



Summer 2015  
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Issue 2

# The Journal

**Product Design and Development Division**

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SOCIETY OF  
PLASTICS ENGINEERS

# Editor's Desk

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## **My Two Cents Worth**

**Brandon Lee**

What is great industrial design? What are your criteria for great design: unique, appropriate, attractive, marketable?

Today, I passed a billboard with a beautiful photograph of a baby. The caption read, *Shot on iPhone 6*. I was amazed at the quality and detail of the photograph. Camera technology on phones has certainly come a long way. But then I wondered, when did the camera become the major feature of a phone? Smartphones have evolved much since the first Palm Treo and Blackberry. They have become integral to many peoples lives. On smartphones we're able to communicate, entertain, keep track of our schedules, browse the Internet, get much of our computing work done, and yes, even take pictures. However, any tool with multiple functions, like the Swiss Army Knife, tends not to do any one job well.

So the question is, do smartphones represent good, let alone great industrial design? From an appearance standpoint smartphones are essentially monolithic, well proportioned planks. The smartphone's ergonomically are not great phones, nor cameras, nor even a good typing platform to use. Finally, the smartphone's industrial design communicates nothing about its function nor operation. The use of the smartphone is only obvious after years of trial and error on behalf of first adopters.

So how does the iPhone's meet your criteria for great industrial design?

## Features

In this issue of the Journal, we explore the subject of design originals versus their copies. Also, we dedicate this Journal issue to Jordan Rotheiser. Jordan has been a dedicated member and contributor to the Product Design and Development Division of the SPE for many years. He recently passed in March and will be missed.

I wish you a terrific summer.

Talk to you this autumn.



Brandon Lee  
Editor-in-Chief  
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**PD3**

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# President's Desk

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## President's Message for Summer, 2015 PD3 Newsletter

### Al McGovern

Greetings to all from the Product Design and Development Division (PD3) President's Desk!

It's supposed to be springtime in Chicago, at least according to the calendar. Problem is, someone forgot to tell Mother Nature—it's May 31<sup>st</sup> as I type this note, and it's a cloudy 55°F (13°C)! I'm wishing I was back in Orlando, which is where this year's ANTEC and NPE were held. I hope you had a chance to make it there, since both were very well attended events, with lots of great new equipment and process suppliers, along with many excellent technical presentations. The Student Section of SPE was especially busy this year, and seems to grow larger and more active each year. This year, their Awards Luncheon at ANTEC was named in honor of Patsy Beall, wife of Glenn Beall, one of the founding fathers of PD3. Patsy passed away in November of last year.

The PD3 has been building momentum over the past several years, refreshing the Board of Directors with some strong new blood and regaining the strong position it had for many years under the leadership of Glenn, Jordan Rotheiser and others. Sadly, Jordan passed away this past March; you will find more about that and the PD3 memorial donation in this newsletter. Jordan, and his wife Gail, were stalwart supporters of PD3 and of good plastic part design and education in general. He will be missed.

You'll find lots of information in this newsletter pertaining to ANTEC, our newly launched PD3 website, and the usual assortment of great technical information related to our profession as plastic part designers. We are looking for new board members, as well as your thoughts for what to include—or exclude—in our new website, and for your suggestions on how we can make PD3 a better resource for you. Please write or, better yet, get involved and help steer our direction as we continue to grow.

As always, I wish you peace and happiness in all you do,

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**PD3**

# Boardroom

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## Board of Directors Meeting, June 9, 2015

### David Tucker

#### Attendees:

Albert McGovern, Ed Probst, Brandon Lee, Eric Larson, Jeremy Braaten, Lance Neward, Mark MacLean-Blevins, Mike Lacey, Rich Freeman, Vikram Bhargava, Kenneth Pawlak, Glenn Beall, David Tucker, and Larry Schneider.

1. Roll Call of Members Present: Albert McGovern
2. Treasurer's Report: Larry Schneider
  - a. Sent out to team
3. Councilor's Report: Mark MB
  - a. Councilors Report sent out on 6-9-2015
  - b. See Attachments.
4. Membership Report: Jeremy
  - a. Follow-up with Kathy Schacht at SPE re: Contacting non-renewing PD3 members
  - b. Methods for making division better value to members
  - c. Discuss joining with other divisions, reach out to members.
  - d. New members are more likely to use the internet to find answers not as likely to pull members in
  - e. 65 new members (never joined PD3), Dropped 39 members since January.
  - f. Data:

Month	Total
January	1058
February	1059
March	1052
April	1028
May	1019
June	
July	
August	
September	
October	
November	
December	



- viii. Idea was to send them out 1 at a time.
- ix. Goal is to be a Destination for Knowledge and expertise
- x. Content needs to stay current
- xi. Format below:
- xii. Link to the chain.
- b. TopCon Committee: Ed, Mike Lacey, Lance, Michael P, Eric, Glenn (consult)
  - i. Update on plans for next TopCon
  - ii. Glenn has discussed TOPCON-Seminar speaker opportunity
  - iii. Ed to follow up with Glenn on the selection of material (Jim Throne)
  - iv. Week of January 18th, Topcon for both SD and Portland locations
    - 1. Monday Tuesday – Portland
    - 2. Thursday – Friday – Los Angeles (most likely in southeastern LA country, or northeastern Orange County).
      - a. This should enable attendees from LA, Orange County (OC), and San Diego.
- c. ANTEC Committee: Mike Lacey, Al, Eric (consult)
  - i. Summary of ANTEC Papers
  - ii. Gearing up for 2016 paper submission
  - iii. Recruit some good papers instead of taking submissions
- 7. New Business
- 8. New Board members, Vikram Bhargava and Kristin Charlton--  
WELCOME!

