December 2001 Issue

THE HOLLOW PARTS CONFERENCE
AWARDED
PARTNERS IN PLASTICS

At the Hollow Parts Conference hosted by the SPE Chicago Section, SPE Blow Molding Division, Thermoforming and Rotomolding Divisions, Partners In Plastic’s blow molded hard-sided suitcase won the award for The Best Blow Molded Product and The Best In Show of all the parts on display. The competition, including Vacuum Formed, Rotational Molded, and Blow Molded parts, featured 36 entries from various manufacturers.

The participants at the conference were given the opportunity to choose the outstanding entry in each of the three molding categories and to then pick the one most unique item from all the entries.

The winning entry was a silver, hard-sided 30” suitcase molded by Partners In Plastics, Inc., in Sharon Center, Ohio. The lid and the base of the suitcase are molded together on a dual 30 lb. Sterling blow molder. The lid is a double wall construction and the base is a single wall. The average wall thickness on the base is .140” and the average wall on the lid is .100”. The base and the lid have 54 in-mold punches for the handles, latches, locks, and retainers for the inner cloth liner.

The suitcase is molded for Airway Industries, Inc., a leading manufacturer of quality luggage. The suitcase is a result of a two year collaboration between Airway Industries, Inc., Partners In Plastics, Inc., and the 500 Group Inc., design firm. In addition to the blow molds, the secondary drilling and trimming fixtures that are capable of handling the unique curved design, had to be built and tested. The result of the collaborated effort is a one-of-a-kind part that meets the challenges of today’s traveler. The suitcases are molded in a 27” and a 30” size and are available in five different colors. Customer acceptance of these durable and versatile suitcases has been very good.

For further information, contact Dave Grammens, Sales Manager or Greg Vincent, President, Partners In Plastics, Inc., Sharon Center, Ohio. Their phone number is (330) 239-0202, email address is dgram@apk.net or gvincent@apk.net
Winter Newsletter Message
From Robert A. Slawska

The Society of Plastics Engineers is now entering its 60th year serving the Plastics Industry.

Our Blow Molding Division Charter Mission is: It shall be the aim of the Blow Molding Division to disseminate technical information, relevant to the blow molding industry, to the SPE membership, to educational institutions and to other technical societies peripheral to the plastics industry. This will be done through technical meetings, liaison with educators, publications and newsletters. We will maintain listings of speakers and films on subjects within our area of interest. The scope of our interest will include blow molding machinery, tooling and ancillary equipment, processing, product testing and material evaluation. We will direct our efforts toward augmenting the membership of the SPE and our Division.

To date, we have sponsored many students in their college training with over $115,000 in contributions. Unfortunately, many of these students have decided not to enter the Blow Molding field. If you know of any students studying plastics and in particular Blow Molding, please have them contact Mark Barger or any other director listed in our newsletter. Perhaps, we can also assist them.

Please mark your calendars for two very important dates in 2002. First is the Annual SPE ANTEC meeting in San Francisco to be held May 5-9, 2002.

The second is our SPE Blow Molding Division Annual Technical Program Conference - "Innovations in Machine Technology". This conference will be held in York, PA - Oct. 2-3, 2002. This is "The Blow Molding Event to attend in 2002". See our Calendar of Events for details on these and other happenings.

We are now seeing positive signs of a turn around in our industry. A few orders for new machines are starting to happen. The inquiry level for new machines has also increased. Many custom and captive molders are short on inventories and are starting to load up their existing equipment. Also, there are very few good used machines available.

Please feel free to contact me or any of the Board of Directors. Our Board consists of highly qualified people from all fields of Blow Molding. They are available to assist you. Please make use of our Board experts.

Robert A. Slawska, Chairperson

Blow Molding Calendar of Events

2002
February 5: Blow Molding Division Winter Board Meeting Teleconference

May 5-9: ANTEC - Annual SPE Meeting & Conference, Moscone Convention Center & San Francisco Marriott, San Francisco, CA. Ron Puvak - Chairperson, Technical sessions - TBD, Blow Molding Division Board of Directors Meeting - May 6 – 8:00 am to Noon, No Business meeting, Best Paper, Scholarship & student design awards presented.


