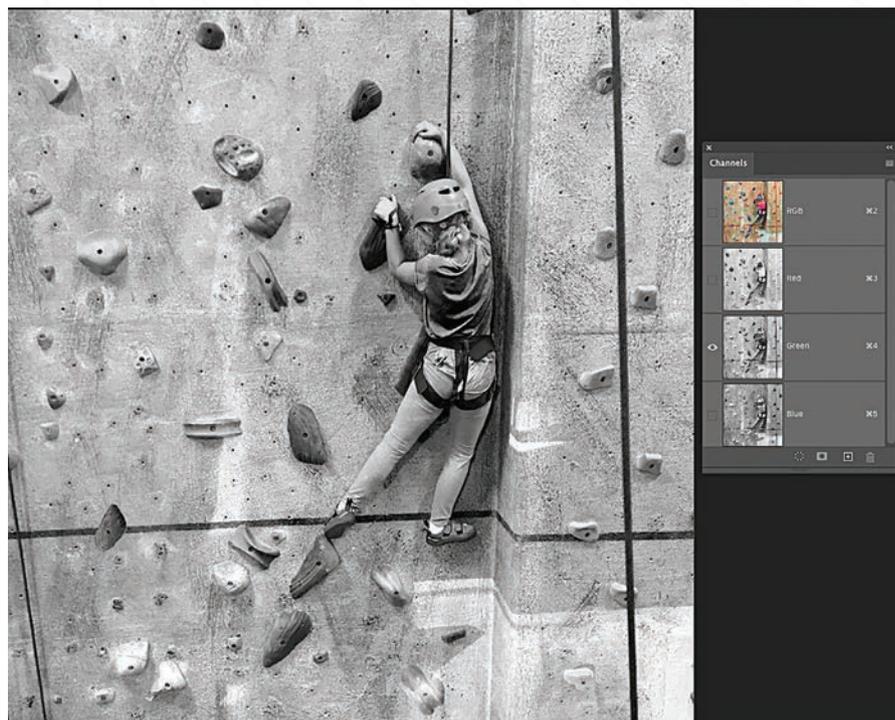


Fig. 2: Compare the three color channels then click on the one that looks the best. In this case, it's the green channel.



Fig. 3: The Duplicate Channel dialog box.

THE CHANNEL MIXER

This variation of the color to monochrome technique uses the Channel Mixer on an adjustment layer to combine values of the three color channels into an image with a wide tonal range. The advantage of using the Channel Mixer technique is its flexibil-

ity. All the controls are in one interactive dialog box and each channel's tonal range can be adjusted independently. This technique also employs a layer mask for even more control. Here is a step-by-step guide on how to mix channels into the perfect monochrome.

THE DIGITAL EYE

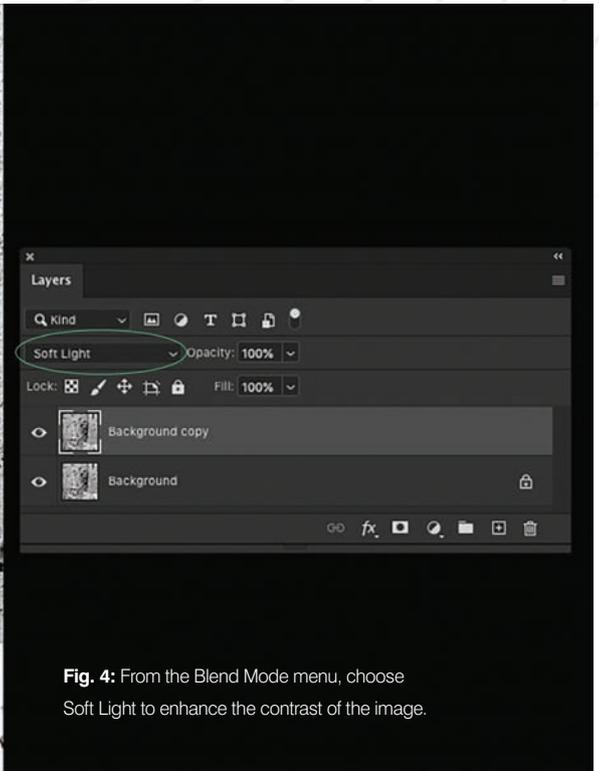
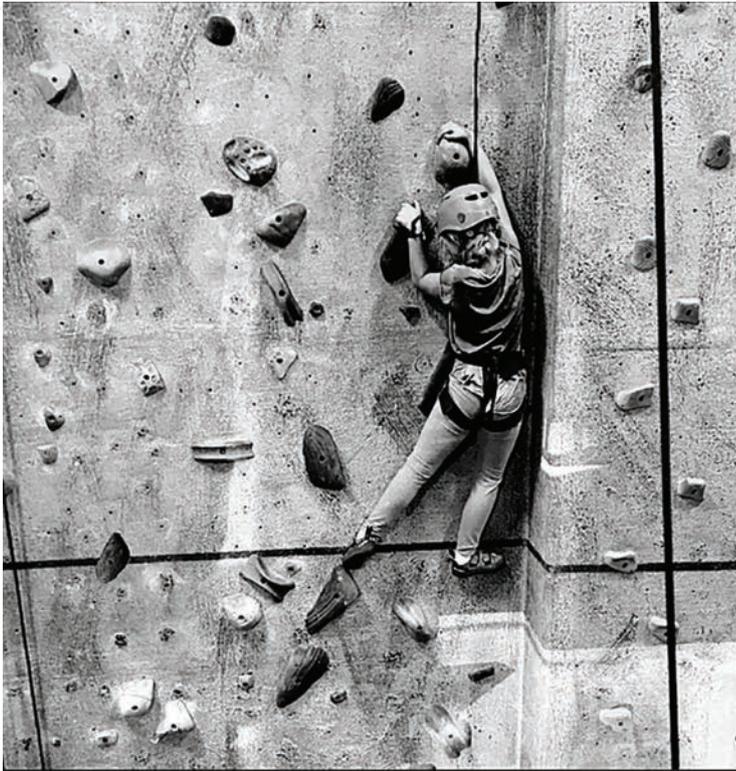


Fig. 4: From the Blend Mode menu, choose Soft Light to enhance the contrast of the image.

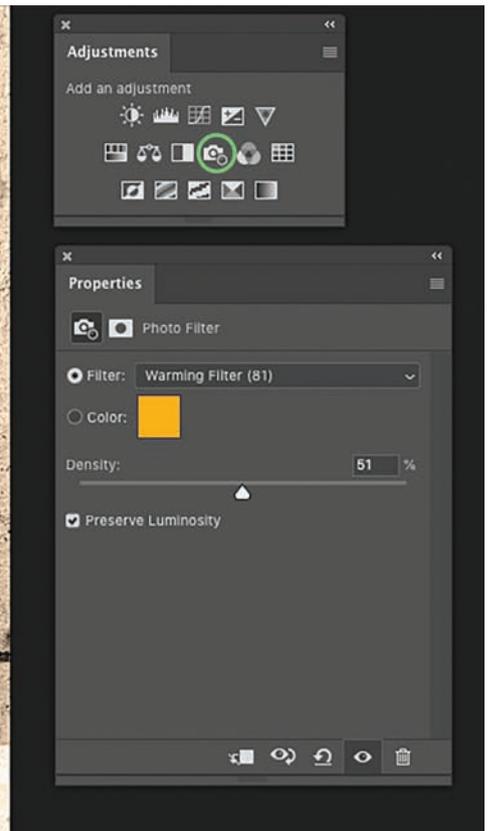
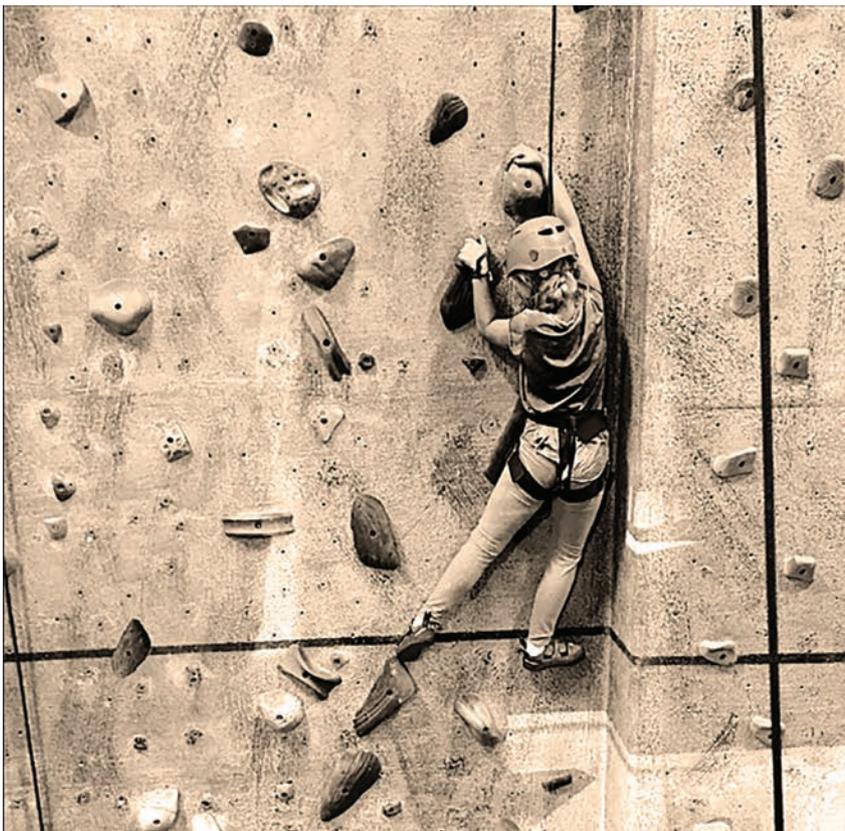


Fig. 5: The Photo Filter adjustment tints the image.



Fig. 6: The Channel Mixer adjustment panel controls the RGB values on a monochrome image.



Fig. 7: Initially the Channel Mixer produces a rather disappointing monochrome.

1. Start by opening a color photograph. Go to the Adjustments panel and click on the Channel Mixer icon. (Fig. 6)
2. Click the Monochrome checkbox. By default, the image now appears black and white and the red and green sliders read 40% and the blue slider reads 20%. This produces a
- rather disappointing monochrome. (Fig. 7)
3. Drag the sliders to get more punch and pop out of the image. Drag the red slider to the right to 75%, and then drag the green and blue sliders to the left until the image shows a good contrast. Drag the constant slider to +2 to slightly lighten the im-

- age. (Fig. 8) Of course, these numbers represent the ideal tonal correction for this image. Other images will require different adjustments.
4. Playing with the sliders a little will produce even better contrast. Determine if the contrast is good by observing the lightest and darkest areas of the image. The highlights should



Fig. 8: Dragging the sliders produces more distinct contrast and better tonal relationships.

be bright but not blown out. The darks should maintain detail.

5. If necessary, click the adjustment layer's layer mask to target it. Choose the Brush tool and a medium soft brush from the Options bar brush menu. Press the D key to set the foreground and background color to the default white and black. Click and drag over the image to paint the highlights back in.
6. Don't forget that even though the image appears as black and white, it was captured in RGB mode and should ultimately be converted to grayscale.

BLACK AND WHITE

The Black and White feature in Photoshop controls all the characteristics of color to black and white conversions in one concise interface. It's like the channel mixer in that it targets specific ranges

of the color in the original image and adjusts them independently. The difference is that the targeted colors can be combinations of RGB colors. In other words, each adjustment is not limited to an individual color channel but can affect multiple values simultaneously. The interface is pretty straightforward.

Open an RGB image (Fig. 9) and click on the Black and White icon in the Adjustments panel. The image changes to a desaturated version of the color image. Drag the individual sliders to adjust the brightness percentage of each color range. As the sliders are dragged, the brightness of each range is affected (Fig. 10). Preconfigured brightness and contrast values can be applied by selecting one from the Preset pop-up menu at the top of the panel. These values simulate photographic filters or specific photo effects.

If desired, click the Tint checkbox to

apply a color tint to the image. Drag the Hue and Saturation sliders to modify the black and white image into a sepia tone or another monochromatic color.

The Black and White command works only in RGB mode. When the command is applied to the image, though it appears as a grayscale, it remains in RGB mode until it is converted to grayscale.

THE BEST MONOCHROMES

Using any one of the three techniques presented here will produce a great monochrome with a minimum of effort. These step-by-step processes are designed to achieve optimal brightness and contrast on a monochromatic image. Remember however, that each image is unique in its requirements. As in all Photoshop workflows, experimentation is the key to producing the best results so don't be afraid to play around with the features.

I hope this article has increased your



Fig. 9: Open an RGB image and click on the Black and White icon in the Adjustments panel. The image is desaturated.

understanding of how to achieve a monochromatic image that exceeds your expectations. Don't forget to tune in for my next Digital Eye article in *GRAPHICS PRO* magazine that will show you the best techniques to colorize a monochrome into a full color image. **GP**

STEPHEN ROMANIELLO is an artist and educator who has been teaching computer graphics since 1990. He is the founder of the Digital Arts program at Pima Community College in Tucson, Arizona. Stephen is a certified instructor in Adobe Photoshop, Adobe Illustrator and Adobe Premier and the author of numerous books, articles and media on the creative use of digital graphics software. Steve is the founder and CEO of GlobalEye systems, a company that offers training and consulting in graphics software and creative imaging.



Fig. 10: Drag the individual sliders to adjust the brightness percentage of each color range. As the sliders are dragged, the brightness of each range is affected.

Introduction to Wayfinding

DIRECTIONS TO GUIDE YOURSELF THROUGH A SUCCESSFUL SYSTEM

BY JD HAMILTON



Wayfinding is an integral method of guiding people from one area to another in an unfamiliar place.

Definition – The basic art of getting people from point A to point B. The dictionary defines it as the process or activity of ascertaining one's position and planning and following a route. You can look at wayfinding as the visual language of moving people through space.

History – Wayfinding is as old as signage and has its roots intricately tied to it. It dates back to when most people could not read, and shops like shoe cobblers would hang a large shoe on their building, and blacksmiths would hang a carved anvil, so people knew how to find them. Ironically, wayfinding as a discipline of signage only began to evolve as a standalone discipline starting in the 1950s, and its importance has quickly been rising since.

5 PRINCIPLES TO SUCCESSFUL WAYFINDING

- Create an identity at each location: This is the tie-in with signage. Your final destination needs to be easily identified.

- Use landmarks to provide orientation cues: This can either be a physical reference, a sign at a location, or another part of the wayfinding system that keeps travelers moving in the right direction.
- Create well-structured paths: While usually well beyond the scope of work for signage, architects, builders, and contractors should be mindful of a safe and open “pathway” for the traveler.
- Create regions of differing visual character: Ah, theming and branding. We will cover this in more detail. But all successful systems must have directions that are sized appropriately and easily read.
- Don't give the user too many navigational choices: Think of the overly complicated instructions back in the day by Sears and Roebuck to assemble furniture and contrast that to the simple instructions by Ikea. KISS – keep it simple stupid!

