The SPE Press

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2014

The Southern California Section of the Society of Plastics Engineers

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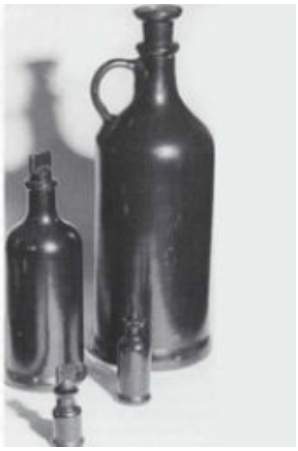
Local information on resources and education available to the plastics profession

The Birth Of The Plastics Industry?

In my article in plastiquarian no. I contended that the birth of the plastics industry could be traced back to 1843 when samples of gutta percha, forwarded from Singapore by Dr William Montgomerie, were examined in November of that year at a meeting of the Royal Society of Arts (RSA) in London. That statement has not been received with universal acclaim and alternatives have been strongly advocated, in particular cellulose nitrate which, as Parkesine., was the motivation for the much admired The First Century of Plastics by Maurice Kaufman and in the preceding issue of plastiquarian, where it is suggested that ebonite has a legitimate claim. What is now obvious is that, if gutta percha is to be awarded the prize as the first plastics material, the grounds for such have to be made clear.

That gutta percha is a plastics material, there can be no doubt. Unlike its geometric isomer, natural rubber (which has chronological precedence), gutta percha exhibitsthe classical properties of a thermoplastic, being softened by heat and having the ability to be forced into an appropriate shape which is retained on cooling. It should be noted at this stage that we are not concerned with the subsets of plastics: natural, semisynthetic, chemically modified, synthetic, thermosetting, etc., but with the totality – and gutta percha belongs therein. When considering the inception of any new idea one is struck by the fact that few lack some sort of predecessor. To take but two examples: the sun-centred solar system was advocated by Aristarchus long before Copernicus and the discovery of America by Columbus was preceded by the Norse and the Basques (to say nothing of Saint Brendan). What then determines precedence? I would suggest it is when the novelty is recognised by those who matter so that it becomes common knowledge and further developments can be seen to follow from that time. What is clear from the minutes of the RSA is that gutta percha was the subject of great interest from the very beginning. By January 1845 sufficient was known about this new material for the Society to resolve 'that this substance appears to be a very valuable article and might be employed with great advantage in many arts and manufactures of this country'. The report was prophetic. In the same year patents were being applied for, machinery was being developed and the Gutta Percha Company was in being. By 1846 R&J Dick Ltd of Glasgow was processing gutta percha: both these companies would still be in existence 100 years later.



1847 saw the use of gutta percha in both dentistry and golf, and its excellent dielectric properties were being exploited for insulating cable not only in the UK but in Germany and the USA as well. All this activity associated with a material obtainable from sources 10 000 miles distant. Plastics have penetrated every aspect of modern life through their versatility and ease of processing. In this respect, from the very beginning gutta percha set a hot pace. There was a multitude of uses in addition to those already mentioned. By the time of the Great Exhibition in 1851, less than eight years from its introduction, the Gutta Percha Company was marketing articles for over 100 different applications ranging from maritime to domestic, medical to electrical, and sporting to chemical. At this time imports exceeded over 1000 tons per annum in the UK alone.

In the Plastics Historical Society's series of 'Great Lectures of the Past', the subject in November 2000 was that given by Alexander Parkes to the RSA in December 1865. Therein Parkes spoke of supplying a cheaper material than gutta percha by producing Parkesine at 'less than a shilling a pound'. So he was seeking to establish his product by undercutting the competition which was already established and dominating the market. Thus, the classical sequence of events: the discovery of a new material and its exploitation in a wide variety of applications opening up new areas of activity which is the very story of plastics. It is gutta percha which, uniquely, first fits that role. If not, then what else does it have to be? What more does it have to do?

I rest my case.

Article taken from Plastics Historical Society

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https://www.facebook.com/pages/Southern-California-Section-of-the-Society-of-Plastic-Engineers/699425046748541

President's Message

I would like to wish everyone a Happy New Year with good health and prosperity. The SoCal Board continues to attract appropriate speakers that deal with topics and concerns of our local members. Our members as you know are composed of Mold Makers, Injection Molders, Custom Compounders and suppliers of Resins, Pigments, and Additives and Consultants that can be contracted for almost any requirement in the plastic industry. With such a diverse audience we rely on you the members, to also suggest topics that you would like to learn about. We want the Southern California SPE Section to thrive and be a leader in the plastic industry. We do not have the Tier 1 automotive industry here in Southern California. I have noticed that the California Market is full of free thinkers and entrepreneurs. We all think outside the box. We are able to take information and applications and build upon them.

