THE THREE STAGES OF UNDERSTANDING

Here's a story I frequently share with students and young designers still unsure of their comfort with materials and manufacturing. When I look back at my first five or so years out of design school, I can describe my relationship with materials and processes in three rather distinct stages.

The first stage was a period of blind naïveté. Anything was possible and how my concept would make its way into reality was a secondary concern (if at all). Perhaps this is one of the primary reasons employing young designers can be so refreshing and energizing to a studio as they can be the source of wild new forms, trends and ideas unfettered by any bias or understanding for the realities of materials, manufacturing or the laws of physics. But for me, I sensed that this disconnection between concept and reality also represented a significant amount of risk—for my design, the client and the end user. I felt like I was working without a net, with no underlying understanding of how to convert the art of my concepts into designs that solved more problems than they created.

For some designers, I think that's where they wanted to remain, fearing that to know too much about the realities of materials and manufacturing would somehow "break the spell" and suddenly all their crazy, beautiful expressive forms would somehow become plain boxes with tons of draft and huge fillets. There still may be practicing industrial designers out there who have gone out of their way to avoid learning too much about all that manufacturing gobbledygook, steering clear of anything that might spoil their concepts. These designers might be looked to as futurists or conceptual designers to help us imagine what is yet to be using materials and manufacturing techniques still to be developed. For others, they might have a support team of engineers available to take the spirit of their sketches and sculptural forms and convert them into reality. Great work, if you can get it.

But for me, I sought out this information. I needed to know the truth about what materials could and couldn't do and how they could be manipulated and formed. This was in the '90s before the wealth of information on materials and manufacturing was readily available online. So I attended workshops, read books and magazines, and examined the products around me to understand how they were made.

The second stage of this evolving relationship developed with my mounting awareness of all the "rules" of manufacturing—what you had to do versus could not do, what drove costs up and how to reduce those costs, materials selection guidelines, assembly techniques, and all the spectacular failures that can and do occur in manufacturing. I became terrified that everything I designed had some fatal flaw or would cost too much to produce or, worse yet, couldn't be produced at all.

I think this might be the worst fear for any young designer: to find themselves caged in by all these rules and restrictions, no longer capable of developing designs without a manufacturer or engineer pointing out how ill-conceived it was or that it would be too expensive to produce or not structurally sound.

But there was light at the end of that tunnel. After some time learning about these rules and seeing them applied firsthand (correctly and incorrectly) and applying them to my own products, I started to understand how to work within those rules and take advantage of them. Experience taught me how they could be bent and sometimes broken. And