Meeting Adjourn:

**Attachments:**

PD3 Councilor's Report – Spring 2015 Council Meeting – March 21<sup>st</sup> and 22<sup>nd</sup>, Orlando, FL

Sections, Divisions and CCOW Committee Meeting:

- Sections – 8 new student chapters
- Sections – Toledo Section is in the process of re-forming
- Sections – The incoming Sections Committee Chair is Rodney ? - looking for a volunteer for vice chair.
- Divisions – New Additive Mfg. SIG
- Divisions – Austin Coffey is the incoming Divisions Committee Chair – looking for a vice-chair.
- SPE Foundation – the foundation can provide administration services for scholarship funding for Sections and Divisions.
- The Chain – presentation on the Chain and discussion about how to make better use of it for Section and Division Board use and meetings.
- CCOW – Large and long discussions revolving around by-laws and policy changes that are to be voted upon in Council I meetings tomorrow.

Council I Meeting:

- Positive financial result of 103K for the FY – the budget called for a deficit of 86K – so that was good news.
- Revenue Sources:
 

Membership	Stable	
Advertising		+20%
Events		+20%
Publications		+20%
- Expenses:
 

Membership Mailings	-45%
Events	-12%
Governance	+18%
Others	+30%
- Accounting Audit: is now looking at the foundation and the society as one unit.
- Advertising Income on new website of \$90K in year one vs. \$0 from previous website
- Committee Reports: See notes from Committee meetings held yesterday (above).
- Elections:
 

Scott Owens	was elected President Elect
Olivia Craig	was elected to Senior VP
Monika Verheij	elected to VP
- By-Laws and Policies:
 

4.4.1 & 4.4.2 Voting for Students	Passed
7.3.3 & 7.3.4 Nominations housekeeping	Passed
8.1.2 & 8.1.3 Councilor definitions housekeeping	Passed
8.2.1 Defines Council	Passed
8.4 Removing housekeeping	Passed
14.7.10 Foundation Org. Structure	Passed
17.4 Remove Second Reading (D41 voted against)	Passed
4. Changing Member Grades	Passed



David Tucker  
 PD3 Secretary  
**PD3**

# Councilor's Desk

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## Spring 2015 Council Meeting – March 21-22, Orlando, FL

### Mark MacLean-Blevins

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4. Changing Member Grades Passed
- HQ Overview – Russ Broome: Planning to grow resources at HQ
  - Adding PlastiVan instructors
  - Adding updates to AMS system and to website
  - A new registration system is 99% ready and will have a test event before being offered to all.
  - P2P seminars (pellet to part) to be corporate sponsored with SPE hired to handle logistics.
  - SVM surveys as a service to companies (revenue source?)
  - Open Innovation – perhaps provide some platform (fee-based?) for interchange between members and sponsoring companies?
  - SPE U – HQ will be visiting campuses around the country to attempt to drum up student and institution involvement.

### **Council II Meeting**

- Incoming Society President Dick Cameron takes the helm.
- Council approved the 2015-2016 Operating Plan
- Wim DeVos presented the SPE Strategic Plan of Income Stream
- Breakout Sessions: small group sessions discussing the role of governance for SPE and what size does the governing body need to be.
- Discussions regarding remote participation at Council meetings – cost vs. benefit – these are extremely costly but only cater to a few individuals each meeting.

- Report from Student Activities Committee:
  - Poster Session this ANTEC was a successful all digital format
  - 79 posters this ANTEC
  - 75 travel awards stateside at \$250 each
  - 36 travel awards International at \$350 each
  - PD3 did contribute this year and was recognized with a bronze award
  - The Student Luncheon this year was re-named as “ The Patsy Beall Memorial Student Activities Luncheon”
- Mold Making & Mold Design Division requested a name change to Mold Design and Technology Division.



Mark MacLean-Blevins  
PD3 Councilor  
**PD3**

# Membership Desk

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## Summer Update

### Jeremy Braaten

I hope that everyone is off to a great start with your careers, projects and businesses this year. One of the keys to keeping us ahead of the curve is to stay connected with new information and technologies that are constantly being developed and made available to the plastic industry. The PD3 division is here to help designers, engineers, business owners and managers stay on top of their game by providing access to our large database of technical papers, presentations and resources to help expand your knowledge and understanding in various fields. Being a member of SPE gives individuals access to other opportunities, such as networking and regularly scheduled webinars that are held throughout the year. SPE members also have the benefit of discounted rates for conferences and seminars. At these conferences you have a great chance to engage other plastic professionals and learn from their experiences. The PD3 division is off to a great start this year and has gained 65 new members in the past 5 months. I encourage these new members to take full advantage of the resources that our division provides.



Jeremy Braaten  
Membership Committee Chair  
**PD3**

# Mentor's Corner

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## Concept Refinement

### Michael Paloian

In my last Mentor's Corner editorial I discussed the importance of developing many concepts before settling in on a design direction. Developing and selecting a concept is a critical step in design since it defines the premise for all subsequent decisions that will take place throughout the development process. Design concepts loosely define a design direction. The specificity of a concept may range from something as vague as a scribbled sketch or cardboard model to a photorealistic industrial design rendering. In any case concepts always require further development which will be discussed in this editorial.

