SOCIETY OF PLASTICS ENGINEERS
BLOW MOLDING DIVISION

Fall 2005 Issue

SPE Blow Molding Division Annual Conference

For over a day and a half, the Blow Molding Industry descended on Toldeo, Ohio, to attend its annual technical showcase known as the ABC 2005. This event has become the premier industry venue for all segments of the blow molding industry from resin supplier to end-user.

This year's conference also included a distinguished list of attendees and keynote speakers. Highlighting day one was Bill Carteaux – President of The Society of the Plastics Industry (SPI) who gave the attendees the state of the plastic industry and enthusiastically stressed the need for their support of the industry at local, state and national levels. Following Mr. Carteaux was Dr. Luis Proenza, President of the University of Akron. Dr. Prozena extolled values of the active industry/ university relationships in practice today in both development of personnel talent and technologies. He cited many examples that illustrated the ROI on this type of investment. To close this high energy morning session were Chase Willets and Nick Vafiadis of CMAI. They filled the hall with numbers and facts, which clearly defined the direction and future of the PET and HDPE resin industry supply chains.

Left -Tim Womer, SPE President-Elect
Right – Bill Carteaux, President SPI

The conference featured speakers who covered industry segments in both packaging and industrial applications. From resin developments to machinery innovations to automation, design and safety, no topic was missed. Attendees expressed great satisfaction on the scope and details they were exposed to during the conference. SPE International was well represented by Tim Womer, President-elect for 2006-2007, who discussed with attendees the society's goals and objectives. All attendees were also given the opportunity to tour a local blow molder, technology development center and recycling operation.

The SPE Blow Molding Division's annual awards were presented at dinner, which highlighted the student scholarships and student design winners. A special segment of the evening was dedicated to the Division's Lifetime Achievement Award winner, Dr. Saleh Jabarin.

continued on page 3

Chairperson's Message

Sometimes as Chairman you do not need to say anything. For this issue I will let someone else speak about the Blow Molding Division.

This is the context of a letter which was received after the conference in Toledo.

October 18, 2005

On behalf of Len Kogut, Larry Schult and I we would like to thank the Blow Molding Division of the Society of Plastics Engineers for their hospitality at the ABC, Blow Molding Conference in Toledo last week. The conference was excellent and we found it to be very informative. It was particularly nice to attend a smaller conference; normally we attend the ANTEC which is almost overwhelming in scale. Your membership is very friendly and approachable. They helped explain the challenges facing the blow molding industry today.

As you are aware, the Ferris State University Plastics Engineering Technology Department is strengthening its Blow Molding curriculum. Being allowed to attend the ABC has afforded us a better understanding of the industry and its current status. We were also able to gain industrial contacts that will help us as we progress in the curriculum development. The Blow Molding Division's support is appreciated; it further epitomizes the SPE's focus on plastics education.

Again, we would like to thank the Blow Molding Division's generous support.

Sincerely,

Robert G. Speirs
Professor and Chair
Plastics and Rubber programs
Ferris State University

Gentlemen, we thank you for your kind words and we hope to continue our efforts to keep the industry and educational facilities informed of the latest challenges and innovations in Blow Molding for many years to come.

continued from page 1

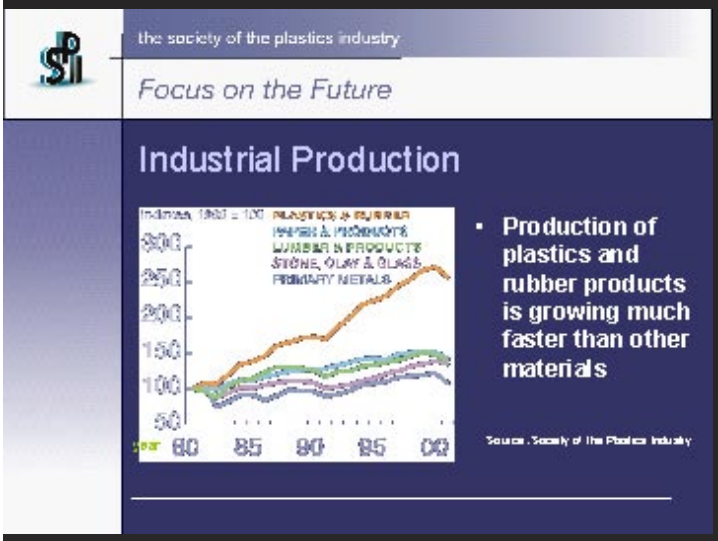
Dr. Jabarin of the University of Toledo and the Polymer Institute was presented to the audience by Dr. Tom Brady of PTI who recounted their long association beginning at Dartmouth, continuing through their employment at Owens-Illinois and beyond.