4 COMMON TYPES OF WAYFINDING

While we could spend a whole series of podcasts on wayfinding, in the interest of

time, let's discuss four primary types and compare and contrast them.

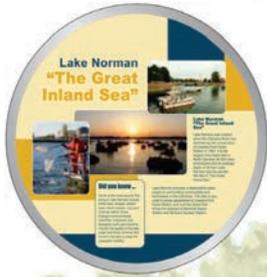
WAYFINDING FROM A VEHICLE

Over the years, it has become more popular for tourist and historic main street projects to include some type of wayfinding system for people in vehicles. These systems need to consider that they are read from a distance and take a traveling vehicle's speed into account. There are many sources from the Department of Transportation that discuss size and best sans-serif font types to be used and vary upon the desired reading distance. Often reflective backgrounds will be mandated by code. You will often see these systems have several sign types of varying sizes that are used at thoroughfare (where cars are moving at a higher speed), smaller signs at stoplights, and special sign types in slow-moving downtown/historic areas that have the hybrid job of communicating directions to both vehicular and pedestrian traffic. Outskirt wayfinding and historic wayfinding in the same system are often differentiated by unique sign types.

Keep in mind that many of these signs are installed in right-of-ways, so DOT guidelines must be followed. They often



Zoos are a fun example of creative wayfinding. Often, they will have several different exhibit areas. Wayfinding can direct, identify, and expand the experience for the traveler. (Images courtesy JD Hamilton)





LISTEN TO JD HAMILTON BREAK ALL OF THIS DOWN AND MORE ON THE GRAPHICS PRO FILES. TUNE IN TO HIS EPISODE AT <http://gpro.link/jd>

will need a stamped engineered drawing, and most importantly, utility checks will be needed before any installation. I have seen a lot of companies underestimate the time and expense needed to cover these requirements.

PARKS, ZOOS & UNIVERSITIES

Directions to fun and games or getting to that boring English lecture? These projects have a lot of creative potential. They also often have the unique wayfinding “buddy” — the park map — that is usually given out with the entrance ticket or the multi-thousand-dollar tuition bill. These two resources, when created with the same goal, can be invaluable to the traveler. Like the signage for vehicular traffic, these signs are usually exterior but can be smaller since pedestrian traffic is moving by foot. For both, it is important to design and fabricate with appropriate materials that can handle harsh environments, UV rays, and regrettably a potential vandal with a can of spray paint.

Let’s use zoos as a fun example of creative wayfinding. Often, they will have several different exhibit areas. Wayfinding can direct, identify, and expand the experience for the traveler. They may have an “Australian Outback” area with kangaroos and koalas. This area could have an Aboriginal

carving for a post, so the traveler knows they are in that portion of the zoo. An “African Safari” exhibit featuring elephants, hippos, and lions could have another look. The typeface, colors, and size of the actual signage should be consistent throughout the zoo, but the unique location could be modified in several ways to let the visitor know where they are. You often see rentals available for audio experience, and in today’s modern world, apps can be downloaded to give cues and background information along the journey. Wayfinding in today’s world is more than just signage.

For universities, you often see modular architectural post-and-panel systems made of extruded aluminum components. These systems are designed for modifications or additions, featuring the school’s colors and logo.

Many state and federal parks prefer the use of HDPE (high-density polyethylene) in two-color substrates where you CNC carve through one color into another (often brown and white or golden yellow and green). This is highly durable and very vandal resistant.

HEALTH CARE FACILITIES & AIRPORTS

These systems are primarily interior, so there is not as much emphasis on the harsh environments found in exterior wayfinding. However, ADA (Americans with Disabilities Act) can often be a requirement. This can vary from state to state and municipality to municipality. So, you need to do your research on what is required. Typically, “directional wayfinding” does not need raised copy and Braille, but destination and room signage will require it. The key to a successful system is tying them all in with the same colors, fonts, frames. Keep in mind, to meet ADA requirements on the room signs, you must have high

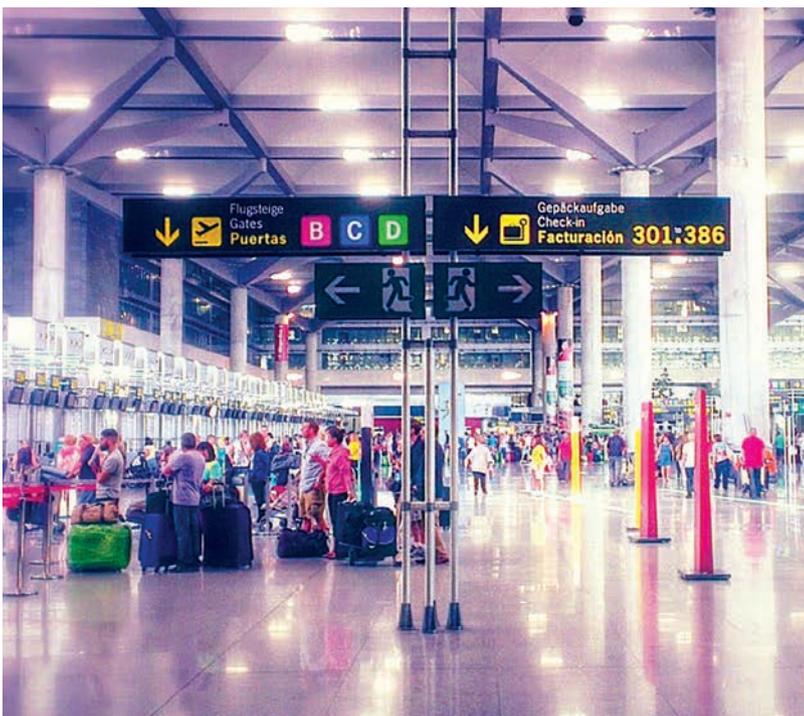


In many state and federal parks, you’ll find HDPE (high-density polyethylene) in two-color substrates. The material is CNC carved through one color into another, often brown and white or golden yellow and green. (Images courtesy JD Hamilton)

contrasting colors, matte (or non-glossy) backgrounds, as well as appropriate Braille and raised sans-serif copy. These requirements could impact the look of the overall wayfinding system.

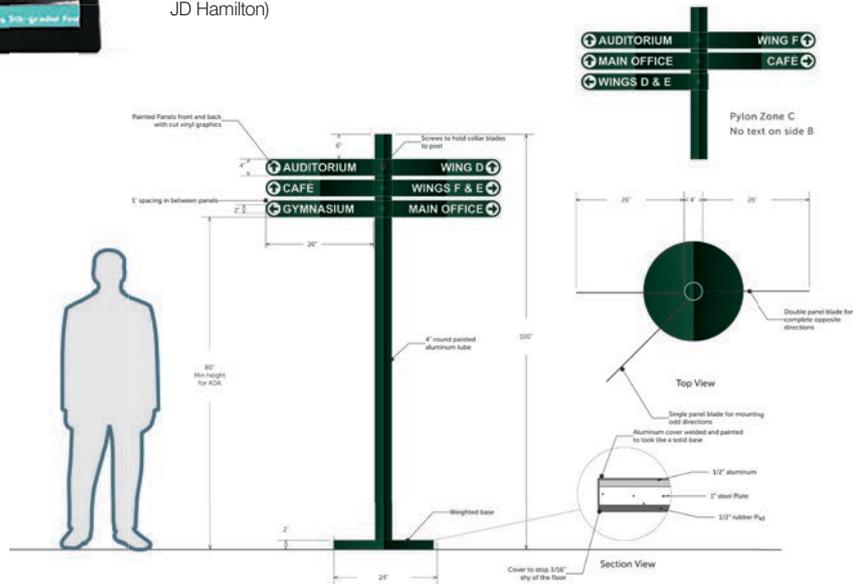
A lot of work goes into sign types and message schedules, and it is imperative to pay close attention to travelers coming off an elevator and placing the initial wayfinding in a location that quickly and easily directs left or right. Additional wayfinding is also found at the end of hallways, and the design and installation need to be looked at carefully if it is to be wall-mounted or hanging.

Airports are a unique situation. There is somewhat of a standard found amongst airports. They often have large open areas and concourses. So, wayfinding needs to be designed to be easily read at a distance — often large copy seen in vehicular systems. Each airport has its own special color scheme and creativity, usually found in unique large identification signage going to concourses, identifying departure or arrival gates.





(Images courtesy JD Hamilton)



CORPORATE & RETAIL

For corporate locations, you can follow the guidelines of health care, but the expense and amount of wayfinding are not often needed. This system in the past was often handled with a changeable building directory that identified which floor to go

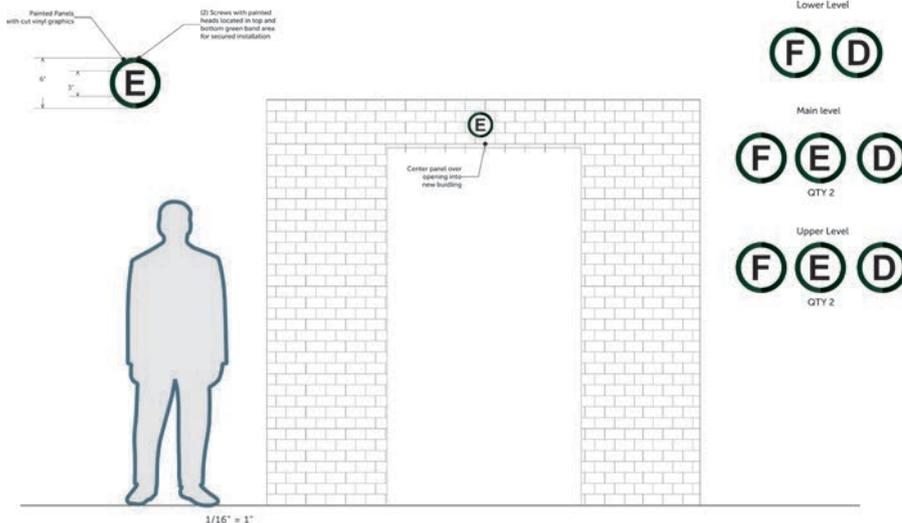
to and another smaller directory of what businesses are located on the floor when exiting a stairwell or elevator.

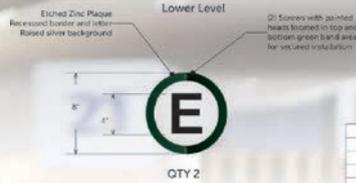
As a sign maker, I hated these jobs that required updates from a company that either formerly created it decades ago or went out of business. It was hard for the

property manager to justify paying the price to add one new tenant and even more frustrating to do this job as a loss leader for potential other work. Most of the time, it was a lose-lose relationship for both.

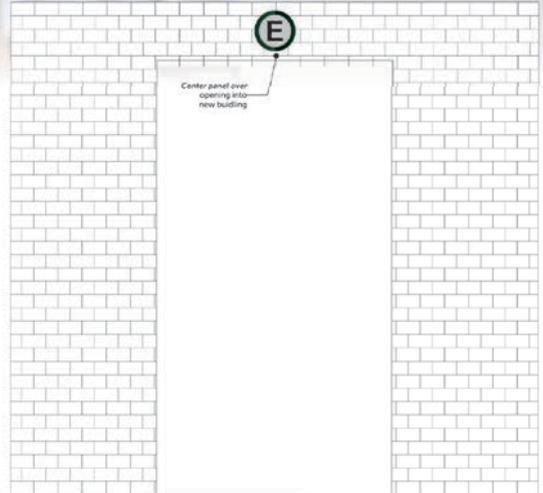
Enter technology! Today there are a variety of interactive electronic directories. These not only deliver wayfinding information, but they also offer the ability to communicate other helpful information. Advertising can even be sold, and property managers can make these new directories into a revenue maker! Time, weather, and other info can be communicated. Best of all, the property management, after purchasing the unit and having it installed, can make their own updates.

Depending on the corporate and retail size and requirements, these systems can be static running info on a loop or a touchscreen where the visitor can have an interactive experience. For example, where can I get lunch after my appointment?





EXPLORE HOW DIGITAL SIGNAGE CAN PLAY A ROLE IN WAYFINDING:
<http://gpro.link/wayfinding>



1/16" = 1'

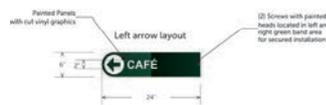
BANDING & THEMING OF WAYFINDING SYSTEMS

Far and away, the biggest change and improvement to successful wayfinding systems involves creative design that projects a unique experience for the traveler/visitor. This goes across the board for any wayfinding project.

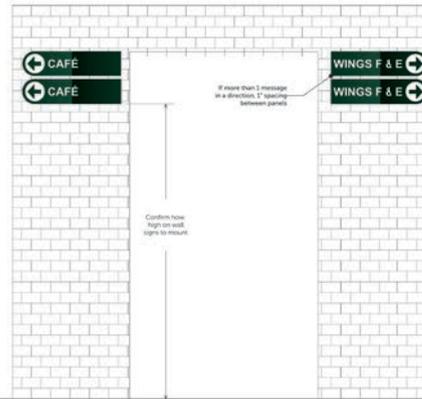
While the primary purpose is to provide clear and concise directions from one place to another, the visitor can be immersed into a themed environment. The primary importance of having easy to read sans-serif copy on a contrasting background with clear graphics of arrows and directional symbols remains. The ability to work with unique sign shapes, materials and incorporate header graphics or logos not only aids the visitor in knowing where they are but creates a branded image for the company or organization that is directing them.

This is the area where successful designers and fabricators can thrive, strut their stuff, and deliver a unique and valuable product and service for their clients! The journey can be the experience. Crafty designers realize beyond getting travelers and visitors successfully from point A to B that they can create an experience for them. This is where interpretive graphics and signage along the route can fully be directed, educated, and immersed in a branded and themed environment.

Think of visiting a zoo. Sometimes you



(Images courtesy JD Hamilton)



may come across lion paw prints in the walkway, letting you know where you are. Perhaps some signage that describes the vegetation of Africa explains the habitat. For corporate wayfinding, this is a great opportunity to give historical milestones of a company's achievements. Wayfinding opens the door to express and educate more than just directing.

WHERE DO WE GO FROM HERE?