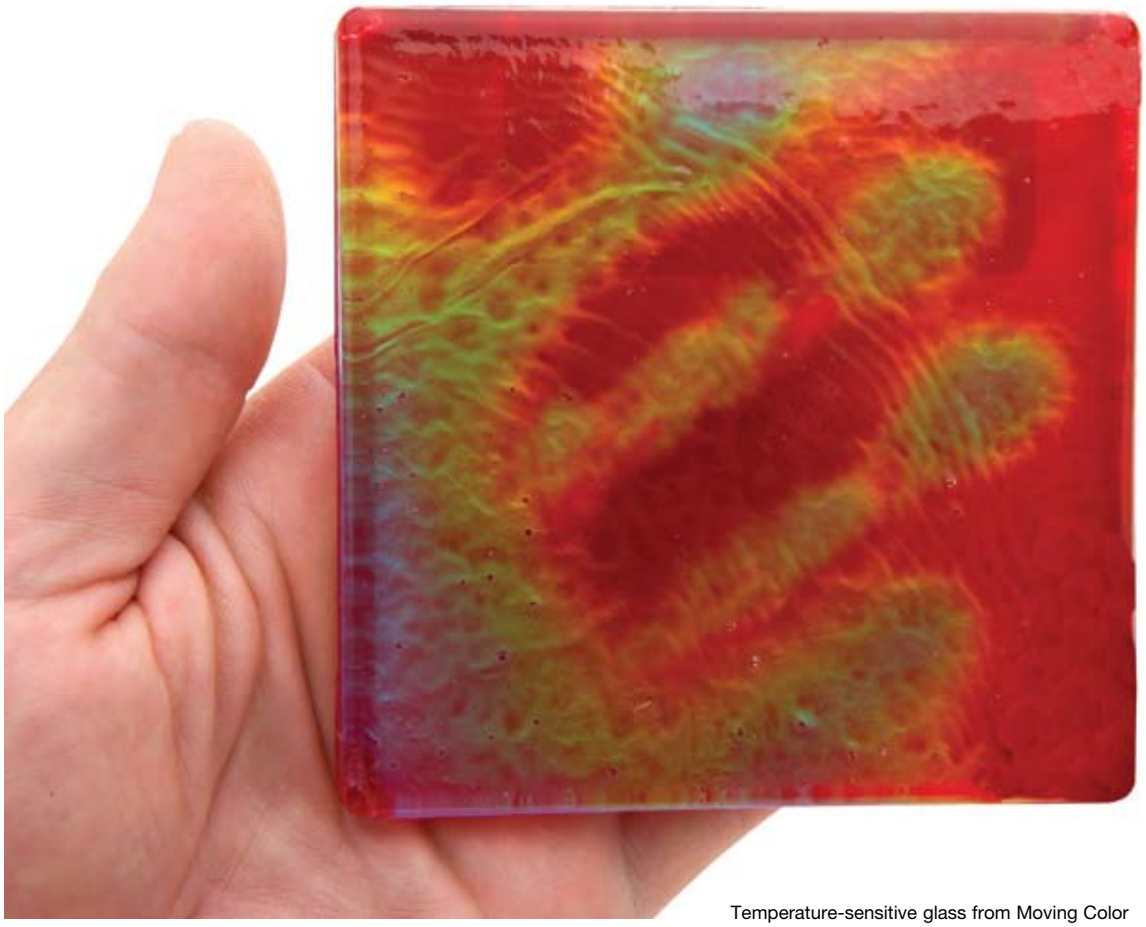

Photo courtesy of Inventables, www.inventables.com

Temperature-sensitive glass from Moving Color

with this new confidence came the realization that these manufacturing issues could be addressed within the conceptualization process as opposed to just afterward.

This final stage is an on-going relationship with materials and manufacturing. It extends beyond understanding those rules to embracing them. With the ability and confidence to apply that knowledge, my own criticisms can be suspended to experiment and ideate, knowing I can address those issues when needed. By owning this technical experience, this periodic materials-and-processes review takes place within my own design process.

Obviously, developing this expertise takes time, and there are always new materials and manufacturing technologies to learn about. But with this sensitivity, form and concept development, as well as manufacturing and assembly methodology, can take place within the same cyclical concept-critique-refine loop. So when it's time to do a review with an engineer or manufacturer, I've already considered many of the issues that will most likely be discussed and have already accounted for them in the design. And if not, I'll at least understand what they're talking about.

Developing this experience, comfort and confidence has had an additional benefit when working with other team members: empathy. Great design starts with empathy and an understanding of what people need and do and not just what they say they want. This sensitivity extends beyond the user and into the needs of engineers, manufacturers and suppliers—all having a vested interest in the product's success. If you can understand their language (maybe even translate between different disciplines), anticipate their needs and identify with their concerns, you can remain engaged in the design process longer to better serve the end product.

Despite the advances in interface technologies and on-screen experiences, we still live in a physical world of materials and manufactured objects. Our sensitivity to these materials and how they are transformed into the objects we interact with remains central to our roles as industrial designers. What follows is a series of articles from designers and professionals who have embraced materials in their work. They remind us that design and materials are intimately intertwined and when designers take the time to truly understand them and what's possible, amazing things can happen.

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