In the November December issue of Plastics Engineering magazine, there was an interesting set of write ups under, Additives Annual 2013: Alternatives Multiply. One of the write ups was Glass, in New Forms. This discussed 3M Hollow Glass Spheres and Trexel Inc. MuCell technology to create light weight parts while retaining mechanical properties and lowering cost. We had these two companies present to us their technologies just a few months ago.

Another article was Thermoforming Leaders Gather at 22nd Annual conference. One of the Technical sessions was on 3D Printing. In November we had two guest Speakers present 3D printing. Terry Price even brought in a 3D Printer from Cerritos College and had it printing parts.

Once again, we invite all request for topics. We will do what we can to meet your request. I will see you at the next meeting, please come and say hello.

Rick Hays, SoCal Section President

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COLLEGE OF THE EXTENDED UNIVERSITY CAL POLY POMONA

Product Design and Tooling for Injection Molding (Spring 2014)

This combined course is designed for toolmakers, apprentices, technicians, product designers, process engineers and other plastics personnel desiring to acquire basic knowledge of product design and tooling technology. This course provides an overview of the design process for injection molded plastics parts. The emphasis is on concurrent engineering practices, which leads to elimination of barriers between various engineering groups, toolmaker and manufacturer. The student will learn about the importance of proper material selection, part design fundamentals, manufacturing (moldability) considerations, design for assembly, tooling considerations, rapid prototyping techniques and testing. Design fundamentals discussed are applicable to parts designed for all plastics processing techniques. In the tooling portion the emphasis is on various mold components, mold design principles, cooling, venting, draft considerations, shrinkage, mold polishing, and tool surface enhancement techniques. Topics such as use of simulation software to enhance mold design, how to improve productivity, reduce down time, and lower maintenance costs by optimizing tooling design will be covered in detail. Course content: Plastics materials and material selection process; Plastics material identification techniques; Concurrent engineering, plastics part design process overview; Manufacturing considerations; design for molding; Basic part design and design related product failures; Rapid tooling and prototyping; Design for assembly and review of assembly techniques; Tooling considerations; Injection molding process; Injection molds (types of mold construction); Tooling considerations; Mold metallurgy, runners, gates, sprue bushing, sprue pullers; Tour local tool making facility; Mold design and simulation software; Venting, cooling; Draft angles, shrinkage, mold polishing, tool surface enhancement; Hot runner molds and systems. In addition, students will receive a variety of useful handouts showing How and Where to get more detailed information on a variety of plastics-related topics.

April 12 and 19, 2014
8:00 AM—5:00 PM
Cal Poly Pomona

For More information visit the Cal Poly Pomona Website
Or call the College Extended University

Www.ceu.csupomona.edu
ceuinfo@csupomona.com

877-398-8648

The AQMD came in like the Gestapo!

Kerry Kanbara

Recently a molder in Riverside County was turned into the AQMD for creating toxic fumes. The nozzle leaked some ABS onto the heater bands and started smoking. The problem was quickly fixed and the smoke was only produced for about 10 minutes. The next door tenant was annoyed by the odor.

In comes a visit from an enforcement officer who cited the company and said that they had to pull permits for any machines which were capable of processing ABS plastic. The application was several thousands of dollars and he needed permits for over 15 machines. These permits must be renewed each year.

The molder was devastated. This would have crippled the molding company and probably cost some jobs. The officer was threatening and insisted that the permits be filed in a short amount of time or he would be shut down and fined.

The molder went to the AQMD to inquire about permits for his machines and was able to talk to a more helpful enforcement officer who took the time to research this issue and found that a permit was needed to process ABS Plastic and a permit was needed if he were not injection molding. Upon further research he found that Plastic injection molding machines are exempt. The citation was cancelled and not further action is needed.

I am writing this to save our molding community from stress caused by this regulatory organization. The AQMD Rule 219 sections J exempts most plastic processing machines including Injection Molding Machines. Save yourself a sleepless night by knowing this rule.

http://www.aqmd.gov/rules/rulesreg.html

Help Wanted

This Southern California section of SPE would like to assist in the unemployment problems in our Chapter's area. We offer to display help wanted notices in this news letter. This will help our membership find employment and the companies in our section to find qualified help. Any Molding Company in this section may apply for a free add help wanted ad for plastic related employment by sending a request on the company letterhead
Send request to socalspe@la.twcbc.com
Please describe the position, Shift, qualifications, Degree (if needed), your contact information for the applicant to send resume.