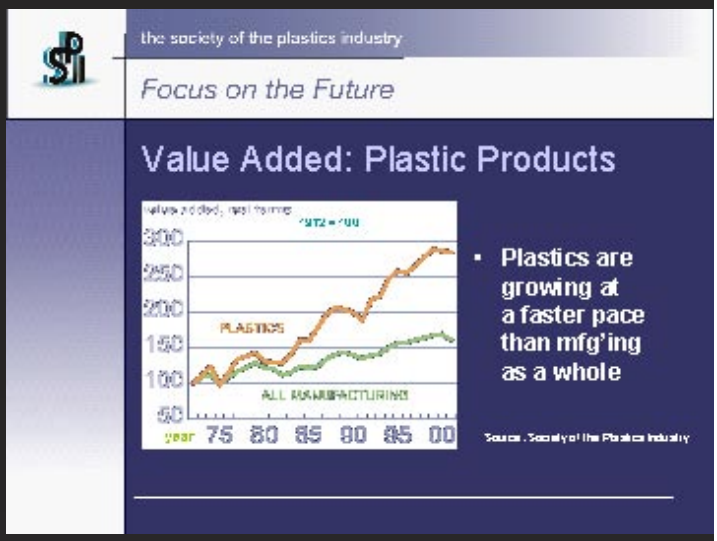
Over 200 industry personnel, speakers and students attended the conference. The information presented from the conference will be posted on the division's web site over the next few weeks at www.blowmoldingdivision.org.

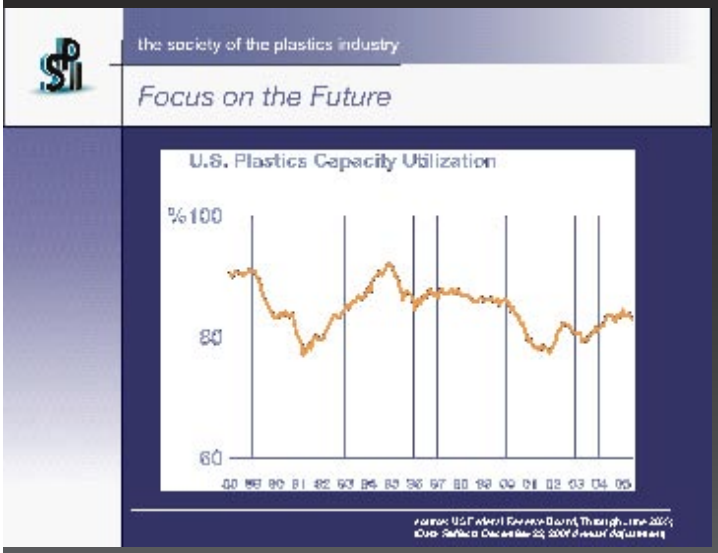
The attendees of this conference are already planning to attend next year's event, which will be held in Troy, Michigan on October 10, 11 and 12, 2006.

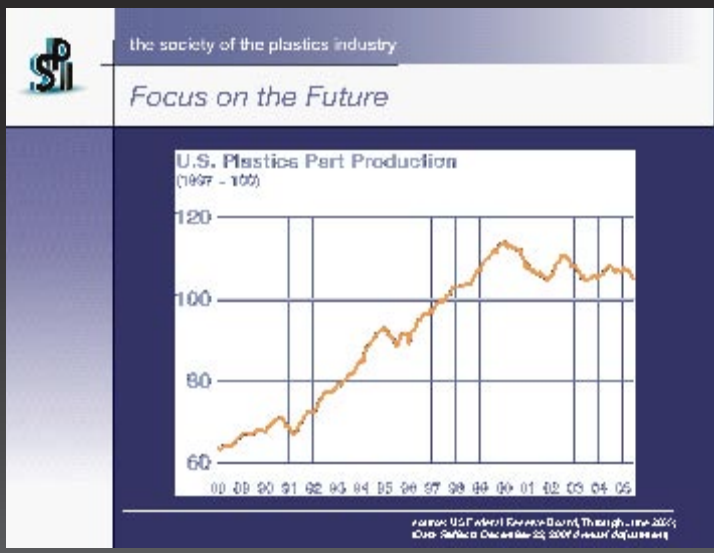
Left to right; Dr. Tom Brady, President PTI, Dr. Saleh Jabarin, 2005 Lifetime Achievement Award recipient, Scott Steele, ABC 2005 Conference Chairman