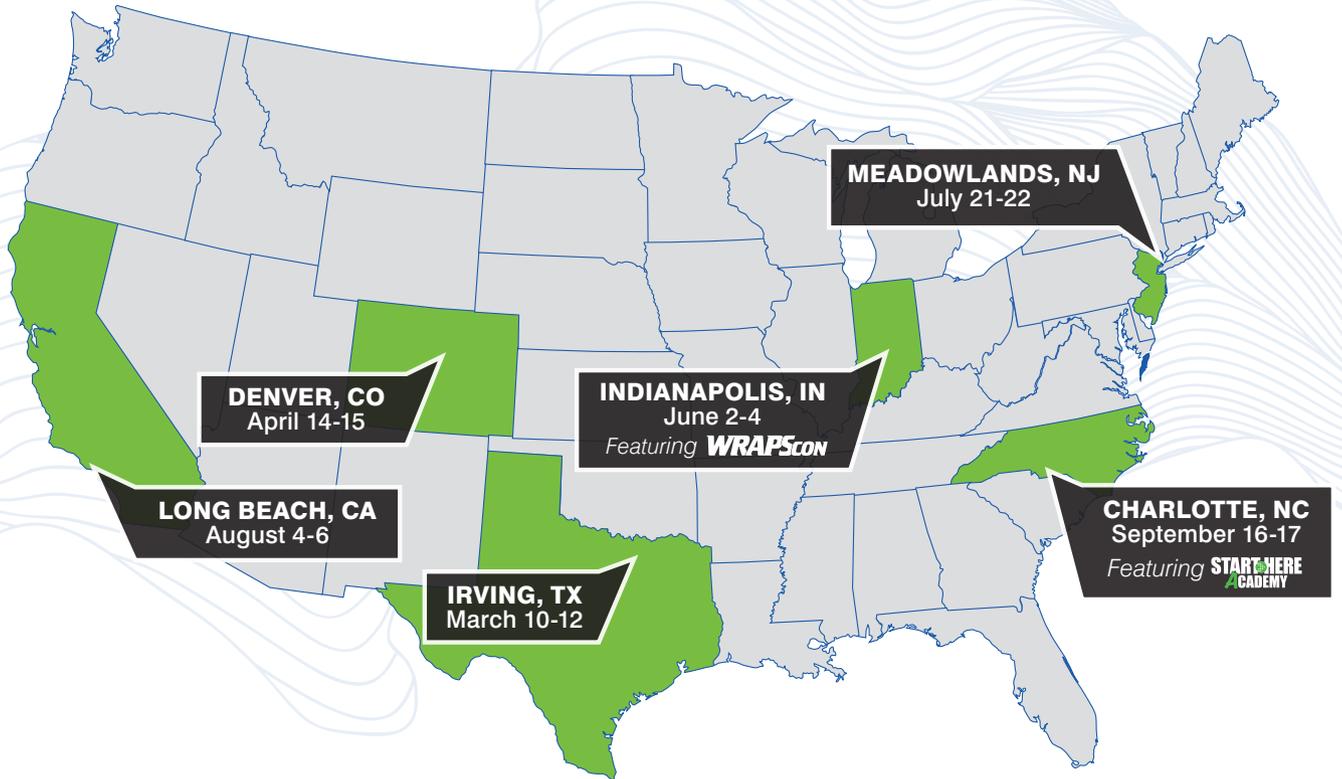
There is no wayfinding to give that direction. With advancements in materials and technology, there are sure to be new changes that will help people get where they want to go. Other media like apps

may be used on mobile devices that not only direct you on your path but in some systems may also allow an interpretive experience on the journey there. Remember, the key is "how" to go, not "where" to go. Although being in the trenches, we may resort to the latter. **GP**

JAMES DEAN HAMILTON has been writing for NBM since 1995. After a decade sabbatical from writing, he is back in the saddle. With over 30 years of experience, he has vast experience in everything signage and marketing, and workflow management.

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Ensuring Efficient Fume Extraction

PROPER INSTALLATION AND LOCATION IS THE KEY TO BEST RESULTS

BY JULIA SCHROEDER



Fume extraction is an essential component of most graphic shops. Laser cutting and engraving, 3D printing, inkjet coding, among many other industrial processes, all generate respirable dust and gases that can be toxic at higher concentrations.

Airborne contaminants can include both particles (including nanoparticles) and gases (including volatile organic com-

pounds), explains Brian Tefertiller, BOFA. Exposure to these emissions has the potential to impact human health, ranging from headaches, eye irritation, skin problems to occupational asthma.

“It is important to remove these contaminants from the air before it reaches you,” says Chau Vo, PAT Technology. “Filtered fume extractors pull the contaminated air right from the source, filter the contami-

nants out, and return clean air into the room.” Fume extraction helps reduce both indoor and outdoor pollution, benefitting the laser operators and the environment.

Using this technology not only helps maintain a safe environment for employees, says Tefertiller, but it also helps to maintain productivity by keeping equipment free from dust that might otherwise impact product quality and machine reliability.



“Fume extraction should be considered any time there is the potential of particles, vapors, or gases being presented into the breathing air of a facility,” says Brad Banfill, Purex Inc. To properly specify the correct size and filtration, Banfill explains it’s important to understand the processes creating the fumes and the chemical makeups of those fumes. In many cases it’s best to have the safety data sheets for materials being lasered and any other materials involved in a process.

DETERMINING THE NEED FOR A FUME EXTRACTOR

“There are two main triggers in determining when a shop needs a fume extractor,” says Tefertiller:

- First, employers must assess the risks to health caused by exposure to dust and fume in the workplace and take steps to ensure that any exposure is prevented or adequately controlled. This requires an assessment by reference to material safety data sheets and occupational exposure levels to determine the preventative measures that need to be taken, including installation of fume and dust extraction technology.
- Second, the impact to the product quality created by non-filtered processes may increase costs and downtime.

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SIGNS A FUME EXTRACTOR IS NOT WORKING EFFICIENTLY

Most professional fume extractors will have alarms to tell you when there is a problem. However, Chau Vo, PAT Technology, says there are two signs that the extractor is not operating properly:

1. Smoke is not being evacuated fast enough from the laser enclosure. You should be able to see this through the glass door of the laser. This usually means that the dust filters are clogged and need replacing. Alternatively, it could be a sign that you have a leak in the ducting between the laser and the fume extractor.

2. Odors are getting stronger. This usually means that the gas filters are full and need replacing. As above, it can also mean that you have a leak in the ducting between the laser and the fume extractor.

Additionally, Brad Banfill, Purex Inc, says machine operators or other people near the process may complain of headaches, depending on the process and what fumes are being created. **GP**



Most fume extractors work best when they are kept relatively close to the laser, printer, or other equipment. (Image courtesy BOFA)

Weighing these factors will help to guide the user on best practices when installing or updating equipment.

“In general, using a fume extractor is always a good idea as it relates indoor and outdoor air quality,” Vo adds. “However, if you know that you or your staff are sensitive to odors and chemicals in the air and/or you want to avoid any conflicts with your neighbors who would object to chemicals being blown in their direction, the filtering fume extractor can help maintain a good relationship with those important people and make your business run smoothly.”

Vo encourages purchasing a fume extractor at the same time as the laser, or other type of equipment, to proactively avoid any issues from the get-go.

CHOOSING A FUME EXTRACTOR

Fume extractors come in a variety of shapes and sizes. When determining which fume extractor to go with, it’s important to understand the areas involved, the amount of air-flow required to pull fumes from a process, and any surrounding areas which may be affected by the production of fumes, Banfill explains. Proper sizing and filter selection are important to get the most optimal solution.

“If you know which materials and the quantity you will be processing, share this information with the fume extractor manufacturer and they can help you determine the best fit for your application,” Vo says. For example, if you know that you will be cutting acrylic, a fume extractor with a large



When installing your fume extractor, hoses or ducting should be as short as possible to keep any turns or bends to a minimum, to avoid any unnecessary frictional loss. (Image courtesy BOFA)

capacity for gases would be appropriate.

Some processes are more prone to creating potentially harmful byproducts and should be fully researched when looking for the best solution, Tefertiller explains. For example, thermal plastic processes and solvents can give off volatile organic compounds (VOCs), while PVC releases hydrogen chloride/hydrochloric acid and small amounts of phosgene when lasered or thermally processed, both of which are highly toxic.

SETTING UP A FUME EXTRACTION SYSTEM

When installing a fume extraction system, it's good to keep in mind the surrounding environment. Banfill asks, "Where do you want the clean air directed, are there any other sources moving air in the surrounding area, what voltages and power supply are available?" Also, when installing, Banfill says that any hoses or ducting should be as short as possible and to keep any turns or bends to a minimum, to avoid any unnecessary frictional loss.

"Space is usually at a premium," Vo adds. "A balance of size versus performance/capacity must be struck. Most fume extractors work best when they are kept relatively close to the laser or other equipment. This limits the length of ducting/hose required to connect the laser to the fume extractor, according to Vo.

However, Tefertiller explains that the precise design of each system will require in-depth analysis of many different variables to ensure correct mitigation of risk. "This detailed research will involve taking account of material safety data sheets, the makeup and volume of airborne contaminants and/or gases given off by the pro-

cess, the type of production machinery, whether the process is enclosed, the duration of production, and whether there are thermal risks associated with higher temperatures."

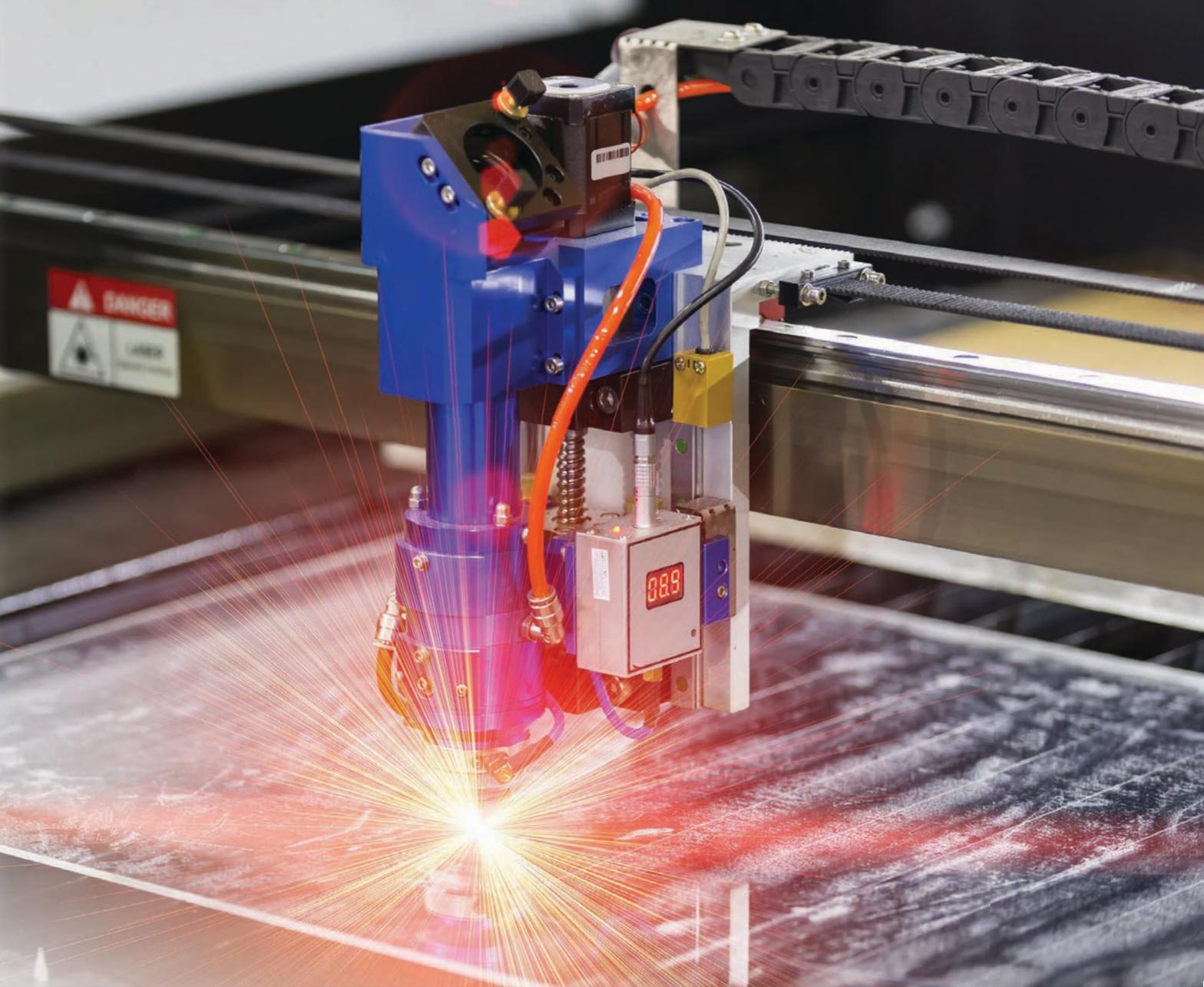
Vo says to choose an extractor that has an electronic feature, often referred to as an "intelligent flow regulator." This feature allows users to initially set the fume extractor at the right flow setting to evacuate the fumes from the process. Then the system automatically maintains that flow set-point despite the increasing restrictions caused by the buildup of dust in the filters. This ensures that you have consistent performance throughout the



The fume extractor will often be equipped with filter monitoring, such as particle counters and VOC detection. (Image courtesy BOFA)



Most professional fume extractors will have alarms to tell you when there is a problem. (Image courtesy BOFA)



life of the filters and maximizes the potential capacity of the filters.

Proper filter changes are one of the most important things to make sure fume extractors are running properly. Banfill suggests keeping stock of spare filters so there are not delays when filters become saturated or blocked. It is also good to check or replace hoses and ducting to ensure there is a clean pathway from the process to the fume extractor.

The fume extractor will often be equipped with filter monitoring such as particle counters and VOC detection to assist with this. Otherwise, it is left to the user to set up the frequency. Each process produces a different level of fumes; therefore, the life of filters differs between applications and frequency of use.

PERFORMING MAINTENANCE CHECKS

Most professional fume extractors are designed to run with minimal maintenance, but there are some basic things to keep on top of, according to Vo:

- Regularly check the ducting/hosing for blockages, leaks and to ensure it is connected to the laser and the fume extractor. (On rare occasions, people have run the laser without being aware that the fume extractor was disconnected from the laser.)
- Check the status of the filters on a regular basis. This will help you change the filters at the right time and ensure that you are running as efficiently as possible.
- Again, keep spare filters on hand so that you don't have to scramble to get replacements at an inconvenient time.

Fume extraction maintenance checks should be carried out weekly, some monthly, and some annually. "Regular servicing is also recommended — in many countries this is a legal requirement and it's important you refer to your local regulatory body for specific guidelines," Tefertiller adds.

And one last word of advice: Banfill encourages users to consult their local agencies to verify if there are laws or regulations regarding fume extraction. **GP**

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BETTER
HAVE
PLENTY
OF AIR

COMPRESSORS for BLASTING on GLASS



BY RUTH DOBBINS

After the last project interlude, it is time to get back to the essentials of our business. One of them (something we are receiving a whole bunch of questions about lately) is the seemingly never-ending topic of the air compressor. And it is an important consideration; after all, the compressor is the “heart” of our blasting system and the one item that seems to stump most beginners.

Choosing the right compressor is the most important choice you will make in order to work efficiently. If you do not solve this problem adequately, it will come back to haunt you in more ways than you may think. The general question is: what



Left: This is a common model of an electrical upright compressor with a belt-driven motor and an 80-gallon air storage tank. The uprights take up less space than the horizontal models. (All images courtesy Ruth Dobbins) **Right:** A two-stage belt-driven horizontal compressor, also with an 80-gallon air storage tank. As you can see, this type of compressor requires quite a bit more space than the uprights.

kind of compressor should I get? This usually implies that the questioner wants to hear a name brand, when they should be asking: what type of compressor should I get and how much air does it need to be able to produce? What's the difference? Well, a big one.