We do not want request from employment agencies or head hunters.

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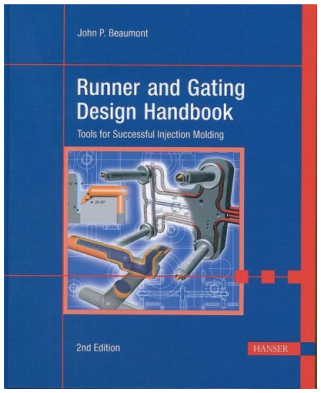
Book Review



Runner and Gating Design Handbook – Tools for Successful Injection Molding
By John P. Beaumont

In the opinion of many Plastics Experts, the design of the runner and gates is one of the most important yet often neglected and least understood features in successful injection molding of plastic parts. Traditionally, both part and tooling designers have avoided addressing the issue of sizing and properly balancing the runners and mold makers have followed their own intuition and relied on the past experience. Today, more than ever before, molders must recognize the fact that the only way to achieve the quality goals such as Six Sigma is to develop a clear understanding of the molding principles and mainly the melt delivery system and its effect on molded parts.

The recently published Runner and Gating Design Handbook: Tools for Successful Injection Molding by John P. Beaumont is an outstanding contribution to the plastics industry and provides a valuable resource for proper design and troubleshooting techniques for both hot and cold runner systems, and methods to successfully solve engineering and processing issues. This first-of its-kind processing handbook is intended to provide the reader a better understanding of the rheological properties of polymer melt and melt delivery system consisting of nozzle, sprue, runner, and gate. Also explained in a clear and concise manner, the shear induced melt variations, key differences between hot and cold runner molds, gating locations and molding problems related to gates and runners. The book starts with brief introduction and orientation of basic runner types and their influence on gate design and gating location. The author has done an excellent job of simplifying somewhat difficult to understand subject of rheological characteristics of plastics in the subsequent chapter. In order to assist the reader in establishing an optimum gating and molding strategy, an in-depth analysis of the development of the melt conditions within the cavity and its relation to molded parts is carried out. Chapter four discusses important considerations in the positioning of gates. The effect of gate placement is explained in detail along with examples and illustrations. Of particular interest is the effect of gate placement on parts made with integral hinges such as pill boxes and containers. The next chapter deals with the core subject of melt delivery system. The topics covered are: runner design fundamentals, melt flow through nozzle, sprue, runner and gate, pressure drop through melt delivery system, effective use of mold filling analysis, formula for sizing runners and runner layouts. How often have you seen an expensive mold designed and built by an experienced tool maker with geometrically balanced runners and precisely machined gates only to find that the parts are significantly imbalanced? Two full chapters are devoted for the purpose of explaining the sources of mold filling imbalances and how to manage shear-induced melt variations for successful molding. Here, the reader benefits from author's unparallel knowledge of melt rotation technology, his patented Melt Flipper® technology and its successful application in providing means for balanced filling in molds. The application of melt rotation technology in hot runner molds and melt rotation for controlling two stage injection processes is also discussed.

Chapter eight covers cold runner molds including runner shapes, sizes, runner ejection, and various gate designs. According to recent statistics, the use of hot runners in molds has increased to approximately 30 percent of all new molds. Chapters 9 through 13 provide a close look at the design of hot runner systems and their unique capabilities and challenges. Advantages, disadvantages and limitations of hot runner molds are discussed along with the mechanics and operation of hot runners. The process of designing and selecting a runner system is summarized in chapter 14. Colorfully illustrated last chapter on trouble-shooting with contribution from industry experts such as John Bozzelli and Brad Johnson compliments all the hard work and effort put in by the author throughout the book. To increase the versatility, author may want to consider adding an appendix section with the list of equipment manufacturers, addresses and web sites along with some useful charts and tables for ready reference in the next edition of the book.

Overall, Runner and Gating Design Handbook is an excellent technical reference manual, written in easy-to-understand and easy-to-read format, with numerous colorful illustrations, photographs and charts. Hanser Gardner Publications has done a salient job of producing this book, allowing author to clearly demonstrate his point with the use of full color 3-D graphics and photographs throughout the book.

The book is a must for all designers, tool makers, and molders and will prove extremely valuable to anyone wishing to further enhance the plastics engineering knowledge. Author John P. Beaumont is Professor and Department Chair at the Plastics Engineering Technology Program at Penn State Erie and President of Beaumont Technologies, Inc.