INFORMATION FROM SPI









This is part of a presentation from Bill Carteaux, President of SPI.
More information about this presentation can be found at our website.

Product Data Bulletin

Resin Compatibility

"Compatibility" is defined as the "capability of existing together in harmony." In any proposed new application of plastic containers a question frequently asked is: "Is your resin suitable to 'hold' my product?" In the absence of a proven history of successful use involving a specific chemical-product combination, such a question deserves an answer. In fact, if a product is hazardous (corrosive, flammable, etc.), there is a legal requirement for chemical compatibility:

> "Polyethylene used must be of a type compatible with the lading and must not be permeable to an extent that a hazardous condition could be caused during transportation and handling". (Title 49, Code of Federal Regulations, Part 173) The Shippers Section, Par. 173.24 (e).

Fortunately, the polyethylene plastics commonly used for liquid packaging containers have exceptional chemical resistance as well as good mechanical strength. Laboratory data and field experience are available for many liquid chemicals to indicate whether or not they are acceptable in polyethylene packaging. However, certain chemicals will require testing, especially if the chemical is hazardous and there is no history of successful use in the specific container under consideration.

There are various test methods, which can be employed to "prove" good compatibility before shipping. For example, test strips molded from the polyethylene used to manufacture the containers can be exposed to the liquid in question and a "before and after" comparison can be madeof tensile strength, elongation and impact resistance (ASTM D-628). However, since the container design and the molding process can influence performance of the container, a test involving the container itself is advisable. This involves "holding" the liquid in the container under conditions which duplicate or exceed the proposed storage time and severity of storage conditions (stacking height, temperature, internal pressure, etc.). If the storage time is unacceptable, the test can be "accelerated" by raising the storage temperature. Reduction of storage time by a factor of 2.5 for 10°C increase in storage temperature is used as an approximation. For examples, a proposed application involving one year "shelf life" at an average temperature of 25°C would be held for 21 weeks at 35°C or eight weeks at 45°C to obtain "equivalent" results. A specific test procedure for hazardous material compatibility testing is specified in Appendix B of Part 173, Title 49, Code of Federal Regulations.

"Results" infer that the period of storage will have shown zero or, at worst, a negligible reaction between the container and its contents, in which case the application may proceed. What should one look for? What reactions might be anticipated?

CHEMICAL ATTACK - A weakening of the wall structure of the polyethylene container. An approximate determination can be made by drop testing the filled sample(s) after the storage period.

SOFTENING – SWELLING – storage of permeating hydrocarbons can cause this. Suggests that permeation is occurring. Not necessarily a deterrent to using the container, if degree is small and a "one way" (single trip) insert (not a self-supporting container) is involved.

PERMEATION (To the Outside) – weight loss, 2% during testing is generally acceptable unless the product is a poison, then a rate of ½% is required. Certain chemicals are known to excessively permeate polyethylene containers: naphtha, benzene, gasoline and carbon tetrachloride. For polyethylene inserts in steel outer containers this is not as important as with all-plastic containers.

PRESSURE (To the Inside) – oxygen permeating inward may damage the contents. Examples: certain flavor concentrates and photographic developers are oxygen-sensitive.

PRESSURE BUILD-UP – can occur from vapor pressure of liquid contents, accentuated by elevated temperature or by reaction of permeating oxygen with liquid contents. Pressure build-up in unsupported containers can exert stress at seams and other areas and this can make the container more susceptible to environmental stress cracking (ESC).

DISCOLORATION OF CONTENTS – can occur from reaction of product with permeating oxygen or by reaction of product with polyethylene. For example, concentrated sulfuric acid darkens when stored in contact with polyethylene (which does not reduce the efficiency of the acid).