Let's take a look at what's important. In order to give you a complete overview of the topic, I need to give you a good amount of technical information. Bear with me, I will try to keep things as uncomplicated as possible, and hopefully it will help you choose wisely if you are just starting out, or it may help you change your current situation to a more efficient one. Here we go, and yes, this will be a two-part article.

TYPES OF COMPRESSORS

Most people think that a compressor is a compressor, but that's far from true. There are at least five different types of compressors available, and knowing about these is important. The types are diaphragm, piston, rotary vane, rotary screw and coil.

Diaphragm, more commonly known as oil-less compressors, are to be avoided for our type of work. For the most part, they are small and do not put out enough air. The larger ones are considered light duty compressors and are noisy. Many of the known hardware stores carry these types of compressors as their low-end "handyman" compressors. We have used an oil-less compressor a few times only to find that the motors do not hold up for our application. After burning up two motors, we decided to never use one of these compressors again.

Piston compressors are by far the most common type of compressors available today. Their cost is relatively reasonable, their maintenance cost is acceptable, and they are available in many different sizes and come in about three different quality levels: handyman, commercial and industrial. They require an air receiver, or air storage tank, and are available in various configurations from vertical, horizontal, portable and stationary.

Rotary vane and **rotary screw** compressors are more high tech and geared to large air production while also carrying a higher price tag. These types of compressors are made for demanding industrial applications that may require them to run 24/7 and sport a long service life. They generally cost two to four times as much as piston compressors that produce an equivalent amount of air, which mostly puts them out of consideration for glass etchers. However, if you are a production studio blasting on a continuous basis, one of these compressors may just be what you want. You could blast for extended periods of time with consistent air flow and on top of that get a compressor that produces little noise. We used rotary vane compressors in England for our workshops there and were impressed by their quietness; you could hardly hear them running. We also used rotary screw compressors in other European countries and here in the U.S.; we were impressed with their performance as well, even though they were a bit louder than the vane models. These compressors use a set of twin screws, a male and a female, to compress the air instead of pistons.

I do not have much information about **coil compressors**, which are lesser known to us, since we have not had the experience of working with one of them, but from what we have read, they also seem to be high-quality machines and priced right along with the rotary screw compressors.

COMPRESSOR COMPONENTS

Piston compressors are the most widely used compressors, so I will concentrate on this type here. These compressors have three basic components: the motor, the pump and the storage tank. All the other miscellaneous parts are related to those three. The motor powers the pump, which pressurizes the air and sends it to the tank, where it is stored until it is used by the blaster; here is more info about the individual components.

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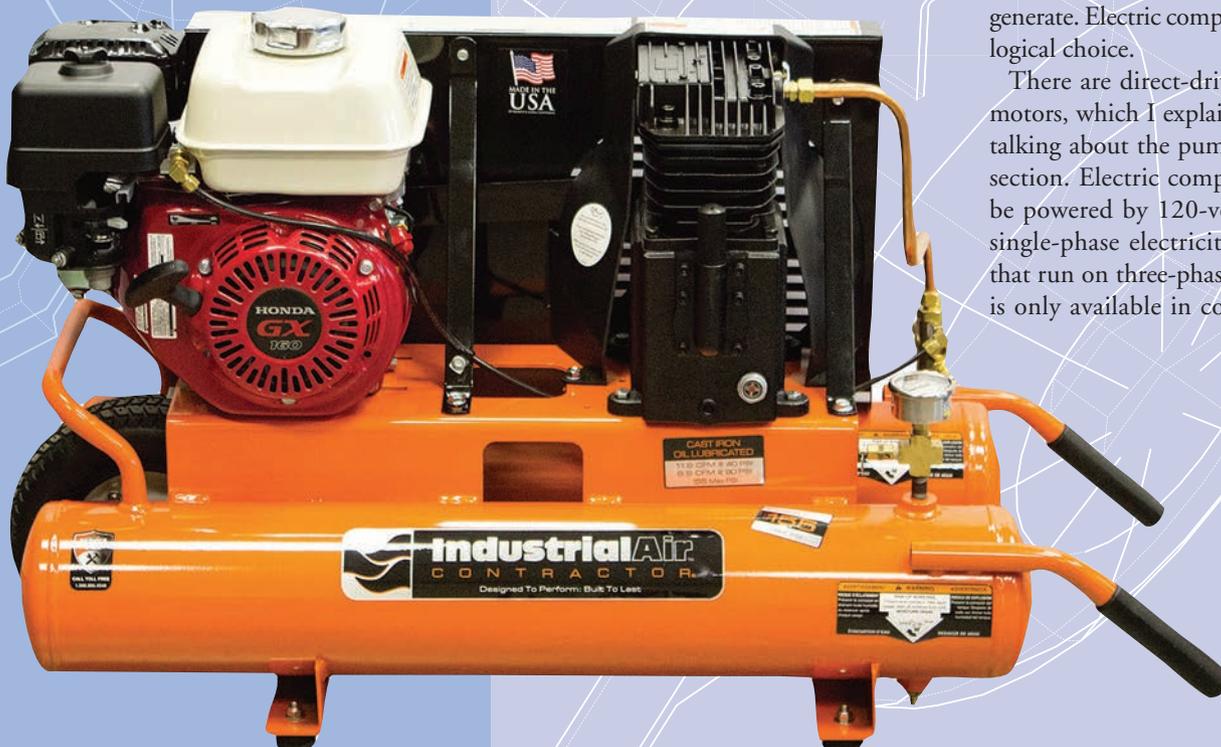
This is a common “handyman” model on two wheels, making it possible to easily move. These compressors run on common 110 household current but are generally low in air output. If you are on a low budget, you could use two of these low-end compressors and pipe them together.

THE MOTOR

Piston compressors are either powered by electric or internal combustion motors, such as gas or diesel engines. Though gas compressors can power a blaster, they are not the right choice for just any situation. They are more expensive than electric compressors, require constant attention to keep the gas level supplied, and are louder. Additionally, they cannot be operated inside in a closed environment since they give off noxious fumes and are less efficient than their electric counterparts.

The main application for a gas engine compressor would be the need to blast with an on-site blaster, which requires way more air than a pressure blaster. The unit would have to be placed on the outside of any building, which is not always possible with any given job due to the noise they generate. Electric compressors are the most logical choice.

There are direct-drive and belt-driven motors, which I explain a bit more when talking about the pump in the next subsection. Electric compressor motors can be powered by 120-volt or by 240-volt single-phase electricity. There are some that run on three-phase electricity, which is only available in commercially zoned



This is also a common gas engine compressor with small twin storage tanks. The gas tank sits on top of the motor and has to be filled if you are working for long periods of times. These compressors are noisy, smell, and generally output only a fair amount of air pressure (about 7 CFM at 90 PSI).



A much larger unit that needs to be towed by a vehicle. We use this type of compressor on large blasting jobs on construction sites and any on-site job where noise is not an issue. These engines are loud but deliver all the air one could want for any blasting job.

areas. Regular household electricity has a range from 110 to 120 volts and can power a small compressor. This is because most household circuits are only 20 AMPS, and more powerful compressors require at least a dedicated 50 AMP breaker. Due to the physics of electricity, only relatively low-power motors can run on this type of electricity.

A compressor running on 120 volts will provide enough air for blasting on a hobby to light professional level, as long as you do not plan to do a lot of carving. For serious blasting professionals, they will not do. For continuous blasting on a professional level, you need to choose a compressor with a motor that runs on 240 volts, the type of electricity used by electric stoves, dryers and furnaces. These outlets are rated at 220 to 240 volts.

Unfortunately, most households are only equipped with one or two such connections, which are ordinarily in use by household appliances and are often not located where you could place a compressor. Most home-based shops will need to have a separate outlet installed, which also depends on the size of the electric service for the dwelling and may require an additional panel to be installed. These are things to explore before buying a compressor because the cost for new service is not exactly cheap.

THE COMPRESSOR PUMP

The pump is the device that pressurizes the air by pumping it up to a higher pressure. It is important to know what kind of pump the compressor you choose has. The two types of pumps you most commonly find are belt driven or direct driven. Belt driven is the most used model. The most important thing you need to find out is how many CFM you will need from the compressor. The more CFM you need, the bigger the motor and the pump need to be. Hold this thought, we will pick that topic up later.

continued on page 94



As you can see, rotary screw compressors are compact and neat besides being able to deliver a large amount of air at almost no noise level. It's no doubt on everyone's wish list but carries a hefty price tag (\$4K and up).



LASERING GRAPHICS: WHAT YOU NEED TO KNOW, PART 2

MASTERING CONTRAST AND GRAYSCALE

This is Part 2 of a two-part series. To read Part 1, visit <http://gpro.link/p1>.

You just finished lasering a logo for a customer project and the logo is a prominent centerpiece of the design. It doesn't seem to represent the full-color logo the customer provided, and it really doesn't look good at all. The file resolution was high enough as I needed to reduce the size of the logo. What went wrong?

COLOR TO GRAYSCALE CHALLENGES

If the resolution was high enough that the edges of the shapes and letters are

crisp, it must be how the individual colors translated to the grayscale that is the primary issue. So, let's analyze the graphic. To start with there are blue, red, and yellow colors in the logo, in that order. The blue and red seem to be almost the same shade of gray. The yellow appears to blend into the plate you engraved on so it doesn't seem to have lasered out much of the plate color and can hardly be seen. Let's look at the colors in the original logo. Are the blue and red similar shades of their color?

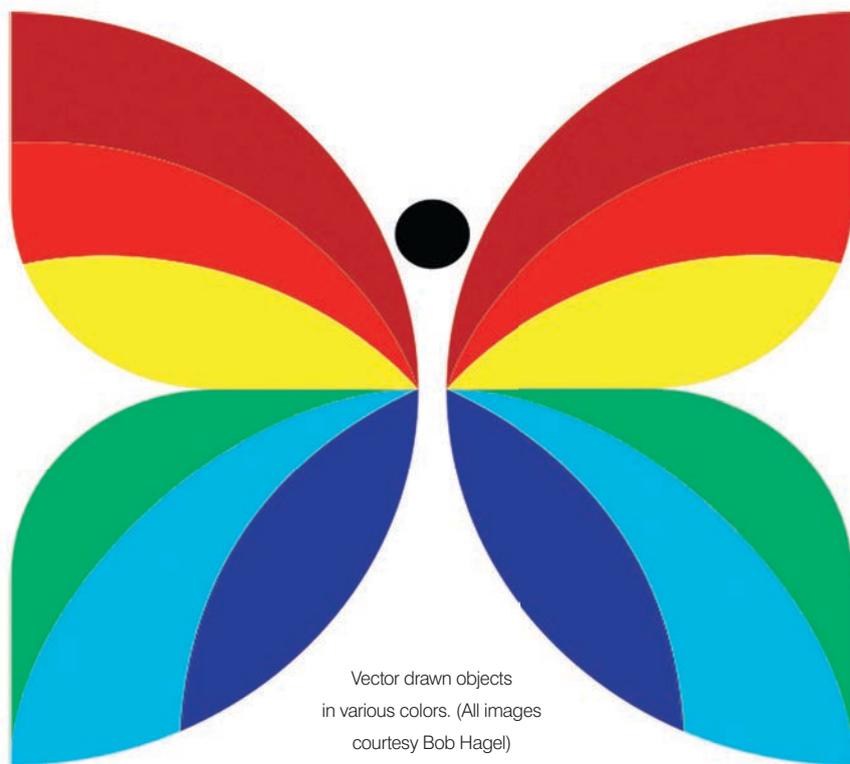
In other words, are they similar in their darkness or lightness? Yes, even though they are different colors their shades of

the color are very similar. So, when your software translated them to grayscale, they became almost the same shade of gray. Another way of looking at it is that there is very little contrast between the color shades and thus the shades of gray. It is hard to distinguish between the two shapes each color represents. So why was the yellow shape hardly lasered out? You cannot distinguish the yellow shape from the background plate color as very little lasering took place. As the yellow color was a very light yellow, it translated to a very light shade of gray. The laser will only etch out this shade of gray very lightly and in this case, could almost not be seen. The shape was not surrounded by darker shapes to differentiate it from the background and other shapes. The key word here is **CONTRAST**. I will use the term shapes to refer to each of the various different parts of the graphic. To easily distinguish one color from another or a particular shape from the background, whether it's a metal plate color, a wood plaque or two-ply acrylic plastic, contrast between shapes is necessary.

GRAYSCALE

How much contrast is needed for good results? The smaller the image the more contrast is needed, especially to read the text. For very small graphics a black and white image may be necessary to make it readable or even recognizable.

How do you measure contrast? In CorelDRAW, you will find a color palette for grayscale, and it will include black and white. If you hover your mouse over each shade of gray it will indicate the percentage of black that the shade represents. So, 100% is pure black. 0% is pure



Vector drawn objects
in various colors. (All images
courtesy Bob Hagel)

white. Each of the grays are a percent of black in increments of 10%. So, 90% black (I will call it 90% gray) is very dark and almost black. 10% is very light gray and may be difficult to distinguish from white.

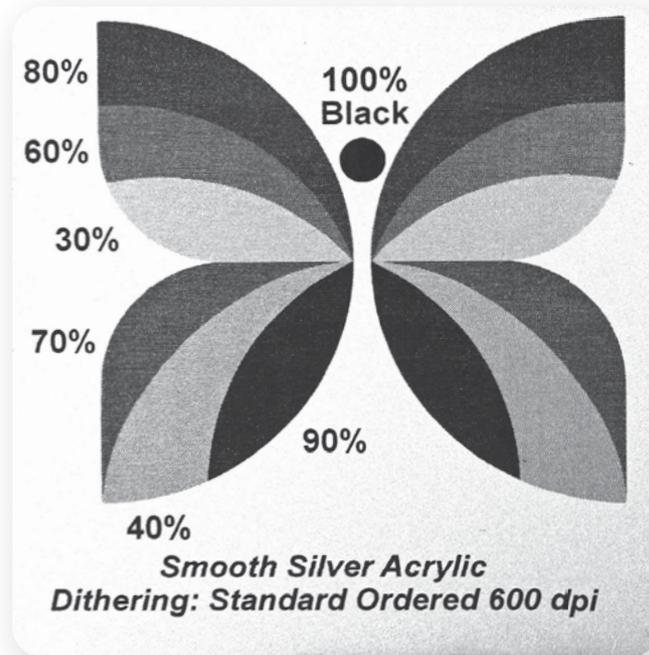
If you have a graphic with lots of different colors that are similar shades, they will translate to grays of similar shades. The same is true for light colors. They will be hard to differentiate.

If a dark color shape is next to a light color shape you will have two grays that provide good contrast, and the two parts can be easily distinguished from each other. The background to text should often be a light color for dark text (often black) to stand out, or vice versa. Light color shapes in the graphic need to be surrounded by dark shapes or they may get lost in the background as little etching will occur. Colors that are faded from dark to light will have the same issue if they are not contrasted by the shape to either side of the dark portion and the light portion of the fade.