2003
January - TBD: ANTEC 2003 - Matrix Meeting
Nashville, TN - ANTEC 2003 TPC Chair & ANTEC 2004 TPC Chair to attend.

May 4-8: ANTEC - Annual SPE Meeting & Conference, Nashville Convention Center & Stouffer Renaissance Hotel, Nashville, TN. John Meckley - Chairperson, Technical sessions, Blow Molding Division Board of Directors Meeting, No Business meeting, Best Paper, Scholarship & student design awards presented.

June 23 -27: NPE 2003 - National Plastics Show, McCormick Center, Chicago, IL

October 3rd or 4th week: SPE Blow Molding Division Annual Technical Program Conference (Automotive & After-market focus - will use tie in with Detroit section and SME), Detroit Area. Bob Jackson - Chairperson, Mike Moran (Lear) - Local Coordinator, Eric Skov - Marketing / Publicity. Technical Session, Formal business meeting & BOD Mtg., Lifetime Achievement awards presented.

INDUSTRIAL & LARGE PART BLOW MOLDING WORKSHOP

April 8 - 10, 2002 - On April 8th & 9th, the workshop will be held at Equistar Chemicals, 11530 Northlade Drive, Cincinnati, OH. On April 10th, the workshop will be held at Milacron, 4165 Halfacre Road, Batavia, OH

Featuring : Problems & Solutions
Workshop Leader : Norman Lee

At this workshop you will examine how to: Lower costs & increase efficiency with design mold engineering, material selection and machine utilization. Features “Hands On” practical know how from concept to production.

Register by phone: Call SPE at 203-740-5403, Register online: go to http://www.4spe.org/conferenceseminar.htm, then go to Upcoming Seminars, then go to the title of program of interest.
Executive Meeting
- Bob Gilbert, councilor will need a replacement.
- Gary Henneberry - need replacement for finance chair.
- Accepted Bruce Thompsons resignation of Past Chair.
- Discussion is needed on changing the policy of Directors missing BOD meeting
- Travel budget cuts and restrictions may prompt more problems to fulfill obligations.

Call to order
- 8:15 am – Bob Slawska
- Moment of silence for the victims of the September 11th tragedy

Secretary’s Report by Ron Puvak
- No additions or corrections
- Motion to accept made by Bob Jackson, Seconded by Mark Heitker

Treasurer’s Report by David Curtis
- Budget increased by $9,000
- Crossed financial threshold of $250,000, new IRS forms required.
- Motion to accept made by Gary Henneberry, Seconded by Bob Jackson

Finance Report by Gary Henneberry
- 43 Newsletter sponsors 2001 – down from 48 in 2000
- Gary will assist until April so that a replacement Finance chair can get acclimated.
- Gary suggested a Master sponsorship proposal
  - This would be a full-page ad in the newsletter.
  - Would be on per issue or 3 total per year.
- Motion to accept made by Joe Altimari, Seconded by Cheryl Hayek

Nominating Committee Report by Bob Gilbert
- Term expiration of members needs identified

Awards Report by Dave Holliman
- John Meckley volunteered to work on awards committee

Membership Report by Erik Skov
- SPE Membership list may not be up to date which may have caused low numbers on the report.

Publicity Report by Bob Jackson
- Publicity chair will accept promotion of newsletter sponsorship; publicity will follow up for collection; suggested that database profile be used for sponsorship solicitation.

Councilor’s Report by Bob Gilbert
- Adopting budget at next SPE Council meeting in two weeks
- ANTEC will still be the singular SPE annual event
- Incorporation issue has been resolved.
- SPE looking at how to grow & lower costs.
- There are no restrictions from SPE National to the direction a division can proceed for activities.

Newsletter Report by Bob Slawska
- Discussion on the format of the newsletter and how it can be ready for web publishing. There are costs involved with this formatting, the how and who does it, needs to be resolved.

TPC – Mark Heitker
- Karl Bruning report on Norman Lee’s seminar, content and attendance was good. Köln, Germany seminar cancelled due to lack of sponsors and attendees.

Continued on Page 7
A SIMPLE SAFETY PROGRAM

Safety is a perennial concern of managers of plastics processing facilities: whole sections of company policy manuals are devoted to the topic, signs throughout plants repeatedly remind workers to be aware of hazards, awards are given for number of days without an accident, and the topic is repeatedly brought up at employee meetings.