Concept refinement can transpire through any number of paths depending on the concept and designer. Let's take a look at some examples of many of concepts and the paths they can follow during the refinement process.

### Industrial Design Concept Refinement

Industrial designers are responsible for creating product concepts based on design considerations that are alien to most design engineers and plastics part designers. Industrial designers focus their attention on the user versus the product or part performance. This is perspective drives many of the design decisions made by industrial designers which are often in conflict with the priorities of engineers. What are user centric design parameters? Factors affecting the user include ease of use, aesthetics, over form, product branding, proportion, symmetry, weight, safety, and product character. Industrial designers can expend hundreds of man-hours optimizing these factors throughout the design refinement phase of product development.

Optimizing ease of use can be essential for products like electric hand tools, garden equipment medical products and virtually every product used by a human. Let's take a look at a chainsaw for example. What are some of the human factors considerations that are essential for the design of a chainsaw?

- Overall balance and location of the center of gravity relative to the handle.
- Chainsaw weight, motor location and overall layout

- Handle size, shape and clearance for gloved or ungloved hands.
- Button size, shape, location and activation force
- Safety brake size shape, activation force, travel distance and location.
- Pull cord location and handle grip design
- Bar chain attachment, dismantling method, chain tightening method, etc.

These are only a few of the hundreds of considerations required to be integrated into the design of a chainsaw. Optimizing these parameters affects overall product design, safety, comfort and efficiency of use. Industrial designers must integrate the mechanical components within the boundaries of the overall product form and strategically locate each subcomponent to optimize these parameters. Often a minor change in a dimension or activation force could change the product from a safe to a highly dangerous condition. Refining these parameters is often accomplished through an iterative process of sketching, CAD design, model making, testing and redesign during the concept refinement stage of development.

### **Mechanical Design Concept Refinement**

Concept refinement is not limited to industrial design. Mechanical engineers, designers and plastics engineers must also refine concepts to more developed states before finally attaining a production ready design. These concepts are typically functional and must conform to performance related parameters. Examples include mechanisms, attachment details such as snap locks, or structural design features which must perform within strict fatigue or deflection limitations. Concepts can be refined using CAD, simple models or machined highly detailed models. Concept refinement and prototyping are crucial to refining ideas. Rapid prototypes have become a very popular means of refining concepts, however they do have many limitations. I've used all the rapid prototyping methods including FDM, SLA, laser sintering, wax FDM and ZCorp's powder process. These processes have been used to form both plastic and metal parts. The major limitations for all these processes are material choice and size limitations. If you are trying to evaluate a design based on chemical resistance and impact strength you may discover that a machined prototype in the particular material will be much more representative of the final product than an SLA or FDM prototype. You may be involved in designing a rotationally molded part in polyethylene and are curious about how strong a particular molded in feature is. The part may be the size of a small car and too impractical to prototype. So how do you verify the design before you commit to thousands

of dollars in tooling for a design that may not work? You can simulate the conditions with a computer or you can make a small mold of the area of interest and test it under a variety of conditions similar to actual use. I've used this technique many times with great success. It's critical to constrain and load the section being analyzed in a manner similar to its use. I've also simulated large structures and applied finite element analysis to the product based on specific materials and load conditions.

It's easy to develop concepts but the real challenge is to translate the ideas to a level which works and can eventually be manufactured. The concept refinement stage should evolve on multiple levels. What I mean by this statement is you should develop concepts with considerations of all factors affecting the final design. These may include tool design, molding, aesthetics, human factors, assembly and safety to name a few. This phase of design is the most crucial in the development process since it will influence all subsequent development steps. Poor decisions during this phase can introduce complexities there might not have existed if a better refined concept was developed.

### **Process Selection, Tooling Cost and Productions Costs**

Concept refinement will also be influenced by decisions concerning process selection, materials, tooling and production costs. For example an initial rendering from an industrial designer may only illustrate its basic form with some indication of colors and graphics. If the design is well thought out, the basic shape should represent its function and be ergonomically optimized for ease of use. These types of preliminary concepts are typically proposed by most industrial designers. Plastics designers and product engineers are required to translate these concepts into a production design. I don't agree with this design approach since the manufacturing process should be considered from the earliest phase of development. If an industrial designer has a basic understanding of different manufacturing processes and their effect on part cost, investment and overall product design, he or she can propose concepts that can be more easily translated to a production design based on design features related to that process. After the initial concept is accepted plastics design engineers can work with the industrial design team to translate the embryonic concept into a more defined product embodiment based on one or more plastics processes. Process selection will play a major role in tooling investment, lead times and reoccurring costs. It also has an influence on appearance, number of parts and product details.

During the concept refinement phase, a concept should be detailed to a level sufficient to define the number of parts based on a particular molding process as well as the estimated tooling costs and unit cost. Early estimates for these basic building blocks of product design will minimize any chances of redesigning a product after it has been completely designed. It also

provides a platform for everyone to converge based on risk, appearance and potential tooling complexities. This method of designing on multiple parallel paths leads to a smoother product design program since all parties can agree on basic objectives from an early phase of the project.