HOW MUCH CONTRAST IS NEEDED?

Shades of gray need a minimum of 20% differential between shades. So, a 40% gray (black) shape needs to sit next to a 60% gray shape at a minimum. A 30-40% differential is best. To have a graphic appear at its best it can be pure black, pure white and 2-3 shades of gray.

This might look like black, white, 20%, 50%, and 80% grays. This assumes the



Vector objects changed to various shades of gray and laser on silver acrylic. Note placement of color shades.

white and 20% gray is surrounded by darker shades and are not on the outside of the graphic. A light gray such as 20% gray will blend into the background as not much will be etched out. If it seems complicated, it is. This is why designers should create a black and white version and then a grayscale version as the first two steps. It would prevent having to work with a logo that suffers from a lack of contrast.

HOW DOES THE LASER ETCH A GRAYSCALE SHAPE?

Lasers don't fire when etching pure white, so nothing is etched out. With a black object or

YOUR LASER AT WORK

shape, the laser fires continuously (or almost so), etching out everything. Achieving shades of gray is accomplished by etching out small dots (dithering) leaving tiny bits of background surrounding each dot. There are a variety of dithering patterns used. You will hear names such as Stucki, Jarvis, Floyd Steinberg, Low Resolution, Brighten and maybe even Standard.

Given the same set of power and speed settings, I found Brighten to show more detail than most others but be a very light etch unless I added more power. Epilog's Standard dithering provides a good combination of detail and darkness. Low Resolution is very dense and dark with the rest producing fairly dense, darker images than Standard. You may want to experiment using different dithering

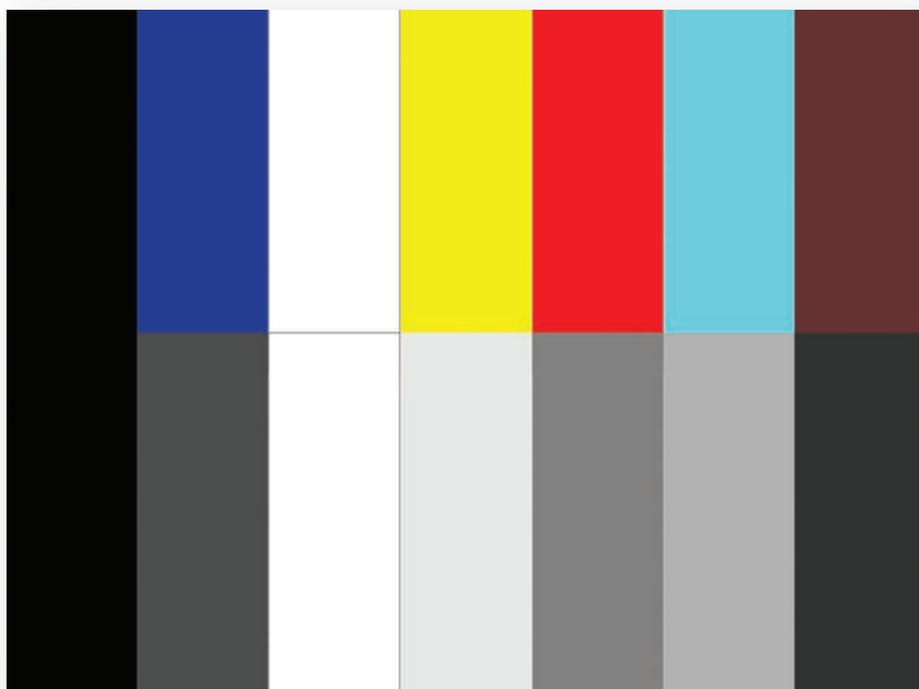
patterns with the same graphic and the same laser settings. You may not find a great deal of difference. However, in a few cases, changing the dithering pattern may provide a better, acceptable result.

TOOLS TO HELP FIX CONTRAST ISSUES

The larger and more prominent the lasered graphic, the more likely you will want to fix the contrast challenges. A reasonable way to quickly improve the contrast between shades of gray is with using a Bitmap Editor such as PaintShop Pro, Photo-Paint or Photoshop. If your graphic is still the original color file you will want to turn it to grayscale. There are many ways to do this. However, there are ways to improve the contrast before while it is still the original color image.

I am using Corel PaintShop Pro 2020. You can adjust the lightness or darkness of each primary/secondary color creating more contrast between colors before turning the graphic to grayscale. In PaintShop Pro, from your top menu, go to Adjust > Hue and Saturation > Hue/Saturation/Brightness. Adjust the brightness for each color you want brighter or darker to create contrast between shapes next to each other. Then with the colors set to Master, reduce the hue down to 0, removing all colors.

Another way is to turn the graphic to grayscale: Image > Grayscale and then Adjust > Brightness and Contrast > Highlight/Midtone/Shadows and further adjust the brighter and darker tones creating more separation between the tones.



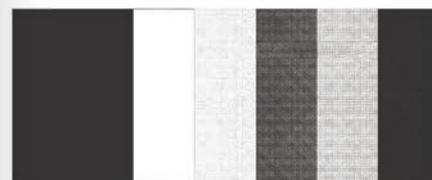
Left: The tone, not the color determines the shade of gray. Darker tones such as navy blue would become a dark shade of gray, such as 70%. Yellow would become 10% and red, a fairly neutral tone, would become 50% black. The larger number of color tones you need to represent, the less distinction between gray tones is necessary. **Right:** Converting from color to grayscale makes the shades vary based on the conversion method. Don't use a black and white conversion method, the result is far too pixelated.



Corel Gray-Scale Conversion



Corel Duotone Monotone Conversion



Corel Black & White Conversion

Most better bitmap editors have tools to actually change a color. Changing a darker blue to yellow will likely be equal to changing an 80% gray to a 20% or 30% gray. A dark blue could also be made a light blue to provide a lighter shade of gray. Remember you want to alter each color to a darker or lighter color. It's the shade of the color that counts. Any changes you make to the whole image such as increasing the contrast may not offer enough change. You can always try just adjusting the contrast which may work on images with only two or three colors.

Even the most basic bitmap editors offer contrast sliders. Just move the slider to the right and see what happens. If you don't get the desired results, you need a more targeted method.

Any method that allows you to alter colors individually or the color's shade with the original color image will work. If the image is grayscale or has been turned to grayscale, you need to use any method that allows you to change the shade or tone of various parts of the image.

The last method is by far the best method and of course may be the most time consuming.

Simple graphics with few colors and very high resolution may be easy to turn into vector objects using your better vector editing software such as CorelDRAW or Adobe Illustrator.

There is also specific software available for this process. The tools are referred to as vectorization tools. Vectorization results fall off with graphics that are more complicated, include fades and



The grayscale conversion results show why it is better to begin a graphic design in black and white or grayscale.

are attempted with low resolution files. Vectorization tools offer a variety of capabilities. One that can be very helpful is the ability to widen or narrow the range of each color shade it includes in creating the separate objects. You may even

merge two or more colors by selecting them in the tool to create one object that you want to give a single color to.

After creating the vector graphic, each shape or object can be selected separately or in groups and can be altered quickly. Changing each shape or group of shapes to the desired shade of gray, black or pure white would be your goal. Vectorization may be more time consuming upfront, yet alterations to the graphic are much quicker.

I would often combine vectorizing a logo using this tool with replacing an object or two and text that did not turn out as expected. Drawing tools such as those that create circles, rectangles and triangles can be quick and easy to use to replace shapes. Typing new text if you know the font is also fast. If you don't know the font, find one that is close, turn the text to curves and you can alter the letters as needed.

For clients that I worked with continuously or had large orders from, I might even trace and redraw a logo or event graphic by using the line drawing tools. It was worth the time for graphics I used for many years. **GP**

BOB HAGEL recently retired after owning Eagle's Mark Awards & Signs for 18 years in Southern California. While owning the business, he offered a full line of personalized products using laser engraving, sandcarving, and full-color UV direct print on products. Today, he consults on starting and expanding personalized businesses and on improving production efficiency and quality. He can be reached at rjhagel@verizon.net.



BY DOUG ZENDER

Design Terminology 101: Adobe vs. Corel

***MATCHING TERMS FOR SIMILAR FEATURES
IN BOTH DESIGN PROGRAMS***

(All images courtesy Doug Zender)



Recently, while visiting the sign shop of a friend, I met a young lady who had been hired as a designer. She was quite proficient with design aspects of Adobe Illustrator. This shop, however, used CorelDRAW for nearly all its designing, so she had to learn a different program. One of her greatest hurdles was with the terms used to describe similar functions between the two programs. To help her with understanding the differences, I created the Quick Reference Chart. (Fig. 1) In the left column are the basic terms used by Adobe Illustrator and the right column shows the corresponding description used in CorelDRAW — these do not reflect all the differences but are the most common terms used. Both programs can produce nearly identical functions, but the terms used are quite different.

Let's go over some of the differences, beginning from top-to-bottom. To start, in Illustrator, an illustration or design is called *Artwork*, but Corel calls it a *Drawing*. The main difference is that Corel can have multiple pages while the Adobe counterpart is one drawing that simulates several pages.

CURVE VS. PATH

Though both programs can draw various kinds of lines, Adobe calls them paths and Corel calls them curves. They are the same thing.

NODES VS. ANCHOR POINTS

Along a curve object, there are certain points that control its appearance. In Corel, they are called nodes and Adobe calls them anchor points. They are the same thing. A future article will look more in depth at their function and manipulation to modify an object.

Adobe Illustrator	CorelDRAW
Artwork	Drawing
Path	Curve
Anchor Points	Nodes
Direction Points	Control Handles
Palettes	Dockers
Place (Files)	Import (Files)
Gradient Fill	Fountain Fill
Live Color	Color Styles & Harmonies
Swatches Palette	Color Palette
Stroke	Outline
Convert Stroke to Outlines	Convert Outline to Object
Guides	Guidelines
Smart Guides	Dynamic Guides
Outline View	Wireframe View
Clipping Mask	Power Clip
Rasterize	Convert to Bitmap
Actions	Macros/Scripts
Live Trace	Corel Power Trace
Save for Web	Export for Web
Pixel Preview	View / Pixels
Compound	Combine
Uncompound	Break Apart

Fig. 1

CONTROL HANDLES VS. DIRECTION POINTS

A node or anchor point sits directly on a line. Extending out of that point are invisible lines that control the shape of the curve on either side of it with a data point at the end that allows the invisible lines to be manipulated. Corel calls them control handles and Adobe calls them direction points. (Fig. 2)

DOCKERS VS. PALETTES

Both programs include a special variation on dialog boxes to help users interact with the software. Corel calls them dockers and they

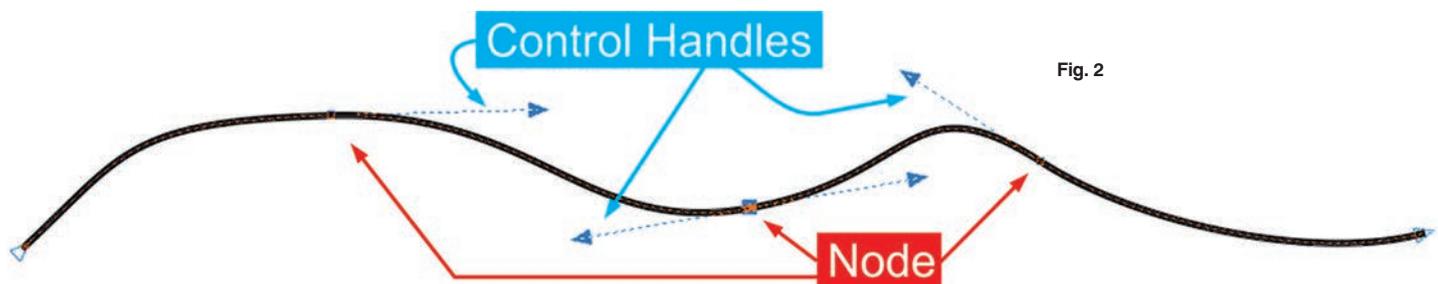


Fig. 2



are called palettes by Adobe. There are slight differences, but they are similar. Fig. 3 shows a CorelDRAW Color Docker and a Color Palette used in Illustrator.

IMPORT FILES VS. PLACE FILES

Most projects require one to bring in artwork from another file. Corel uses the File > Import command while Adobe's process is File > Place. Both accomplish the same thing.

EXPORT VS. SAVE AS

Often you will want a document to be output in a file type that differs from the native format. In Corel, you would choose File > Export and then the format you want. Adobe uses File > Save As followed by the format desired.

FOUNTAIN FILL VS. GRADIENT FILL

Any object that has one color that fades to another is called a fountain fill by Corel and a gradient fill by Adobe. The techniques and names are different, but the results are the same.

COLOR STYLES AND HARMONIES VS. LIVE COLOR

Whenever you want to change an overall color scheme, both programs have features to facilitate it. Corel terms these color styles and color harmonies while Adobe uses the term live color. We'll explore the CorelDRAW features in a future article.

COLOR PALETTE VS. SWATCHES PALETTE

Both programs have an element to easily change the color of objects in a drawing. Corel calls them color palettes and Adobe calls them swatches palettes.

OUTLINE VS. STROKE

Whenever you have a shape or object, you can fill it with a color and also have a color follow its edge. Corel refers to that color as an outline and Adobe calls it a stroke. In addition to color, other properties can also be customized.

CONVERT OUTLINE TO OBJECT VS. CONVERT STROKE TO OUTLINES

This is the process that will separate the edge color from the fill color and make it into an individual vector object.