But does the safety information given to your staff realistically address the hazards they’re exposed to on a daily basis? It’s one thing to stress safety as a lofty goal — “work safely, and don’t hurt yourselves” – and another to provide explicit instructions on how to avoid or eliminate specific hazards associated with operating the actual machines in your plant.

Equistar Chemicals has developed a program processors can use to swiftly identify hazards and develop a series of simple safety checklists for each machine and piece of equipment used in a particular plan. Here’s how to quickly identify and address potential hazards in your facility.

INSPECTION TEAMS

Between five and seven individuals are chosen to serve as an inspection team for the machine areas of the plant. The teams include the primary machinery operators, backup operators, and other employees whose duties place them in the machine area. During the inspection procedure, the primary operators run the equipment, the backup operators take note, and the other members of the team observe the equipment operation with an eye toward identifying the potential and existing hazards.

For each piece of equipment, starting with machines that have the greatest hazard potential (such as granulators), observe the following basic steps of operation:

1. Mold tooling changes and setups. This category includes changes that are made frequently and do not involve extended equipment shutdowns. The primary operator usually makes these changes.
2. Preparation. This includes assembling raw materials and turning on pieces of auxiliary equipment as needed.
3. Startup. These tasks are the necessary procedures to be performed before normal operations (purging, drooling and so on) begin.
4. Operation of the equipment as it was designed to manufacture, test, move, package product or reuse.
5. Shutdown.
6. Cleanup of equipment and work area.

As each step in the operation process is observed, establish a schedule for quickly modifying each piece of machinery to eliminate any unsafe mechanical conditions that were noted during the inspection.

CHECKLISTS

The next step in this process is to develop a Safe Operations Checklist (see sample) for each piece of equipment. Using the notes taken during the inspection, draw up a list for each machine.

- Include a comments section where workers can explain why any deviations were made in following the checklist.
- Include a space for the operator’s signature.

The last, most important step is to make these checklists an integral part of the standard procedures for each equipment operator throughout the plant. To do this, require each machine operator to complete and sign a checklist each time he or she operate a piece of equipment, and submit the checklist to his or her supervisor at the end of each product run. The comments section is intended to be used for describing unusual situations when a safety item was not checked off – for example, a piece of auxiliary equipment was not used during a certain product run, so auxiliary safety steps were not used.

By following this process, machinery operators are constantly reminded about the potential hazards presented by each machine and what steps to take to prevent injuries. The checklist is not intended to be used as an operations guide, and for that reason should not be printed with any other information on the same page. Make the list a separate piece of paper for each machine and make sure that supervisors insist on receiving completed checklists throughout each shift.

To keep these checklists current, be sure to update each list at least once a year and any time new equipment is purchased, existing equipment is modified, or operating procedures are changed.

BLOW MOLDER INSPECTION: 16-POINT CHECKLIST

1. Check emergency stop functions.
2. Bottle weights versus targets.
3. Cycle time.
4. Thermocouple calibration.
5. Check timer and temperature settings.
6. Check heat exchanger operation.
7. Check hydraulic system operation.
8. Inspect machine safeties.
9. Check hydraulic accumulator.
10. Check blow pin alignment.
11. Check and adjust parison drop.
12. Inspect trimmer operation.
13. Check bottle trim ability.
15. Inspect regrind operation.
16. Inspect material handling systems.

Continued on next page
# EQUIPMENT: BLOW MOLDING MACHINE

## POTENTIAL HAZARD (CAUSES)

<table>
<thead>
<tr>
<th>Tooling Change:</th>
<th>Safe Practice Checks</th>
<th>Check</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Burns (hot tooling and polymer)</td>
<td>1. Wear gloves when handling hot tooling.</td>
<td></td>
</tr>
<tr>
<td>2. Bodily injury (clamp area, swing arms, conveyor, trimmer)</td>
<td>2. A. Gate Open</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B. Hydraulic pump off</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C. Accumulator dump valve open</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D. Air supply off</td>
<td></td>
</tr>
</tbody>
</table>