Experienced designers can also anticipate draft angles and split lines in a part from this early stage of development. Although these considerations may seem to be a bit premature in the design program, they are not. Draft angles and split lines will have a major impact on aesthetics, part count, tooling cost and overall product quality.

I would like to provide an example to emphasize the point I was trying to make in the previous paragraph. Let's look at a sculpted injection molded handle as our example. If a concept for this handle is being refined without considerations for split lines and draft from the early stages of design, an impossible molding condition can be created. This will force the designer to either totally redesign the handle or seriously compromise ergonomics and aesthetics. The problem becomes even more difficult if a surface requires a heavy texture and additional draft is required to mold the part. These topics will be discussed in more detail in future editorials.

I hope these examples and comments have made you think a bit more about your design work and will influence you in future projects. You can contact me at [www.idsys.com](http://www.idsys.com) or meet me at my seminars which are held twice a year at University of Mass, Lowell, <http://continuinged.uml.edu/plastics/IntegratedDesign.htm>

The next one will be on August 10 – 12 of this year.



Michael Paloian  
PD3 Mentor  
**PD3**

# Gallery of Goofs

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## **The Picture Frame**

### **Russ Malek**

Bad design was also exhibited in the creation of a frame that was to be placed around a bathroom medicine chest. The molded frame was designed to snap over the conventional medicine chest and create the effect of a picture frame. The frame was well built, had a fine polish, good miter and was most attractive.

It was molded in general-purpose polystyrene because once the frame was placed on the door of the medicine chest it was not supposed to be subjected to any unusual load. It was retained in a static position, and the styrene could be expected to function adequately as a decorative frame.

Indeed, it would have functioned adequately if it were only a picture frame. However, it was placed around a bathroom medicine chest, which is almost always mirrored. When applying hair spray or lacquer, many women (and men, these days) stand in front of their-'bathroom mirrors. The aerosol lacquer spray would settle on the picture frame. Shortly after their introduction, a parade of picture frames headed back to the department stores where they had been purchased, crazed and distorted because they had been subjected to the lacquer thinner in hair sprays.

The bad design factor in this product was not in the design of the mold, molding of the part or the fit of the part, but it was in the failure to recognize the environment in which the product was going to be used. Of course, some plastics products fail when they are exposed to extreme ranges of temperature or conditions that are not in the normal, expected range. But it should not be necessary to design a conventional, inexpensive product so that it would be able to survive -90°F at the North or South Pole.

Knowing that this frame was going to be used in a bathroom where temperature and humidity often run high, and where women apply their hair lacquer in front of a mirror, the product designer should have been careful to specify a type of material that would not be affected by lacquer or hair spray, or other commonly used bathroom products.

### **PD3**

# Article

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## **Real or copycat: The thorny issue of authenticity in design**

**Nathalie Atkinson**

In the design industry intellectual property can be difficult to pin down, with many consumers not even realizing that they are buying knockoff versions of high-priced furniture

The "Eiffel" chair is an archetype of modernism. The moulded plastic shell seat sits on a cage of metal (or sometimes wooden dowel) and recalls the scaffolding of the Paris tower that give it the nickname. Its actual name is less poetic: the "wire-base side chair," designed by Charles and Ray Eames and first mass-manufactured in 1950. It is a licensed trademark: Today, if the chair is not made by Vitra or Herman Miller, no royalty goes to the Eames estate. But here's the catch – the "it" I'm talking about is the Eames name, a trademark that is registered, not the chair design itself, which while we can acknowledge was first conceived by the Eameses, is not.

Musician Robin Thicke is paying Marvin Gaye's estate more than \$7-million (U.S.) in damages for copyright infringement after it was ruled that he had used Gaye's groove in a hit song. When it comes to design, however, intellectual-property law is fairly clear but the ethical lines are blurred on what's owed to the originators of design, such as the Eames chair's identifying design riff. Every category and field of created work (from literature and music to fine art and fashion) has different standards, tests and IP laws, but a classic 65-year-old chair makes a good case study of how even in the absence of much legal scaffolding, those with vested interests find other persuasive arguments – authenticity, ownership, conscience and even entitlement – to deter the dissemination and sale of (their word) copycats.

The Eames chair is now in the vernacular of design vocabulary. Consumers can buy derivatives of the archetype from a variety of sources. The chair costs \$69 at Structube, while at Kitchen Stuff Plus it's on sale for \$39.99. Versions with the licensed Eames name attached are about \$400. Are the cheaper ones infringements on a designer? Which to buy without guilt?

Like many consumers, I am conscious of wanting to do the right thing – but in this case what is the right thing?

Christopher Sprigman, a professor at New York University School of Law and co-author of *The Knockoff Economy*, thinks the discussion of copycats in furniture design highlights other preoccupations, such as the popular idea of authenticity. Because there is no general industrial-design protection regime in the United States, he explains, there is instead a patchwork of laws that touch upon it in one way or another – like design patent, which gives someone the exclusive right to make, use or sell a particular design for a period of 14 years if it's a novel design. (In Canada, Industrial Design Right grants a term of five years, renewable for another five.)

Another piece of the patchwork is trade dress, which refers to characteristics of how something looks that signify its source to consumers and has no expiry term. If the limiting principle is consumer confusion, "then just don't advertise it as an Eames chair," Sprigman says.