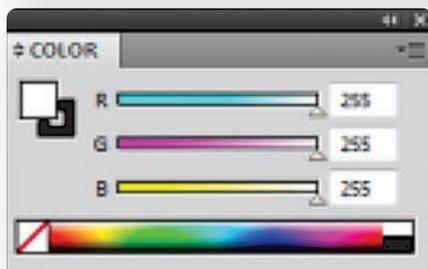
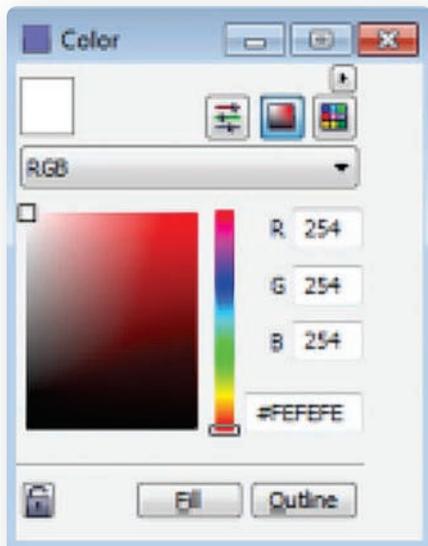


Fig. 3

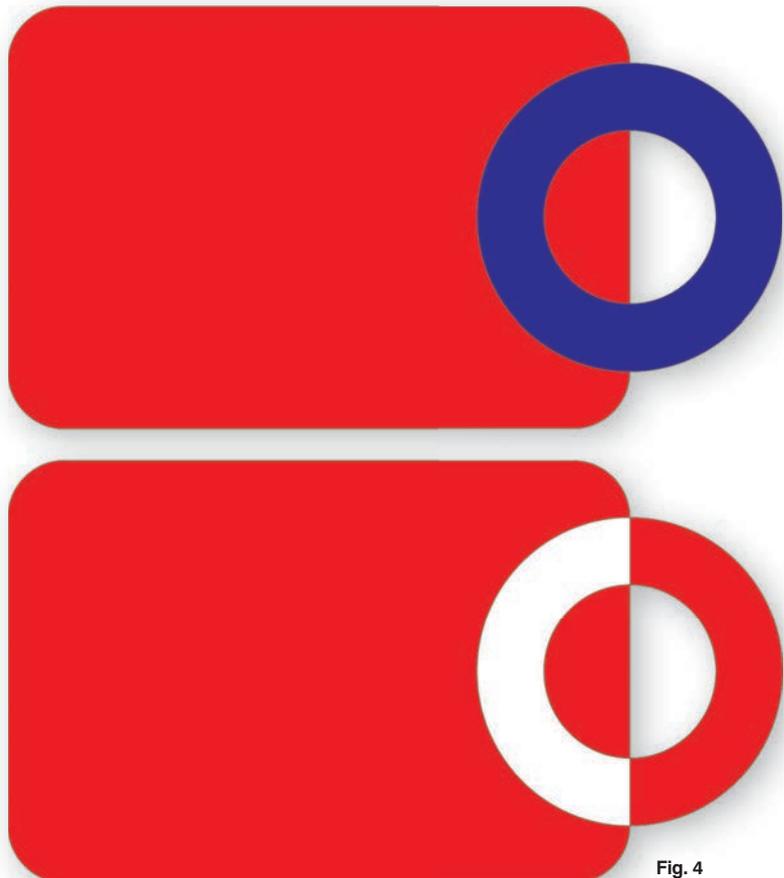


Fig. 4

GUIDELINES VS. GUIDES

Both programs have a type of line that can be used for aligning objects. Corel calls them guidelines while Adobe has named them guides.

DYNAMIC GUIDES VS. SMART GUIDES

Each program can make alignment lines visible when they are needed. In CorelDRAW, they are dynamic guides and Adobe terms them smart guides.

WIREFRAME VIEW VS. OUTLINE VIEW

Typically, while designing, you view a full color representation of your design but there are times when you want to see only the outline of each element or object in your drawing. Both programs have a view mode to do this. In Corel, select View > Wireframe. In Illustrator you would choose View > Outline.

POWERCLIP VS. CLIPPING MASK

There are times when you will want one or more objects to have their visible shape defined by another object, kind of like pasting those objects inside another. Corel calls this PowerClip and is begun by choosing Effects > PowerClip > Place Inside Container. Adobe refers to this as a Clipping Mask and is achieved by selecting Object > Clipping > Make.

CONVERT TO BITMAP VS. RASTERIZE

There are times when you'll want to make selected objects in your drawing into a bitmap. While most elements in a drawing are vector based, sometimes it is best to make them into a raster-based bitmap. In CorelDRAW go to Bitmaps > Convert to Bitmap. Adobe has the same process by choosing Object > Rasterize.

MACROS/SCRIPTS VS. ACTIONS

Both programs can automate certain tasks. Corel calls them macros or scripts. Illustrator calls them actions.

POWER TRACE VS. LIVE TRACE

Both programs have an automated feature to trace a raster image into a vector image, each with different options.

EXPORT FOR WEB VS. SAVE FOR WEB

Both programs have a specific command to create the file needed when your design is destined for the web. In Corel, choose File > Export for Web and Adobe users would choose File > Save for Web and Devices.



VIEW > PIXELS VS. PIXEL PREVIEW

Each program allows one to see exactly how a pixelated image will appear on the web by choosing View > Pixels in CorelDRAW and View > Pixel Preview in Illustrator.

COMBINE VS. COMPOUND

Sometimes there will be two or more objects that you'll want to merge into a single object. In Corel, it is called combine and Adobe calls it compound. Fig. 4 has a comparison of two individual objects at the top and the two combined at the bottom.

BREAK APART VS. UNCOMPOUND

The bottom object is comprised of three sub paths. The Break Apart command in CorelDRAW separates them into three individual objects as does the Uncompound command in Illustrator.

CorelDRAW and Adobe Illustrator are both very capable design programs that have nearly equal abilities, but the terminology is quite different between the two. My hope is that I have been able to clarify the differences for users. Though I invite questions, since I no longer have a working copy of Adobe Illustrator, I will only be able answer questions regarding CorelDRAW. There are, however, many good books and tutorials available that are specific to Illustrator. Some of the concepts I've touched on here will be addressed in detail in future articles.

Questions, comments and/or insights should be directed to dezender1@gmail.com. **GP**

DOUG ZENDER has used CorelDRAW extensively since version 4. His goal is to minimize the intimidation of the program and give users the sense that CorelDRAW is a friend, not an adversary. Doug began as a design artist, then moved into the sign industry in 1992 doing vinyl graphics. You can contact him at dezender1@gmail.com.

Team Sports

Look Out for These School Spiritwear Trends in 2022

BY KARIN BELLINGHAUSEN



Kids have never been happier to be back to school. After a long year-and-a-half shutdown for most, school is back in session. And so far, back to school in 2021 and 2022 looks a lot better than 2020. Schools welcomed kids back, sports are being played, fans are in the stands. But one thing is for certain, whether students are back to in-person classes or a hybrid situation, they still want school spirit gear. Even during the pandemic, students and parents found comfort in wearing school apparel, which helped to keep everyone bonded and together. Never underestimate the power of a printed school T-shirt.

SELLING TO SCHOOLS

As an apparel decorator with a heat press and custom transfers, you can offer schools everything they need for back-to-school, printed T-shirts, caps, sweatshirts, and more. Custom transfers give you the look of screen printing for a fraction of the effort. All you do is order them and heat apply.

It's not always easy finding the right contact when working with schools. You may want to start by talking to parents in the neighborhood. Find out the contact for the parent-teacher group. Schools are always looking for successful fundraisers, and spiritwear can make money for both you and the organization. Don't forget the

middle and elementary schools. High schools usually have a bookstore where spiritwear is sold but the elementary and middle schools get ignored. Try to find a contact for groups who may need custom apparel. Groups like student council, choir, band, yearbook, drama, sports teams, and booster clubs each usually have their own contact.

2022 SPIRITWEAR TRENDS

RETRO: Retro is a recurring theme. The question is, what is considered retro these days? You have to look back to the '70s, '80s, and '90s. In addition to garments with color blocking and stripes, you will find distressed prints and '70s fonts are very hot.

TONAL TIE-DYE: Tie-dye has also been a reliable trend for many years, but this year we're seeing it with a twist. Instead of a rainbow and multiple bright psychedelic colors, things are toned down a bit. It's called tonal tie-dye. You'll see orange on orange shirts or gray on black. A tie-dye pattern without all the color. It's really a fresh way to use tie-dye and it's perfect for spiritwear.

TEXTURE ON FLEECE: Everyone wants a sweatshirt when the temps drop. Hoodies, half-zips, and sweatpants are all part of back-to-school and teamwear across the country. This year, people are looking for texture and specialty finishes on their

fleece. Puff transfers are back in style again and you can also use textured heat transfer vinyl on fleece. Flock and soft foam heat transfer vinyl are very popular on everything, from sweatshirts to stadium blankets. Another trend on sweatshirts is logo placement down the sleeve.

PRINTING ON BAGS AND OTHER ITEMS

If your local schools already have printers providing them with spiritwear, try approaching them with a variety of other items. This could be anything from tote bags to stadium seats or even caps. Not every printer in town can print promo items. If you can offer promo-type items, you may eventually be asked to handle all their printing.

Remember, sometimes purchasing relationships with schools can take a while to create. Don't give up. Even if you don't have any contracts now, you can look ahead to spring, graduation, and fall events and sports. **GP**

KARIN BELLINGHAUSEN runs marketing and communications at STAHL'S, a manufacturer of garment decoration equipment and materials. Karin has been with STAHL'S since 1988. She manages web content and helps customers understand how to use group GroupeSTAHL products and services to grow their businesses.



(All images courtesy STAHL'S/
Transfer Express)



PRODUCT SPOTLIGHT: TEAM SPORTS

For more on the suppliers featured in this section, please see website and phone information following each product.



BASKETBALL AWARDS

JDS Industries Inc. offers its basketball awards. The company says it has various options from medals and ribbons to resins or more traditional trophies and plaques. A \$99 order qualifies for free shipping.

800-843-8853

jdsindustries.com



PERFORMANCE T

Royal Apparel offers its Performance Poly Tee, featuring DRI technology. T-shirt details include a set-on rib collar, double-needle sleeve and bottom hems, and a satin label. It's available in black, gray, safety orange, and safety yellow.

866-769-2517

royalapparel.net



LASER ENGRAVER

GCC America Inc. offers the GCC LaserPro, recommended for customizing medals, trophies, plaques, and awards. Engraving tables range from 20.4" X 14.7" to 41.4" X 11" and have a maximum speed of 140" per second. The full line of laser systems feature a material database for different jobs and materials.

909-718-0248

gccworld.com



DESIGN SOFTWARE

GraphicsFlow offers its Graphics Builder 20 software, a new collection of layouts, designs, graphic elements, textures, and fonts. It has 72 pieces of art and graphic elements, including geometric shapes, badges, ribbons, swooshes, pennants, and wavy lines. It also includes four texture backgrounds, 40 typefaces, and a library of layouts.

800-959-7627

graphicsflow.com



TEAM SPORTS PRODUCTS

Johnson Plastics Plus offers thousands of blanks ready to personalize with sublimation, toner heat transfer, engraving, UV-LED printing, and vinyl application. Items include water bottles, apparel, bags, awards and more.

800-869-7800

jplusplus.com



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Sportsman Cap & Bag offers its Legacy Cool Fit Boonie, which is a 100% polyester, cool fit, performance hat. It is unstructured with a 3" snap-up brim, moisture-wicking sweatband, an adjustable toggle chinstrap, and black matte grommets. It features UPF 50+ protection.

913-541-0901

sportsmancaps.com



POLYMER DECAL

World Emblem offers its FlexStyle polymer decal. The product comes with a three-dimensional look and a pressure-sensitive backing. It can be applied to glass, wood, metal, and plastic, and it comes with a low-melt adhesive. Emblems range in size from 0.5" X 0.5" to 5.75" X 5.75". The thickness varies depending on the complexity of the design starting at 2 mm.

800-766-0448

worldemblem.com

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PRODUCT SPOTLIGHT: TEAM SPORTS

For more on the suppliers featured in this section, please see website and phone information following each product.



HEAT PRESS

Insta Graphic Systems offers its Insta 288 Swing Away heat press machine, their largest manual machine with 20" X 25" platens for ease of use with larger substrates and transfers. It can also be used as a sublimation heat press machine.

562-404-3000

instagraph.com



PERFORMANCE HEADWEAR

Atlantis Headwear offers its SAND sustainable performance cap. It features a six-panel, mid-profile construction with a slightly curved mid-visor and stretchable sweatband. The cap is made of 95/5 certified recycled polyester/elastane and is available in black, dark gray, navy, royal, and white.

atlantisheadwear.us



LOW-CURE INK

Lawson Screen & Digital Products introduces its Dynamic plastisol low-cure ink. The low-bleed ink is for printing on garment types such as cotton, polyester, 50/50s, and tri-blends. Dynamic ink is a soft-hand, fast-flashing, low-cure (270 F) opaque ink. It is available as a mixing system and to match any Pantone color.

314-382-9300

golawson.com



CUSTOM SPORTS MEDALS

Catania Medallie Specialty Inc. offers its custom sports medals. They are laser engravable and can be enhanced with color fill, cut-outs, ribbons, keychains, and more. The company says custom medals can be manufactured in three to five business days.

800-633-2586

cataniainc.com



PERFORMANCE CAP

Kati Sportcap & Bag offers its Imperial Alter Ego performance cap. It is made from 100% polyester and is an unstructured, six-panel, low-profile build with a pre-curved visor, gray undervisor, and performance sweatband. The cap also features 50+ UPF ultraviolet protection.

800-392-5559

katisportcap.com



ENGRAVING & CUTTING MACHINE

Trotec's Speedy laser engraving and cutting machines work for team sports applications, from trophies and awards to apparel. Ruby laser software streamlines processing by allowing users to create and edit designs without the use of a third-party software, according to the company.

866-226-8505

troteclaser.com



RESIN SPORT AWARDS

Marco Awards Group introduces another family of 6" resin sports figures that includes baseball, basketball, soccer, and softball. These resin awards include a fully sculpted design with full color sport balls.

800-229-6592

marcoawardsgroup.com



LEATHER WALL ADHESIVE

General Formulations 264HTR WallMark Leather incorporates a high-tack removable adhesive, while also offering clean removal. The subtle textures can bring depth to wall murals, graphics, and decals, says the company.

800-253-3664

generalformulations.com

GP

Popular Apparel Decorating Equipment

THE MACHINES YOU NEED TO GET AHEAD IN THE MARKET

BY PAULA AVEN GLADYCH



It's easier than ever for small shops to get into apparel decorating. Not only has the technology improved greatly over the years, but mom and pops can get into the business for as little as \$5,000.

The first step to starting an apparel decorating business is to determine what type of apparel decorating you want to do. Is

it T-shirts and ball caps or do you want to design your own clothing line for a pop-up shop in a mall? Sign shops are in a perfect position to branch out into apparel because they are already familiar with graphic design programs and printing equipment so the learning curve won't be as steep and

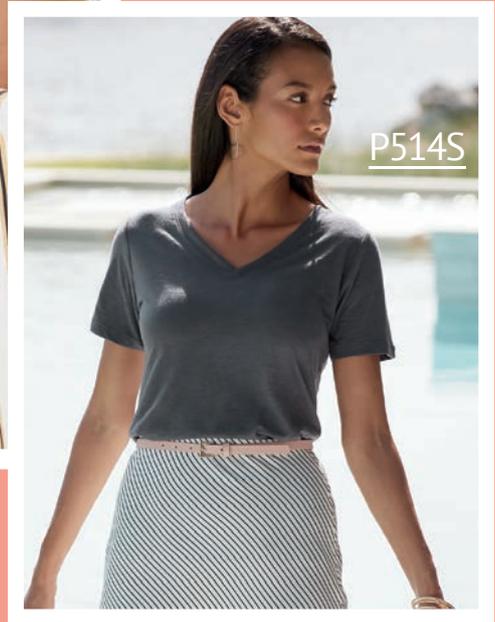
they already have a customer base in which to cross-sell different printing applications.