## PREPARATION:

<table>
<thead>
<tr>
<th>Preparation:</th>
<th>Safe Practice Checks</th>
<th>Check</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Health (hazardous materials)</td>
<td>1. Read Material Safety Data Sheets (MSDS)</td>
<td></td>
</tr>
<tr>
<td>2. Slipping/Falling (materials on floor)</td>
<td>2. A. Check Housekeeping</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B. Check for leaks (water, oil)</td>
<td></td>
</tr>
</tbody>
</table>

## STARTUP:

<table>
<thead>
<tr>
<th>Startup:</th>
<th>Safe Practice Checks</th>
<th>Check</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Projectiles and Burns (excessive extruder and adapter pressures)</td>
<td>1. A. Check for low zone temperatures</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B. Safety doors closed</td>
<td></td>
</tr>
<tr>
<td>2. All Hazards (faulty emergency stops)</td>
<td>2. A. Check all emergency stops weekly</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B. Check trimmer safety doors</td>
<td></td>
</tr>
</tbody>
</table>

## OPERATIONS:

<table>
<thead>
<tr>
<th>Operations:</th>
<th>Safe Practice Checks</th>
<th>Check</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Burns (heaters, hot tooling, flash)</td>
<td>1. Wear gloves during head adjustments</td>
<td></td>
</tr>
<tr>
<td>2. Projectiles (high extruder and head pressures)</td>
<td>2. A. Start extruder up slowly</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B. Monitor zone temperatures</td>
<td></td>
</tr>
<tr>
<td>3. Pinch Points (molds, swing arm, conveyor, trimmer)</td>
<td>3. A. Adjust parisons when molds are closed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B. Use plastic rods to clean conveyor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C. Open trimmer safety gate to clear jam</td>
<td></td>
</tr>
</tbody>
</table>

## SHUTDOWN:

<table>
<thead>
<tr>
<th>Shutdown:</th>
<th>Safe Practice Checks</th>
<th>Check</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Fire, flood, etc. (equipment left on)</td>
<td>1. Make sure all utilities and auxiliary equipment are off</td>
<td></td>
</tr>
</tbody>
</table>

## CLEANUP:

<table>
<thead>
<tr>
<th>Cleanup:</th>
<th>Safe Practice Checks</th>
<th>Check</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Slipping/Falling (materials on floor)</td>
<td>1. Check housekeeping</td>
<td></td>
</tr>
<tr>
<td>2. Check for any leaks</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Comments:**

I have read the safe operations checklist and followed the same practices listed on previous page.

**Signature:** ___________________________ **Date:** _______________

---

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Gary Henneberry, Principal Engineer at Polyone, Burlington, NJ, has been elected Fellow of the SPE in recognition of his outstanding, long-term contribution to the industry. Mr. Henneberry was one of 15 SPE Senior Members to acquire this distinction. Since the award’s inception in 1984, 183 of the current 29,000 SPE memberships have been so honored.

Gary co-developed the process, compounds, additives, as well as designed production lines to produce Econvinyl™, which was the only commercial PVC bottle compound made from 35% post consumer regrind. He created compounds and process technology for extruded PVC tool handles, and, for 20 years, trained several hundred blow molding machine operators to make clear rigid blow molded parts. His development of a high melt strength, rigid PVC compound with outstanding weather ability is potentially a breakthrough in blow molding PVC.

Gary has been member of the Society since 1978. He is affiliated with the Philadelphia Section and Blow Molding Division Board of Directors as Finance Chairperson of SPE. He holds a BSIE from the University of Missouri. He and his wife, Vicki, reside in Burlington, NJ.

Dr. Andres Garcia-Rejon, Senior Research Officer, Industrial Materials Institute, National Research Council Canada, Boucherville, Canada, has been elected Fellow of the SPE in recognition of his outstanding, long-term contribution to the industry. Dr. Garcia-Rejon was one of 15 SPE Senior Members to acquire this distinction. Since the award’s inception in 1984, only 183 of the current 29,000 SPE membership have been so honored.

He has made significant contributions to the advancement of the understanding of the material behavior during polymer processing by combining experimental techniques and process-oriented computer simulation models capable of establishing relationships between material properties, processing conditions and final part performance. He created the Blow Molding Research program at the Industrial Materials Institute (IMI) and set up an industrial-scale blow molding laboratory (extrusion, injection/stretch and 3D blow). He was instrumental in the creation of the Special Interest Group in Blow Molding, a precompetitive R&D partnership between industry/universities/IMI. His research interests have also been oriented towards the processing of novel materials such as PET/LCP blends; long glass fiber reinforced polyolefins and currently polymer/organoclay nanocomposites.