In other words, the cheaper chairs may be ersatz, but buying them isn't like buying a fake branded designer watch from the inside of a trench coat. It isn't counterfeit when the basic design, albeit originated by an individual, no longer belongs to any one person. Imitation may not be the sincerest form of flattery but replica vendors may operate with impunity and without reprisal. They aren't illegal – though it's still as webbed an issue as the base of the Eiffel design.

John Edelman, CEO of Design Within Reach, an authorized retailer of licensed trademark brands such as Eames, is frustrated by the knockoffs. "Nobody wants to buy a dining room table with a logo in the middle of it," he says. "Honestly, that would fix the problem! But you can't do that."

A big part of the strategy to discourage knockoffs, Edelman says, is educating the consumer about the designer who created what he calls "authentic product," as well as how it is made and why it's better. Edelman argues that most consumers buy replicas because they don't know any better – they don't know it isn't the real thing, or that there is a real thing.

"We're working on it. To increase the moral shame of it," Edelman says. He recently joined the board of Be Original, a new advocacy group of manufacturers and design studios that will promote the three Es: the economic, environmental and economic value of authentic design. In addition, DWR now signs new products, such as the underside of the Helix dining table, with its designer's name, Chris Hardy. Each upholstered Egg chair by Arne Jacobsen (designed in 1958, and retailing for about \$6,800) now has a serial number and invisible identifiers of authenticity.

Many design-savvy consumers opt to purchase the duplicates instead of the more expensive authorized editions. Almost as ubiquitous as the Eiffel are shelter-magazine spreads in the "steal vs. splurge" vein, and design sites offering "high-low" ideas that mix "real" versions with copycats. The designs seem virtually identical, though some are of palpably lower quality. But sometimes they are not, Edelman admits. "A knockoff can be almost exact, and then you don't even have the argument about materiality," he says, but adds: "You can copy a Rembrandt and do a beautiful job but it's still not a Rembrandt." That poetic analogy might be a good leg to stand on, but unlike a chair, a painting is not a functional item designed for industrialized production.

Still, the issue can seem like a never-ending game of musical chairs.

As Marcus Boon explains in *In Praise of Copying*, because industrial design concerns utility objects, it has weak to non-existent protection. How then to understand the ongoing gotcha moments of condemnation that still hover over the purchase of a so-called inauthentic item?

Boon, a professor of cultural theory at York University, and I talked recently about the philosophy and ethics, public domain and copying in industrial design, and what licensed, or authenticity, even means. "It's also complicated because branding is such a powerful force," Boon says, "and so much of the mystique or power of branding is related to the notion that a vaguely sanctioned object is more valuable than the one that is not.

"There is a kind of boutique capitalism in which, if you can afford it, the notion of authenticity is important – and having paid \$300 at Design Within Reach for the Aalto stool as opposed to \$20 somewhere else," Boon says of invisible provenance as status symbol. "There are people for whom it's meaningful. Most people can't afford that privilege."

Manufacturers want to make money, Sprigman adds from New York, and limit competition. "And I get that – that's their job. But I don't think any particular retailer's view of what the intellectual property regime should be is worth much at all."

Sprigman thinks the idea of authenticity is just as manufactured, in this case by corporate self-interest. "Authenticity is often a kind of idea that people at the top of the economic pyramid use to retain things for themselves," he says, in contrast with hipster culture's focus on authenticity where "certain kinds of bourbon are authentic and certain kinds are not. It's not about money, it's about who's inside and who's outside, who has knowledge. ... With stuff like mid-century-modern furniture, it's really about who has money."

Boon also thinks it's hard to discuss the whole topic without talking about politics. "Structures of privatization are what is organizing the mass distribution, and inevitably there are inequalities that are produced," he says. "The reason things can be produced cheaply for the most part is that somewhere in the world cheap labour will agree to make these objects."

Conscience usually comes at the same price as quality, but only the latter offers a spectrum. "Some people want the best quality and have the wallet to support it," Sprigman says. And for other people, good quality is good enough.

### **Good design for all**

Because the Eiffel, or shell, chair began life as a prototype among the designers' entry in MoMA's 1948 Low-Cost Furniture Competition, Charles Eames's own words about "good design for all" as a philosophy are often cited to justify the so-called unlicensed iteration – as though other vendors of flimsy versions were the Robin Hoods of democratic design.

It's a specious argument, if you consider those words in context, which are also about a quality proposition. Time interviewed Charles Eames about the production of the prototype chairs in a July 10, 1950, article called "Sympathetic Seat."

"It will sell for \$28 and he wishes he could design just as good a chair for less. 'The objective,' Eames says solemnly, 'is the simple thing of getting the best to the greatest number of people for the least.'"

While affordability may have been part of modernist ideology, not every design was meant for mass production – for example the Eames lounge chair and ottoman cost \$578 in 1956 – or about \$5,000 today.

For context, in 1950 when the Eameses put the "good design for all" shell chair into mass production, the price of an RCA television set – at the time, a luxury good – was \$199.95. Calculated for general inflation, the chair's \$28 price tag would today be about \$275. Herman Miller's basic version of the chair with the licensed Eames name, still manufactured in the U.S., currently sells through retailers such as Design Within Reach for about \$339.