Many new businesses start out small. They buy a small screen printer or direct-to-garment machine and install it in their garage. As their business grows, so does the type of equipment they have on

Traditional screen printing is still just as popular as ever, particularly for print runs over 500 garments. (All images courtesy Xpresscreen)



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hand and the space necessary to meet the demands of their customers.

Traditional screen printing is still just as popular as ever, particularly for print runs over 500 garments, but direct-to-garment and direct-to-film printers are becoming more available and more affordable as companies scramble to tap into the growth in e-commerce that was fueled by the pandemic over the past two years.

More and more, individuals and businesses are doing their shopping online. In many cases, they want to purchase small runs of printed apparel and have them delivered quickly and efficiently with the click of a button. In this case, direct-to-garment or direct-to-film equipment makes the most sense because a shop doesn't need a lot of space to run them, they are easy to learn, don't require screens, solvents, and chemicals to produce a good product, and are perfect for any size order.

SCREEN PRINTING STILL KING

To get into screen printing, all someone needs is enough space for a small manual screen printing press and a small dryer to get started. They also would need an exposure unit for making a screen and a flash curer to spot dry ink before you send it to the dryer, says Taylor Landesman, vice president of Lawson Screen & Digital Products.

"You need to understand art and art programs and understand screen printing," says Jay Doub, sales and technical service representative for Xpressscreen. "Both are learning curves."

The beauty of choosing a program like CorelDRAW or Adobe Illustrator is that there are plenty of resources available to help get a new shop owner up to speed on how to use them, from community college courses to online instructional videos.

Shops also can save money by building their own darkroom and light table. He suggests that new shops buy at least a four platen, four hit press so that they can print white and three other colors. "Anything less is kind of a novelty," he says. "I don't see the point in it. They're not expensive and it will make money for you."



If a shop is printing a white base on a dark shirt, a flash curer is imperative to dry that layer to the touch before adding colors on top. That could be as simple as pointing a hot air gun at the image to dry it by hand or purchasing a flash curer that can do the job in nine seconds.

Many shops don't realize that they can screen print their own transfers. Where that comes in handy is when printing shirts for sports teams. Inevitably, a team will come back to the shop and ask for additional shirts because they had some late signups. By screen printing heat transfers with the team logo during the first printing of shirts, the shop won't have to go through the hassle of making new screens when additional shirts are needed. They can just heat press the design onto the new shirts.

Along with a heat press, screen printing shops should also invest in a spot removal

gun for when they accidentally get an inky thumbprint on a sleeve and they don't want to have to throw away the garment.

"If you have no clients, no customers, it is easier to start out with as little overhead as possible," Doub says. But if the shop is already an established embroidery company, for instance, that has been outsourcing its screen printing to a contract decorator for 10 years, it might make economic sense for them to buy their own screen printing equipment and start handling those jobs internally.

Many people just getting into the industry get fooled by equipment vendors and distributors pushing how cheap it is to get into apparel decorating, but they don't understand that there are other costs involved besides the cost of the press and heat press, says Nathan Belz, COO of Impress Designs outside of Dallas.

For screen printing, it takes inks, squeegees, screens, a good computer, monthly subscription to a RIP program and chemicals for emulsion. Someone can get into it for \$500 to \$1,000, but "if they are trying to do any kind of good setup, a good home setup beyond being a hobbyist, \$5,000 would get you into something," says Belz. That cost doesn't include training and getting up to speed.

If apparel decorating is going to be your actual job, most people would agree that it is important to start out with good quality equipment "otherwise you will be paying the price. Bad equipment doesn't have resale value. It is trash when you are done with it," he argues. If a shop spends a bit more money on name brand equipment, even if the shop doesn't last long, the equipment can still be sold so it isn't money down the drain.



Another benefit of buying good equipment to start is that reputable shops typically offer training and troubleshooting if something goes wrong.

Xpresscreen developed MiScreen, a direct-to-screen thermal screen exposure unit which images directly from a computer to a special thermal screen, eliminating the need for chemicals, emulsions or water, keeping costs down and improving setup times. The only drawback of the technology is that the screens aren't as "rock solid" as conventional screens, so they are only good for 750 to 1,500 impressions. Most shops do jobs less than 500 shirts, so these screens are a more economical option, Doub says.

DIRECT-TO-GARMENT & HEAT-APPLIED GRAPHICS

Many pop-up hobbyists have surfaced, peddling their own brands of apparel decorating using some of the newer technologies, such as heat transfer vinyl, which has gotten significantly cheaper, or heat transferable film. Both technologies are similar to direct-to-garment, only the design is printed on film or vinyl and then pressed into the garment using heat.

"DTG has made great strides. There's more flexibility but there is a learning

curve to get involved in that," says Belz.

A small shop can get into heat transfer vinyl with a 24" printer and a heat press. To make things even more unique, they can add a single-head embroidery machine to the operation. If a shop wants to digitize their own files, they will need a decent computer and a graphics program.

Belz says that many shops will focus on one type of printing, whether it is screen printing or DTG, but "will outsource to someone like us. We are a high-volume contract decorator doing eight million shirts per year." They can handle the smaller apparel decorating orders and out-

source the larger jobs to companies with automated equipment that can complete jobs more quickly.

To print 500 shirts, it may take a shop a day or two if they are using a manual press. Belz explains, "We can do it in an hour. A lot of the time we can do that cheaper than they can. They sign us up as a contract decorator to do stuff outside their normal forte and they can still be full service and handle the part they are good at."

He adds that if a shop outsources some of the larger screen printing or direct-to-garment print jobs, it makes more room in their shop for heat-applied graphics, an



embroidery machine, or a cutter to cut vinyl decals and stickers.

“The apparel market is growing, especially the ability to do this at home and to sell online. It is really rising. Before, people would have shops and storefronts and sell shirts that way but e-commerce has been taking off and only really accelerated with COVID and everyone staying at home. There are more and more opportunities to sell online, to specialize,” says Landesman.

A small shop can get into DTG for between \$16,000 and \$18,000, he says. That includes the printer, a pretreat sprayer and a heat press or conveyer dryer. Unlike screen printing, which can print on just about anything, DTG printers work best with 100% cotton and certain cotton blends.

Vinyl is another decoration option that doesn't cost too much upfront. There are machines out there that print on vinyl and then cut it out, making it simple to apply to garments with a heat press.

Most shops do both screen printing and DTG, using the DTG for smaller production runs and screen printing for the really big runs.

“They each have their own niche and complement each other really well but, as DTG develops, certainly it is the wave of the future, we are not quite ready to replace screen printing yet,” he adds.

People wanting to produce their own clothing line will need a pad printer to put in neck labels or a way to sew in neck labels. Shops can also use heat transfers to put in neck labels.

“I would say, after doing this for decades, the most common problem new people have is figuring out how to price or charge for what they're doing,” Belz concludes. “Understanding what you are going to charge and how much time it will take and how much energy are all really important. It all revolves around knowing who your audience is.” **GP**

PAULA AVEN GLADYCH is a freelance writer based in Denver, Colorado. She can be reached at pgladych@gmail.com.





MASTER DECORATED APPAREL SALES

POSITION YOURSELF AND YOUR BUSINESS AS A BRANDING PARTNER



Sometime early on in my career as a commercial embroidery professional, I realized something that helped me become much more comfortable and successful with making sales. I figured out that the people I was attempting to sell to were not buying clothes!

Wait, what? We sell decorated apparel — how could I not be selling clothes? Let me explain.

All my customers, and yours, have closets filled with clothes. These people are not walking around naked. They own plenty of T-shirts, golf shirts, sweatshirts, and jackets. In fact, if you were to ask any one of them, they are likely to say they have too many of these things. Yet, here they are, asking you about buying something to wear.

Once I wrapped my head around this concept, my sales process changed completely. It also accelerated to a completely different level because of the changes in the sales conversations I had with potential customers. I stopped selling clothing and started selling branded apparel and products. The key word here is **BRANDED!**

I realized that our customers had zero interest in becoming well-versed in apparel. The apparel and products we offered were simply a delivery mechanism for their message, their brand. They had a problem, situation, or need they believed could be solved or resolved by making their brand visible.

ASK ATYPICAL QUESTIONS

In a traditional sales conversation, you do most of the talking. You explain what products you have, and what you can do to them for the customer. Hopefully, the customer picks one of the options you presented to them, and boom, you have made a sale.



After I became aware that I was not selling apparel, my sales process changed. I asked the customer what the item was for, how it would be used, for whom it was being ordered. I asked questions so I could better understand what their need, problem, or situation was.

At first, this felt very awkward and strange. The customers wanted to know why I was asking these atypical questions. I explained that I knew they had a closet full of clothes, so I suspected the order was not really about the clothes. Once I

understood what their needs were, I could do a much better job recommending the best products to meet their needs within their price points.

I would say, “For example, are you trying to identify your staff so your customers will know who to ask for assistance? Or do you want to have the kitchen staff look different than the serving staff?” At that point, the customer usually would jump right in and explain what they were looking to accomplish with a branded apparel item or product. Most of the time, once

we reached this point in the conversation, I knew that I would close a sale with this person.

As a result of this conversation with my customers, I reframed how they thought of me and my business. I shifted from being an apparel decorator to becoming a marketing resource for them. The value of working with me and my company was no longer the same as working with another apparel decoration company. My customers felt that I “did more” for them now, without even knowing why in most cases.

STITCH SOLUTIONS





OFFER EXTRAS

I amplified this perception at every opportunity. I offered to keep track of their orders by employee name, so they could reorder for an individual at any time without having to dig up all the details. We created a spreadsheet for these accounts, and tracked the employees by name, size, and products ordered.

We offered a “bag and tag” service, where each employee’s items were sealed in a clear bag, and then labeled. When the boxes arrived, the customer could grab Joe Smith’s products easily, knowing he would get the correct items in the correct sizes. We did charge a small per item fee for this service. Once they used this service, they never discontinued it. The customers loved that we had made their life so much easier when it came to handing out products to their employees.

We offered a “try before you buy” service. I would bring in samples of the products in all sizes, XS-2X and leave them with the customer for a week. Their employees could try on the samples and then know exactly what to order. I would come back

in a week and pick up the samples along with the order. We removed all the risk for the customer since they could order products in the exact quantities and sizes they needed. They did not have to order any extra inventory unless they wanted to have some on hand.

For our largest accounts, we took our customer service one step farther. We provided order forms for their employees. The form listed all the products they could order, the sizes and colors available. Each employee completed a form and turned it in to the front office by a specified date. I stopped by and picked up all the individual order forms. The customer did not even have to compile the orders if they didn’t want to (some did). We did the work to compile all the orders and then sent the customer the summary of the order for their approval. You can also do all of this by offering an online company store to your customers, instead of paper forms. I was setting my company apart from my competition by providing a level of customer service to make the process of ordering custom apparel as easy as possible. If you would like

a sample of a custom order form, email me at Jennifer@nnep.com, subject: Order Form Sample, and I will send it to you.

It is easy to stay in the same sales process and forget that it is not about the apparel and products we offer. We are selling something completely different than T-shirts, sweatshirts, and jackets. We are selling branding, marketing, team building, customer service, and so much more. By positioning yourself and your business as a branding partner, you will outpace the competition, and they will not even know how. Adapt your sales conversations so that you are identifying and then meeting your customers’ needs, and the sky is the limit for you in 2022! **GP**

JENNIFER COX is one of the founders and serves as president of the National Network of Embroidery Professionals (NNEP), an organization that supports embroidery and apparel decoration professionals with programs and services designed to increase profitability and production. You can contact her at jennifer@nnep.com.



APPLYING VINTAGE TECHNIQUES TO A NEW DESIGN

The modern Urban Dictionary defines vintage as an item of age, usually from at least 20 years ago or more. These items could be anything from furniture and children's toys, to clothing and household items. While the more traditional trusted Merriam-Websters version says vintage is similarly of, relating to, or produced in a particular vintage as it relates to wine and of old, recognized, and enduring interest, importance, or quality: Classic! That just about sums it up. We like to say, as it relates to decorated apparel, "What's old is new again." Been saying that for over 30 years now. In fact, we have written many articles about that very subject over the years. We can remember when Abercrombie & Fitch made vintage and distressed printing popular over three

decades ago. Folks said it was a fad and wouldn't last long. Yet here we are today still printing new versions of vintage techniques. Vintage and distressed looks have trended for so long, we see it absolutely everywhere. It is very popular in photography, for instance, where we can add a filter to a new photo for a vintage feel for that nostalgic look. We cherish that which came before and represents our history.

This was the familiar task we were asked to complete for a client. The direction was a very distressed and washed out look to a reasonably complicated and detailed new design. This was for a western line known as Tin Haul. We have written about them in the past as well. Fortunately, in the spirit of the vintage feel, we were printing on all light pastel-colored substrates and wouldn't need a white printer or base plate to manage the colors. Typically, distressed images for screen printing don't have too many fine details for obvious reasons. We risk losing detail once the textured layer is placed over the

top. We constructed the image with some larger dark elements, like the silhouette we used for the bronc rider to reduce the loss of information and still be recognizable. Our type was fairly bold as well, to not lose readability. We also used heavier line weights for the text, horseshoe, and star. The finer details were secondary elements. Adding dark centers to the sunflowers added back in some detail. We used multiple pastel colors to fill the space between the key lines, which provides much of the detail.

The texture worked well on the larger elements but for the finer detail we used a fade with only a percentage of density removed and didn't completely knock out areas of information. We used levels in the adjustment options under the Image menu. That combination was used throughout. Because we wanted this image super soft and subtle, we reduced the density of the entire thing, which helped keep the final print from filling in.

We tested several textures by printing the design in color to size on paper to physically see what filled in. We ultimately chose a burlap pattern with



The direction was a very distressed and washed out look to a reasonably complicated and detailed new design. (All images courtesy Lon Winters)

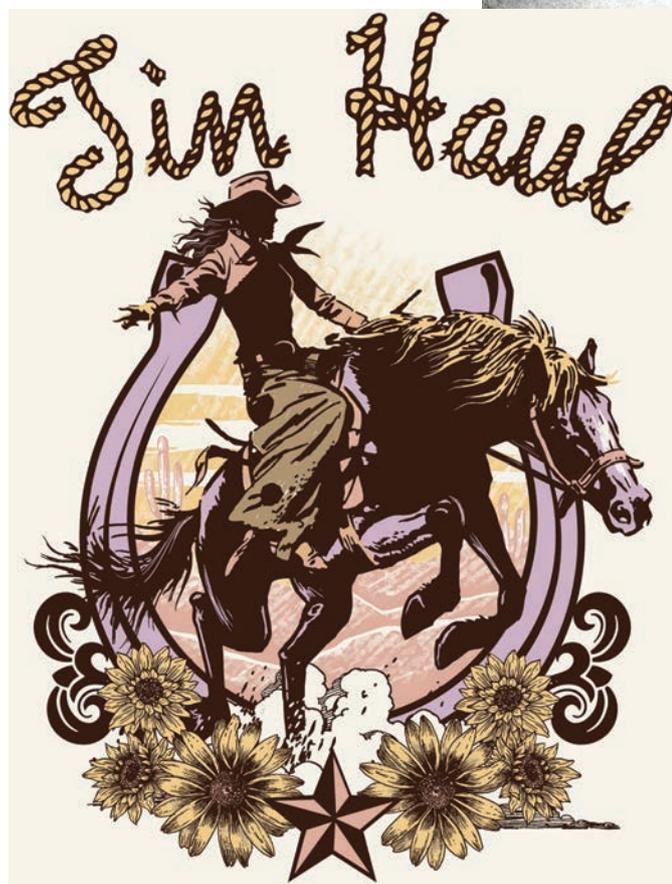


We used levels in the adjustment options under the Image menu.