Dr. Garcia-Rejon has presented more than 100 technical papers and contributed to over 100 publications. A member of the Society since 1982, he is affiliated with the Quebec Section and the Blow Molding Division of SPE. He holds a BSc from the University of Mexico, an MEng, and PhD, all in chemical engineering, from McGill University, where he teaches the polymer processing course in the joint graduate program between McGill University and l’Institut Français du Pétrole. Dr. Garcia-Rejon and his wife, Maricruz Gaubeca, reside in Montreal and have two sons, Santiago and Pablo.

Ravi Ramanathan and Mark Barger sponsored him for this honour.
Board of Director's Meeting continued from Page 3

TPC – SUB-COMMITTEES/ACTIVITIES

- Hollow Parts Conference Final Report – Mark Barger
  1. Our share of monies has already been received
  2. Question on the actual number of attendees and the paid/non paid numbers.
- ANTEC 2002 Report – Ron Puvak
  1. Board agreed to follow schedule outlined in report for holding BOD meeting on Sunday. Scheduling adjusted due to other activities scheduled.
  2. ANTEC has been cut by one day.
  3. Joint session with PD&D has been submitted.
  4. Lack of abstracts is still a concern.
  5. Suggestion to promote conference to Blowmolding companies in western states.
  6. Look at gaining two keynote speakers.
- ABC 2002, York PA – Joe Altimari
  1. Preliminary flyer has been prepared and each Board member has copies.
  2. Graham will be sponsoring much of the conference.
  1. Not much activity at this time.
  2. Will attend the planning meeting at ANTEC 2002
- ABC 2003, Detroit MI – Bob Jackson
  1. Discussion of industry (Detroit area) and the forecast for 2003.
  2. Decision to hold conference still stands
  3. Potentially linking seminar with SME group

continued on Page 10
**Workplace Scholarship Program**

The Blow Molding Division of the Society of Plastics Engineers announces a new program for continuing education of Blow Molding Industry workers. By making financial resources available to Blow Molding Division member companies, this program will assist more people to attend continuing education in blow molding and improve their job-related skills.

Up to $500 per person is available to attend an SPE Blow Molding Conference, an SPE Seminar in Blow Molding, or other program applicable to blow molding.

**ARE YOU ELIGIBLE? This is what you need to apply:**
1. The employee must be a full-time employee of one of our member companies (having at least one current member of the SPE Blow Molding Division).
2. The employee’s job function must be blow molding related.
3. The employee’s academic training must not be higher than Associate Degree.
4. The employee must have company recommendation and support.
5. Costs exceeding $500 will be responsibility of the employee or employer.

**HOW TO ENROLL**
1. Submit a request to the Blow Molding Division (address available on form, from SPE on website - www.4spe.org or from Blow Mold Division Newsletter.
2. Include a letter of support from your company.
3. You will be notified of acceptance before the event that you wish to attend.

---

**Student Design Contest**

$3,000 prize offered by the Blow Molding Division

The Society of Plastics Engineers announces the Second Annual Student Design Contest, sponsored by the SPE Blow Molding Division. The Division is offering a $3,000 prize to the student or group of students who submit the winning entry. The winner(s) must present their proposal at ANTEC 2002 in San Francisco, CA (May 5-9). A $500 travel allowance will be provided by the Society of Plastics Engineers.

**Project**

Convert the method of production of an existing item produced in some other method (i.e., injection molding, thermoforming, rotational molding) to the blow molding process.

**Criteria**

- Project may be done by one student or a group of students.
- All students must be full-time, graduate or undergraduate students.
- Written proposal must be submitted, containing the steps followed and the resources used to reach the final outcome.
- A representation of the part being converted to the blow molding process must also be submitted. The item submitted can be a finished part, a prototype, or a CAD drawing.

Winner(s) must present the proposal at ANTEC 2002 in San Francisco, CA (May 5-9).