Reviewed by Vishu Shah

Vishu Shah is an author, educator, President of Consultek, and managing partner of CPC Plastics, Technical and Management consulting firms for the plastics industry. He is a graduate of UMASS Lowell Plastics Engineering program.

SoCal Plastics Manufacturers Events Calendar

Education Night - Dinner Meeting
March 13 2014 - Cerritos College - **Norwalk, California**

Plant Tour of Pelican Products
April 19, 2014 - Jagerhaus Restaurant - **Anaheim, California**

Additives and Coloring Technology
May 22, 2014 - Jagerhaus Restaurant - **Anaheim, California**

32nd Annual Golf Tournament for Plastics Education
June 19, 2014 - Sierra La Verne Country Club - **La Verne, California**

Western Plastics Trade Fair - VI www.socalspe.org/WPTF
August 14, 2014 - Phoenix Club - **Anaheim, California**

For information on the events listed above contact:
Rick Hays 714-523-8050 or visit the Southern California Section Website www.socalspe.org

National Events	Online Presentations
Organized by National SPE. Industry related conferences and seminars held throughout the United States. *National SPE Seminar & Conference* ***PH: 203-775-0471*** ***www.4spe.org***	Simple and convenient ways to gain practical technical and business knowledge about the plastics industry. *One hour presentations begin at 8:00 AM* ***Register online at www.4spe.org/elearning***

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SPE February Technical Meeting - Screw and Barrel
Kerry Kanbara, Meeting Chair

Our technical meeting this month was about screws and barrels. Not only did we have an enjoyable dinner and a chance to meet our fellow plastics professionals, we learned a few things.

Screws and Barrels are an often overlooked part of the molding machine. The screw and barrel is the heart of the process. The majority of the plasticizing is done by the screw, not the heater bands. The compression ratio, length, pitch of the flights, and screw tip of the barrel assembly control the melt. The wrong combination may not let you process your part efficiently, costing you quality, cycle time and material scrap.

When molding a new material, always look at the materials manufacturer's recommendation for the screw. Often the correct screw is the difference of making a profit or a loss on the production of a part.

Screw and barrel maintenance is a major reason for molding issues. There is a 100% chance that the screw or barrel will wear and provide a molding problem. The most often problem is with the check ring. Check rings wear and break thus limiting the amount of injection pressure and repeatable cushion at the end of the injection cycle. A leaking ring can ruin material by creating excess frictional heat. If your cushion setting does not repeat or you are getting contaminants in your parts, check the tip first.

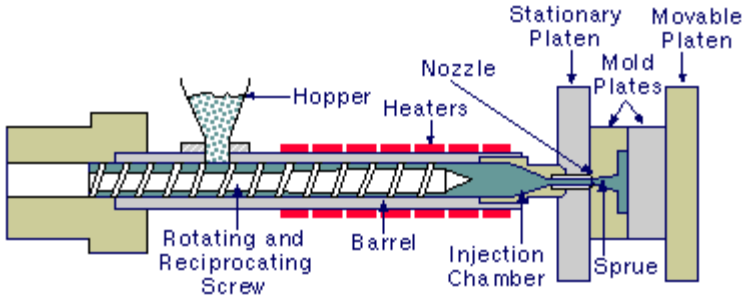
If you are getting contaminant or burnt particles in your part, the screw flights or barrel OD may be worn beyond usable specifications. Inspect your barrel ID and screw OD often and replace or rebuild when they are worn. The screw flights act as a wiper, cleaning the ID of the barrel of material build up. If the clearance is too large, two things happen:

Frictional heat is built up by the material squeezing over the top of the flights causing gas and burnt material.

A coat of material builds up on the OD of the barrel creating contaminants resulting in black spots, black lines and contaminates from prior runs.

Screw Size	New Part Clearance	Worn Clearance	Max Wear Clearance
1"	.003-.004"	.018"	.020"
1-1/2"	.005-.008"	.020"	.025"
2-1/2"	.007-.010"	.021"	.030"
3-1/2"	.010-.012"	.030"	.036"
4-1/2"	.010-.013"	.030"	.039"
6"	.013-.016"	.039"	.048"
8"	.016-.019"	.048"	.057"
10"	.018-.021"	.054"	.063"
12"	.020-.025"	.060"	.075

Remember, the screw and barrel is the key component to your molding process. They control shot size, melt temperature, Injection speed, injection pressure, cycle speed and part quality. This all affects profitability and quality.



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Rick Hays, SoCal Section President
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The Board meets for dinner or by phone once a month to plan and organize events.