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*1 April 2015*

**PD3**

# Article

Summer 2015  
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## Designers' Corner, Rotational Molding, Part 13

Glenn L. Beall

### REINFORCING FEATURES – PART 3

**Editor's Note:** *This is the 13th in an ongoing series of articles on design guidelines for rotationally molded parts. These articles are written by Glenn Beall, a Past Chairman and one of the Founders of SPE's Rotational Molding Division. He has been designing rotational molded parts since 1963.*

This is the last of a series of three articles that describe techniques for providing added strength on thin-walled rotationally molded products.

Some rotationally molded parts are double walled. In some instances the inner wall has approximately the same shape as the outer wall. The open space between the inner and outer walls can be filled with self-rising foam for added stiffness or improved insulating capabilities.

Another less costly stiffening approach that eliminates the cost of adding a foam is the use of kiss-offs. It is a common practice to provide additional strength by attaching two closely spaced parallel walls to each other. This technique can convert two relatively weak walls into one integral box-beam structure that is inherently strong. The thickness of the wall in the kiss-off area (Figure 1) is almost always established by trial and error, but 1.75 times the nominal wall thickness should be specified on the part drawing as a starting thickness. This spacing provides room enough for the powdered plastic to move freely through the cavity. The kissing off or welding together of the two walls takes place only as the last of the powdered plastic coats the cavity.

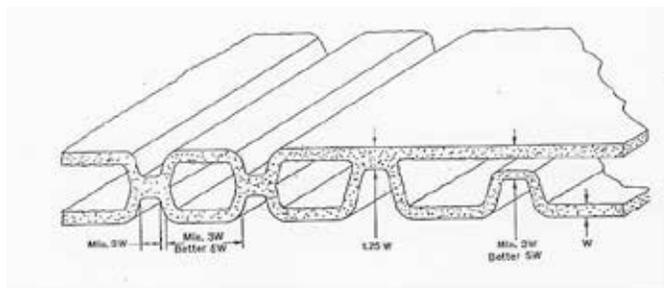


Figure 1

Kiss-off reinforcing ribbing refers to long, continuous kiss-off areas. Tack-off reinforcing refers to interrupted kiss-off areas. These tack-offs can be any shape, but round is the most common (Figure 2).

In those instances where kiss-off ribbing or tack-offs are undesirable on an appearance surface, the kiss-off can be designed into only one wall of the part on the nonappearance side.

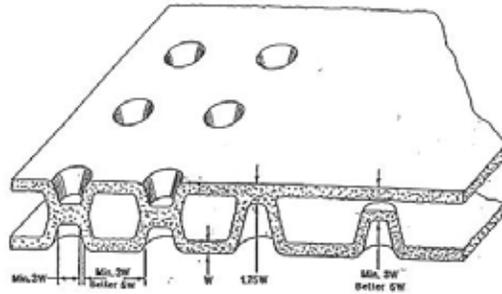


Figure 2

Tack-off and Kiss-off reinforcing are sometimes used in large rectangular portable liquid tanks to strengthen the side walls and discourage the liquid in the tank from sloshing from side to side. In these situations, there can be a substantial distance between the two walls that are to be attached to each other. In these cases, kiss-off ribbing should be designed into both walls. This minimizes the depth of the recess and makes it easier to heat the mold in the actual kiss-off area at the center of the tank.

Kiss-off ribbing has been used in the bottom of double-walled tanks for products such as insulated ice-making machines. In these applications, the kiss-off strengthens the inner wall. Failures can develop at the edge of the kiss-off on tanks that hold liquids or products such as grain that act like liquids. These failures have been traced to the added strength at the kiss-off. The inner bottom wall of the tank between the kiss-offs bends under the load. Stresses build up at the junction between the weaker inner bottom wall and the stronger kiss-off. In some cases, a more durable tank has been produced with what is referred to as an almost kiss-off. An almost kiss-off brings the inner and outer walls of the tank close together, but they are not attached to each other. As the inner wall is loaded, it bends and comes to rest on the almost kiss-off. This supports the inner wall, while leaving it free to move relative to the kiss-off. Kiss-off and almost kiss-off details are shown in Figures 1 and 2.