ENVIRONMENTAL STRESS-CRACKING- Certain liquids, generally known as surfactants or wetting agents, can cause polyethylene to

crack upon prolonged storage. The problem is intensified with any internal pressure buildup, such as storage at elevated temperatures, and also from any external loading such as top loading in stacked cases. Generally, no cracking in 30 days at 140^{0}F in the actual container with the intended liquid is regarded as a minimum.

DROP IMPACT - Every package shipped by common carrier must meet the appropriate UN regulation for impact resistance. For stand-alone packages such as drums and carboys, the testing is fairly straightforward as to height and temperatures of testing. Gallon 4-packs typically require a sturdy corrugated box, perhaps with a top or bottom pad added, to pass the inverted (neck-down) drop requirements. Third party testing is often used by the shipper for independent verification.

DECISIONS CONCERNING COMPATIBILITY TESTING AND INTERPRETATION OF RESULTS-

Solvay Polymers manufactures quality blow molding resins that conform to the typical properties identified in its data sheets and to any and all agreed contractual special specifications required by its customers. Solvay Polymer Technical Service Representatives will make preliminary resin selection recommendations in accordance with available published resin compatibility information and market experience. These recommendations are made in good faith based upon available product information supplied by the blow molder. End use testing and compatibility evaluation is the responsibility of the shipper.

The blow molder is responsible for manufacturing containers in accordance with applicable construction and physical (not chemical) performance standards, codes and regulations, without production defects. The shipper is responsible for making a decision to ship (or not to ship) a given chemical in a given container.

In most proposed "new" applications the shipper will find information relating to previous testing and experience which will eliminate the necessity for testing or, at least, minimize the extent of compatibility testing required. When testing is required, the type and degree will depend on the conditions of transportation, storage, use and reuse. These factors must be taken into account when making a decision concerning compatibility testing. Such a decision is the responsibility of the shipper.

"...this innovative blow molding cooling fixture provided the best contact of all tools tested and eliminated warp on irregular parting line parts. Clamping was improved for 75% of gas tank designs and enhanced cooling was achieved through aluminum fixture blades. The design also facilitated turbulent water flow to provide added heat extraction. Tank quality and consistency was further maximized and efficiency was increased so only two fixtures were required. Normal conveyor cooling for 2 - 3 hours required prior to welding was also discontinued as heat staking and welding were more efficient."

- Leading Gas Tank Manufacturer

Student DesignCompetition

Dave Holliman will continue to coordinate the program. The prize is the same as last year ($1000). International has been contacted to arrange a Fall e-mail blast to SPE student members. The following deadlines have been established:

Application and abstract: January 23, 2006
Final project submission: April 3, 2006

Requests have been made to post the program announcement to our Division website and the SPE website (linked to the SPE student website).

The 2005 design competition award recipients, Atanas Gagov and Pankaj Rathi from the University of Akron, made a presentation of their project "Ehaust System by 3d Blow Molding" at ABC2005.

Blow Molding Division Grant Fund

Grants from the SPE Foundation/Blow Molding Division are available to educational institutions seeking funding for the purchase of blow molding equipment or educational resources pertaining to blow molding. Eligible items include machinery, tooling, auxiliary equipment, instrumentation, controls, finishing equipment, software, and training or educational modules. This program is being promoted by the SPE Foundation.

The 1st grant for the amount of $1000 has been awarded to Associate Professor Larry Schult of Ferris State University to assist with expenses for his 4 month sabbatical to develop a blow molding curriculum for use in the Ferris State University Plastics Engineering Technology program.

Graham Machinery Group Continuing Education Grant Program

The Blow Molding Division of the Society of Plastics Engineers and Graham Machinery Group co-sponsor a 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 in obtaining continued 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.

Eligibility Criteria:

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 the responsibility of the employee or employer.

How to enroll:

1. Submit a request to the Blow Molding Division at the following address:

   Mark Heitker
   Innovene Tech Center
   1230 Battleground Road
   LaPorte, TX 77571
   Mark.Heitker@innovene.com

2. Include a letter of support from your company.
3. You will be notified of acceptance before the event that you wish to attend.

ANTISTATS

Antistats (A/S) are divided into two general categories, external and internal. External antistats are topical agents applied to the surface. Washing the surface completely removes external antistats; thus, requiring reapplication.