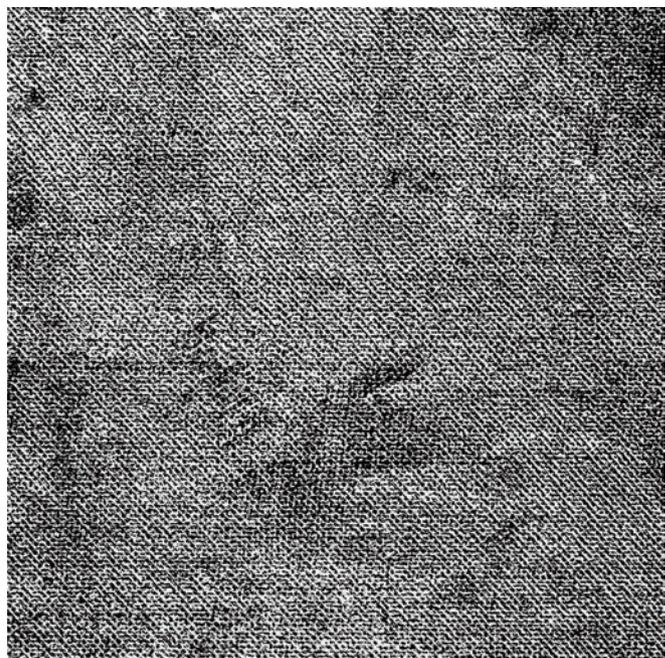
lots of openings that weren't too small. We increased the contrast of the photo of the burlap by overexposing the grayscale to help blow out the lighter values or anti-aliasing. When looking at just the color without the line definition, it was important that the colors had enough contrast. We knew our darker key line would fill in the gaps. We could still make out the breakdown of the colored elements easily enough and texture held up well. The hardcopy gave us the green light to proceed.



Because we wanted this image super soft and subtle, we reduced the density of the entire thing, which helped keep the final print from filling in.



We tested several textures by printing the design in color to size on paper to physically see what filled in.



We increased the contrast of the photo of the burlap by overexposing the grayscale to help blow out the lighter values or anti-aliasing.

SOFTWARE TO SUBSTRATE



Left: When looking at just the color without the line definition, it was important that the colors had enough contrast. **Below:** We knew our darker key line would fill in the gaps.



This was for a western line known as Tin Haul.

Since we were using multiple colors in this print, we took into consideration color theory, using contrast and compliments. Using a pastel violet against the pastel yellow helped keep the integrity of the design because of the natural contrast of complementary colors. In the background, a red is next to yellow, and both are warm colors, however the red values add natural contrast.

For the overall design, the texture plays a major roll. The bolder darker elements kept this design from completely falling apart. It was a fine line. We knew we would lose some of the tiny details in the sunflower where the thinner lines for definition occur but that was to be expected. We were careful not to let that loss of detail take away from the look of the overall print. This design was never really about detail, just representation. The subject matter was relevant to the client's fashion line but ultimately this was about a nostalgic look.

Once our channel seps were completed in Photoshop, we placed the file on our Illustrator art board where our registration marks, grayscale and job information live. We outputted on CTS (computer-to-screen) with a frequency of 55 LPI half-tone at a 22.5-degree angle and a round shape. For a very thin ink deposit, all the screens were work hardened N-272 TPI (threads per inch) at a tension of 45 N/cm. We nailed the setup with no micro adjustment right out of the gate. Truth be told, with how light the ink on the final print was, if we were close, it was hard to tell if we had any registration problems. All the inks were cut with a re-



The client absolutely loved the final image and has placed several reorders.

In the background, a red is next to yellow, and both are warm colors, however the red values add natural contrast.

ducer from 75% up to 99% for a nearly transparent look. We ran everything wet on wet using all 75/90/75 triple-ply, dual-durometer squeegees with flood and print speeds wide open and minimal pressures. We had to play with some of the ink formulations once we saw the first strike off but got most of the opacities right on the second try. Once approved, this thing ran at nearly 1,000 pieces an hour. The client absolutely loved the final image and has placed several reorders. Better to be lucky and good! **GP**

At 21 years old, **LON WINTERS** was the production manager for Ocean Pacific and started his 30+ year career reclaiming screens. He's the president and founder of Colorado-based Graphic Elephants, an international consulting firm and apparel decoration studio specializing in screen printing technical advances, plant design, layout, troubleshooting, productivity, quality analysis, and complete apparel decorating solutions. Learn more at www.graphicelephants.com.



You ever just take a step back in your line of work and notice that most companies are only focused on their price and how cheap they can market their products to the customer no matter if they are a new company just starting up or a multimillion-dollar company. The majority of companies are more worried about being the cheapest rather than known as one of the best and earning

a healthy profit to grow their company.

\$1 MORE

Most people when they start up in business have a lot to learn out the gate, but the first thing they try to do is match pricing or beat the pricing of companies larger than them, which is easier to do when you only have you as the employee. When we started our company, we did the complete op-

posite! We were one dollar more per piece on average than our competitors. We never focused directly on price. Why? Our company since day one has always been about having the topnotch customer service, helping to provide professional designs for free that we own, and hitting 99% of our deadlines on time or ahead of schedule.

When you think about all of that, does that sound cheap to do? You have to be mindful when you are starting up or if you are a smaller company doing less than \$1 million a year in sales. Your buying power is much less and your turnaround time could be slower when you have less people and you need to make sure you are paying yourself what you are worth or you will not enjoy what you are doing as much. You have one shot for your first impression

when starting out. So, admitting you are not the cheapest, but you are focused on producing a higher end product for one dollar more is not that hard of a sell. You simply explain and educate your customers on what makes your services and products better than most or all others in your line

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Don't Focus on Being the Cheapest



BY
HOWARD
POTTER

of work. Taking the time to explain yourself shows your customer that you care and you want them to understand what they are getting for their investment no matter if it is a \$20 or \$2,000 sale.

Yes, you may not get every customer this way, but you will get the customers you can keep up with. You will get the customers that want the quality and customer service you offer. Your company will be earning the extra dollar per piece to invest into an employee or buying other supplies and equipment needed. Best of all, you will be doing work for a customer that not only wants quality but will promote you to their friends who typically have the same ideals. This makes it an easier sell since they heard about you from a friend. These types of clients are usually the easiest and most understanding to work with.

STAY COMPETITIVE

When your company is hitting the next phase, like we did about eight to nine years in when we did our first million in sales for a year, you start looking at different things. You want to know how to improve your profit margin while maintaining your pricing, so now you are staying competitive in the market. Notice I used the word competitive, and I did not use the words cheaper. So, when you hit this next level, your goal is to not only maintain sales, but grow them by 5%-10%. Our company grows no less than 15%-20% annually, so we know the plan works firsthand and has over our 18 years in business.

ERROR RATE

When your company is hitting at the next level in business, you want to focus on your error rate much more than ever be-

fore. The average in our line of work is not less than 5%. Imagine if you get it down to 2% annually. What does that do for your bottom line? Your staff is producing more orders correctly with very few errors, which means you can handle more work weekly and yearly netting a higher profit. You waste less supplies, utilities, and even better your customer is consistently happy, which naturally can put thousands more in profit back into your bottom line and allow you to afford to take care of your staff at the same time!

SELLING CHEAPER

When you are getting to the next stage of sales doing millions, you are now liable to keep feeding the beast called your company, so in many cases this is where most companies feel their only option to maintain and to grow their sales is by





becoming the cheapest at everything they sell. Can it work? Yes, but is it the only or best option? No!

If you are selling everything cheaper than everyone else you are not only hurting your bottom line, but you are hurting the market value as a whole, which only circles back to hurt you. I am not saying to never have cheaper pricing on something, but you never want it to be your main focus or the only way your company can grow. Come up with new products to sell that most do not have access to. A great example during last year's craziness: my wife and I have always wanted a laser engraver, so we had the time and did our research and purchased one this year. It was not only another compact piece of equipment we could run, but we can now produce volume with it and high profit margins, which allows us to maintain pricing with other processes on the backend by profit sharing to that department to stay aggressive in the market. This is another product that is an easy sell to our existing customers. It is much easier to sell more to existing

customers than it is to get new customers through the door.

When you are doing millions in sales and production it allows you to really use your buying power to help improve your profit margins. Certain supplies we used to buy weekly, but not many of them we buy once a month or once a quarter in bulk which not only gives us a better price per unit, but cuts down on shipping costs and time wasted ordering weekly, which really adds up to thousands more than you know.

As you can see, all these things really matter whether you are smaller or a larger company. Your main focus does not have to always be about being the cheapest. We all need to take a step back and look at the big picture. What do I want for my customers, staff, and my family and how do I achieve that? If you try to play the "I am the cheapest" game, it's short lived because you clear very little profit margin from each order. If you make mistakes it chews up the profit margin from other orders and has you working for free. If you are a multimillion-dollar company,

that game can really make it harder for you to take care of your staff since they are the backbone of the business. It also slows down you being able to invest back into your company fast enough to keep up with the growth! Remember, when you have the cheapest prices, you have more phone calls, orders, and typically more issues at hand faster. This leaves you very little room for recovery. Being the cheapest is not always a long-term solution for success. Focus on your customer service, quality, and turnaround time and the rest will fall into place! **GP**

HOWARD POTTER has worked in the promotional industry for 17 years, from designing to building brands and a family-owned business. He is the co-owner and CEO of A&P Master Images LLC with his wife, Amanda. Their company offers graphic design, screen printing, embroidery, sublimation, vinyl graphics, and promotional items. Howard, his family, and the business reside in Utica, New York. For more information, please visit masteryourimage.com.

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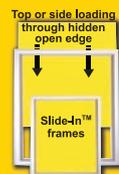


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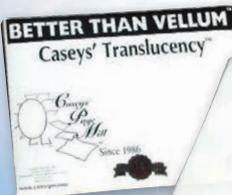
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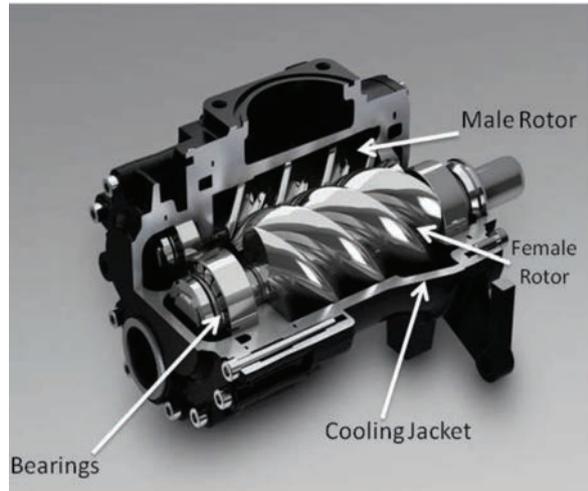
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AIR COMPRESSORS

continued from page 57



Left: This diagram shows a common single-piston and pump found on electric air compressors. **Right:** Here is a cut out of a rotary screw compressor to expose the twin screws that compress the air.

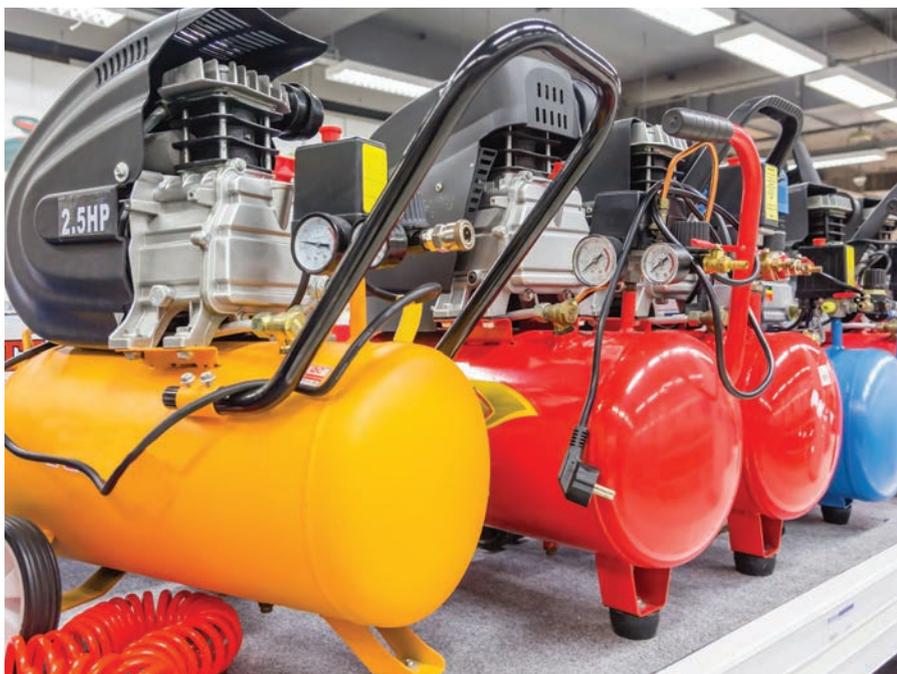
Direct drive means that the motor is directly connected to the pump as opposed to a belt drive, where the motor is connected to the pump by a belt. With a direct-drive unit, the pump turns at the same speed as the motor, usually around 1,700 RPMs or faster. With a belt drive, the motor turns at 1,700 RPMs, but pul-

leys gear the pump down to 600 or 900 RPMs. This means that there is less wear and tear on the pump, which will result in lower maintenance cost. Direct-drive units are louder than belt-driven ones, but the latter may need to have the belt tightened or replaced at some point in time.

THE TANK

The size of the tank of any given compressor really does not matter much because our work requires a huge consumption of air. Much will depend on which techniques you will use most often, as carving requires the most air. We will come back to the topic of air consumption a little later as well. The facts you need to consider are what volume of air your blaster consumes at the maximum pressure you will be using, and what is the air volume output of the various compressors at that pressure. If the tank is a 60- or 80-gallon tank, it doesn't much matter, because at a pressure of 40 pounds in carving, you will deplete the air of either tank in four to eight minutes. **GP**

With over 35 years in the glass business, **RUTH DOBBINS** offers experience in fused and cast glass, as well as in glass-etching techniques. Ruth holds a Master's Degree in Printmaking and Art History and has been a partner in a stained and fused glass wholesale supply company in Europe, which also placed great emphasis on a training program. You can reach Ruth by email at ruth@etchmaster.com, by phone at 505-473-9203. © Ruth L Dobbins



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