Submit all entries to:
Jenny J. Hodge, Field Services Manager
Society of Plastics Engineers
14 Fairfield Drive
Brookfield, CT 06804
203/740-5431; Fax: 203/775-8490
E-mail: jjhodge@4spe.org

Previous Winners
2000 - John L. Raybuck, Penn State Erie, “Blow Molded Toothbrush”
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Email us at - postmaster@meredithspfld.com
ABC 2004 - ???
1. PSU Erie would like to postpone until 2005.
2. Proposal for NRC, Montreal is available.
3. Suggestion that a proposed attendee list (regionally based) be generated to help decide where conferences will have the potential to draw the most numbers.

Education - Mark Barger
- Question on the support of the design competition.
- John Meckley stated that the Design competition is not being promoted to the students (PSU as an example)
- Scholarship, ANTEC paper submissions and other items are being made available to students.

Marketing - Warren Bentkover
- Report submitted via e-mail
- Need to review and update marketing plan
- Discussion on who we should promote as target. These action items are outlined in the marketing plan but no activity was completed.
- Letter to CEO's was proposed but the letter was deemed not strong enough. Suggest that SPE national could help here.
- Need a general brochure or flyer promoting the benefits of being a member.

WEB Site Sub group
- Bob Jackson is our Webmaster.
- Marketing committee is responsible for generating content for promotion purposes
- TPC is responsible for generating content of technical nature.
- Mark and Warren will coordinate this activity.

OLD BUSINESS: NONE

NEW BUSINESS:
1. Bruce suggested new Board Member packet – Bruce Thompson will prepare this as function of Chair-Elect duties.
2. Shirt program to be continued for first time elected/appointed BOD members – motion by Bruce Thompson.
3. Gary Carr: Larry Stoneberg passed away recently; we will include a memorial in newsletter
4. Winter Board Meeting: Motion made that we reconsider proposed site. Chairman is to reevaluate need for a meeting and announce decision within 4 weeks. Suggestion also made that committee meetings in regional sites could be held and then a general BOD meeting made by teleconference. Motion by Bob Jackson; second by Joe Altimari
5. Blow molding division policy manual needs to be reviewed. We will begin with 5 pages at a time. Bruce Thompson will begin activity and route all responses through Emma.

ADJOURNMENT: Motion Cheryl Hayek – second Joe Altimari at 1:48 pm

ON THE LIGHTER SIDE....

An engineer was crossing a road one day when a frog called out to him and said, "If you kiss me, I'll turn into a beautiful princess". He bent over, picked up the frog and put it in his pocket.

The frog spoke up again and said, "If you kiss me and turn me back into a beautiful princess, I will stay with you for one week." The engineer took the frog out, smiled at it and returned it to the pocket.

The frog then cried out, "If You kiss me and turn me back into a princess, I'll stay with you and do ANYTHING you want." Again the engineer took the frog out, smiled at it and put it back into his pocket.

Finally, the frog asked, "What is the matter? I've told you I'm a beautiful princess that I'll stay with you for a week and do anything you want. Why won't you kiss me?"

The engineer said, "Look, I'm an engineer. I don't have time for a girlfriend, but a TALKING frog, now that's cool."
New Blow Molding Pocket Book

Hanser Gardner Publications has a new series of Plastics Pocket Power books for your reference/use.

The new Extrusion Blow Molding Pocket Power is authored by Michael Thielen of SIG Plastics, Troisdorf, Germany.

Dr. Thielen has done an excellent job in putting this pocket book together. The book includes 7 main chapters from extrusion blow molding technology, process variants/innovations, designs and recycling.

This book is well prepared and geared to current technology. It is easy to read and understand. It gives great insight into the blow molding process.

An easy to follow uniquely arranged, troubleshooting guide is included with the book.

Dr. Thielen has authored numerous papers at our High Performance Conferences as well as SPE ANTEC’s. Many of these were “Best Paper” award levels.

A “Must Read Quick Reference” Book!!!

Contact Hanser at:
1-800-950-8977 (phone)
www.hansergardner.com (web)
or 1-513-572-8801 (fax)
<table>
<thead>
<tr>
<th>Name</th>
<th>Company</th>
<th>Phone</th>
<th>Fax</th>
<th>E-Mail</th>
<th>Expertise</th>
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</thead>
<tbody>
<tr>
<td>Joe Altimari</td>
<td>Graham Engineering</td>
<td>717-505-4816</td>
<td>717-846-1931</td>
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**Dated Material**