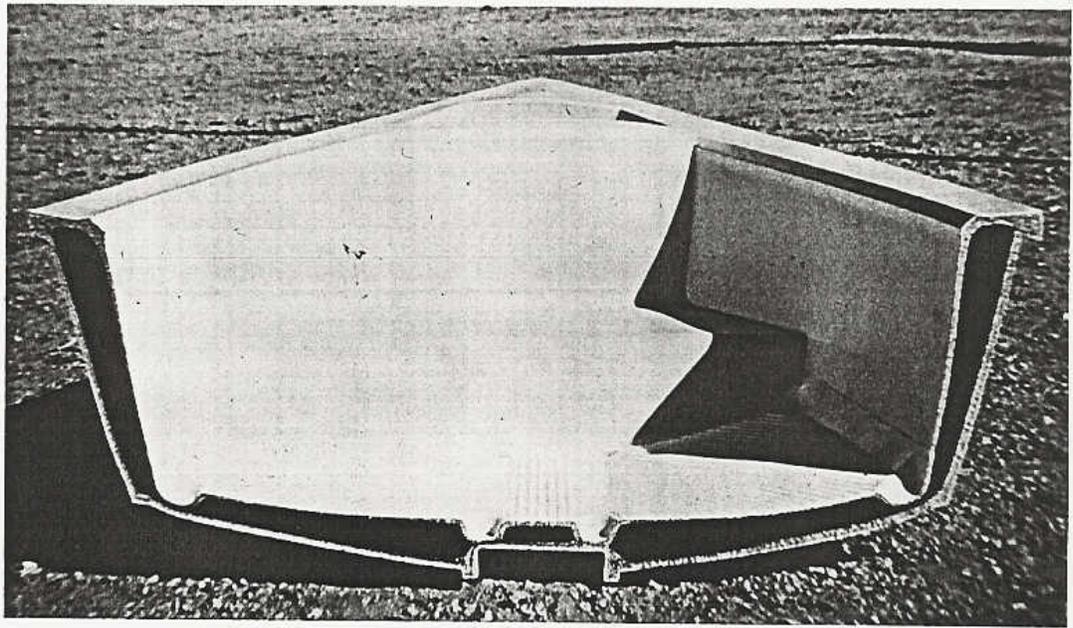


Figure 3

The inner and outer hulls of the boat in Figure 3 have kiss-off ribbing along the keel. Almost kiss-off ribs have been provided along the outside edges of the deck. If the deck flexes under load, it will gain strength from the outer hull, which is supported by the water. At the same time, the inner and outer hulls are free to move relative to each other in response to inside or outside forces.

*This article is a condensed extract from  
G. L. Beall's Hanser Publishers book entitled  
"Rotational Molding Design, Materials,  
Tooling, & Processing" available at [hanser@ware-pak.com](mailto:hanser@ware-pak.com).  
Hanser Gardner Publications, (877) 751-5051.*



Glenn L. Beall  
PD3 Director  
**PD3**

# Article

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## **Plastic part design – who does that? Who even thinks of that?**

**Mark MacLean-Blevins**

Creating a plastic part design requires vision, knowledge, and the ability to think. Compressing all the various facts regarding the functional use of the part, the desired life of the part, the anticipated annual volume of part required, the budgetary constraints for both the part and the tooling required to process the part, the desired end of life outcome for the part, and the materials to be used for manufacturing the part, takes a plastic part design specialist. One who is well versed and understands the physical properties attainable with the wide array of available plastic materials. One who understands the processes used to apply the materials to achieve the desired form or part. One who grasps the economic reality of the magnitude of the investment as compared to the ROI for a given annual volume of parts produced. One who can comprehend the end-use of the part and foresee the end of life disposal or recovery means for the part before the part is ever designed or manufactured.

Design of a plastic part is the domain of the specialist for good reason. The knowledge of materials, processes, manufacturing methods, and tooling are combined to form the vision for a given part prior to the first pencil sketch, CAD keystroke, or mouse click. The ability to take a specification for a part, or perhaps just a statement of desire for a part “...gee, wouldn't it be great if we could provide a device to do thus and so ...” and visualize the initial form or structure of the end part, then think through the process to be used and the material choices that might be best suited and the potential packaging of the part for maximum efficiency in transportation, indeed takes a specialist.

Given a requirement, the design specialist will cut through the weeds and determine one or two best possible materials and processes for the manufacture of the part – well before any active design begins. Given the performance criteria and the economic criteria for the intended part, the specialist will make the material selection and the process selection and begin thinking through the structure of the design as it relates to both part functional performance and part manufacturing process requirements. For an injection molded plastic part the specialist may be considering gate locations for the most efficient process, or for the best functional strength in a certain portion of the final part. For a thermoformed plastic part, the specialist may be thinking about draw depth as a function of overall size and sheet thickness required to satisfy the functional performance required.

For an extrusion blow molded part, the specialist may be pondering the neck diameter to major dimension transition for adequate final part strength while maximizing internal volume and compressing the overall packing volume for maximum pallet density to reduce downstream transportation costs. For a flexible part requirement, the specialist will be considering both material and process, while looking at long term ageing properties for the intended functional use of the flexible part. And the list goes on ... for every plastic part the combination of material selection, process selection, economic reality, tooling requirements, and creative design all flow together during the part design process. One cannot supersede any other they are all interrelated and each combination of choices will drive the tooling and processing requirements, which in turn will drive the economic benefit the part design is capable of providing.

If that is not enough, the plastic part design specialist also must tackle functional life and use issues such as: long term performance, chemical compatibility and stability, color and texture, decorating processes, features for mating to other parts, features to assist in locating the part for secondary operation or assembly, UV stability, dielectric strength, patent infringement, flammability, toxicity, end of life recycling or disposal, premature failure, and dozens more criteria depending on the intended application of the part. The sheer volume of material to be researched when designing a single simple plastic part can be overwhelming, however good design requires due diligence and thorough vetting of the part by the specialist.

Now pick up any plastic part you find and give it a good once over – why was that particular material used, why was that particular process used, how does the structural design of the piece affect the intended end use, could the part be simpler, or stronger, or have a better style, or is it just what is required for the task and nothing more. Once you have evaluated the part think about how many decisions and choices needed to be made to get to the final design and then consider the further decisions that needed to be made to get the design into a production viable product or part. I think you will find a new appreciation for the creative mind of the plastic part design specialist – the simplest final part form sometimes requires the most demanding design selection process. However, at the end of the process, the properly designed and vetted part will perform as intended and fulfil the end use objectives. Then it is on to the next part and the puzzle begins again.



Mark MacLean-Blevins  
PD3 Councilor  
**PD3**

# Memorial

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## **Jordan Rotheiser Dedication**

### **Glenn L. Beall**



The Society of Plastics Engineers Product Design and Development Division has lost a loyal friend. Jordan Rotheiser left this world surrounded by his family on March 24, 2015. He was one week short of his seventy-eight birthday.

Jordan was a Plastics Engineer, a consultant, a teacher, a seminar leader, an author, an expert witness, an inventor with eight patents, an accomplished photographer, an artist, a poet, an industrial activist, and a product designer. He was involved in plastic product design since receiving a Bachelor of Science Degree in Industrial Engineering and a Bachelor of Fine Arts Degree in Industrial Design from the University of Illinois.

He worked at General Motors Fisher Body Styling Division (1959-1960), Abbott Laboratories (1960-1963), and the Raymond Loewy Industrial Design Studio in Paris, France (1963-1964). He founded and ran Rotheiser Design from 1964 until he became ill.

As an industry activist, Jordan was a member of the Institute of Packing Professionals, and the Industrial Design Society of America (IDSA) where he served on the Chicago Chapter's Board of Directors for five terms.

He joined the Society of Plastics Engineers (SPE) in 1960 and immediately became active in the Chicago Section. He worked on the House and the

Professional Activities Committees before being elected to the Board of Directors where he served as Chairman of the Membership Committee. He was then recruited to be the SPE National Membership Committee Chairman.

Jordan attended the first Product Design Focus Group Meeting at the 1987 ANTEC. That group became SPE's Product Design and Development Division (PD3) in 1995. He remained an active member of this group for the next twenty-eight years. When the Focus Group became a special interest group, Jordan was elected to the first Board of Directors, a position he held until his death.

For the next five years he served as the ANTEC Technical Program Chairman. The Design Focus Group presented a technical program at the 1988 ANTEC and every ANTEC thereafter.

He was elected as Chairman of the Board of Directors for the 1995-1996 term. He then represented the Division at SPE's National Council for three years and went on to Chair the Division's Technical Conference Committees for an additional four years.

He was also a member of SPE's Decorating and Assembly Division. He was elected to their Board of Directors and served for two years as ANTEC Technical Program Committee Chair and represented the Division on the National Council for eight years. He also wrote a series of educational articles for the Division's "Plastics Decorating Magazine".

Jordan was elected a Fellow of SPE (2000) and an Honored Service Member of SPE (2002).

He was inducted into the Plastics Pioneers Association (2002), an organization with a limited membership of never more than two hundred and fifty people of distinction who have worked in the Plastics Industry for twenty-five years, and who have done something to advance the Industry. The organization's three primary objectives:

- Collect funds for educational purposes, including scholarships for students pursuing careers in the Plastics Industry.
- Collect and preserve the history of the Plastics Industry.
- Enjoy the camaraderie of the other members.

Jordan served on the Pioneers Plastics History and Artifacts Committee. Jordan was interested in the well being of the Plastics Industry and the education of the next generation of plasticians.

In 1981 he introduced a series of Plastics Technology Seminars, and eventually presented over 100 of those 1 and 2 day programs in addition to numerous technical papers to Plastic Conferences all over the United States.

In 1999 Jordan finished a major book entitled, "Joining of Plastics". That book presented the usual technical information and included the best of what he had learned in his 39 years as a Plastics Product Designer. The book was a success.

Jordan leaves behind a rich legacy with his work for IDSA, SPE, The Plastics Pioneers, the PD3, and with his efforts to educate the next generation of workers.

In the formative years, between 1987 and 1995, when the PD3 received its charter, there was a huge amount of work to be done. Jordan carried more than his share of the load. The PD3 was fortunate to have had Jordan as a member in the very beginning and for so many years thereafter.

Jordan was all of these things, but he was also a family man. I saw him repeatedly turn down profitable work to take Gail and their two girls on trips to Disney Land, Yellowstone Park, or for a weekend in the farm country where Patsy and I were raised.

He was elected a member of the Board of Directors of the Chicago Section of the Society of Plastics Engineers. He was in-line to become a Chairman of the Board, but he turned down that honor in order to spend more time with his family.

On a personal note, in 1960 I hired Jordan right out of college to work in my Product Development Group at Abbott Laboratories. I did not normally socialize with the people who worked for me. However, we became friends. The relationship lasted and deepened over fifty-five years. I am missing him, and will continue to feel the loss.

It would have been much more difficult to create the PD3 without his strong support. The PD3 is fortunate to have had Jordan as a member for such a long time.



Glenn L. Beall  
PD3 Director  
**PD3**

# Award

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## PD3 2015 Silver Pinnacle Award



# Announcements

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## **PD3 Calendar**

### **July 28, 2015**

Novel Trends in Rheology VI

*The international conference 'Novel trends in rheology VI', July 28 – 29, 2015, is organized by the Polymer Centre, Faculty of Technology, Tomas Bata University in Zlín in cooperation with the Applied rheology division, the Society of Plastics Engineers (SPE) and the Czech Group of Rheology. The meeting will capture recent development in areas of experimental and theoretical rheology, non-Newtonian fluid mechanics, applied rheology for advanced polymer processing with specific attention to polymeric nanofibers production.*

### **August 31, 2015**

SPE Thermoforming Conference® 2015

*Cobb Galleria Centre and Renaissance Atlanta Waverly Hotel*

### **September 8, 2015**

Foams 2015 and Tutorial

# Boardroom

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