All the traditional internal chemical antistats are migratory additives, which are further divided into anionic, cationic (or just 'ionic'), and non-ionic types.

Ionic antistats are recommended for polar resin systems such as PVC. Generally, ionic antistats are not recommended for polyethylene due to inherently low heat stability. Non-ionic antistats are organic compounds composed of both a hydrophilic and a hydrophobic portion. The compound migrates to the substrate surface and, via hydrogen bonding with atmospheric water, creates a microscopic layer of water on the surface. Chemical antistats are therefore dependent upon atmospheric moisture for their mechanism to dissipate static electricity.

Internal antistats can be inert conductive fillers (e.g. conductive carbon black, metallized fillers and carbon fibers.) Recently, new clear polymeric antistats have been developed which are non-migratory and provide antistatic properties independent of atmospheric humidity. The non-migratory antistats form a percolating network similar to conductive carbon black, and therefore fairly high loadings of these non-traditional antistats are required to ensure good antistatic properties in polyolefin films. Ampacet's new product 101710 is based on such non-migratory, humidity independent antistat chemistry. This product is recommended for use in multilayer films for cost effectiveness.

TYPES OF ANTISTATS:

Three general types of antistats are used in polyethylene and polypropylene: glycerol monostearate (GMS), ethoxylated fatty acid amines, and diethanolamides.

GLYCEROL MONOSTEARATE (GMS)

The reaction between glycerine and fatty acids yields mono-, di- and tri- substituted esters. The monoester portion acts as an antistat. Although heat stable to 600°F, and FDA compliant at any level, GMS is less efficient than ethoxylated fatty acid amines and diethanolamides in polyethylene and polypropylene. GMS is typically used as an in-process antistat to reduce static and dust buildup. GMS is recommended for short term antistatic performance only (typically 1-2 months).

ETHOXYLATED FATTY ACID AMINES

Amines used as antistats are typically ethoxylated tertiary fatty acid amines. The fatty acid composition of amine antistats will vary depending upon the type of feedstock. The fatty acid composition influences migration rates of the antistat within the polymer matrix.

- Amine antistats have limited FDA compliance.
- Amine antistats have lower heat stability than GMS and can cause some skin irritation.
- Amine antistats are more efficient than GMS, enabling their use in applications which specify conditioning at 50% relative humidity.
- Amine antistats should not be used in electronic packaging where exposure to polycarbonate components may occur. Polycarbonate, when exposed to ethoxylated amines, tends to exhibit crazing.
- Amine antistats appear to be best for HDPE although GMS may be considered for molding applications.

DIETHANOLAMIDES

Diethanolamides are similar in composition to the ethoxylated fatty amines except that a carbonyl group is adjacent to the nitrogen. Like amine antistats, the feedstock used to make diethanolamides influences the fatty acid composition and antistat performance. The amide antistats are thought to be non-corrosive to polycarbonate.

Some diethanolamides are recommended for low humidity applications and testing shows them to be compatible with polycarbonate components. They can be used in applications requiring NFPA-99 and MIL-B-81705C antistatic criteria.

The type of antistat used is determined by resin system, test specifications, FDA restrictions, and end use application.

INFLUENCES ON ANTISTATIC BEHAVIOR:

After migrating to the surface, antistats interact

with atmospheric moisture forming a microscopic layer of water on the substrate surface. This layer of water is held in place by hydrogen bonds. As the relative humidity changes, so does the water layer on the substrate surface. At low humidity, less moisture is available to form hydrogen bonds with the antistat than is available at higher humidity.

Since the water layer provides the conductive path for static dissipation, conditioning is essential for accurate comparisons of antistatic performance. Although two antistatic agents might perform well at 50% relative humidity, their performances can change drastically at 12% relative humidity. The dependent nature of relative humidity and antistatic performance mandates test procedures specifying conditioning to ensure samples reach equilibrium before testing. Conditioning improves reproducibility of results between test facilities.

Just like slip agents, antistats also achieve an equilibrium level on the substrate surface. The remaining antistat below the surface acts as a reservoir. When surface antistat is removed, it is replaced by antistat within this reservoir. Repeated washing eventually depletes the antistat within the substrate.

Since antistats are surface active, they compete with other surface active additives such as slips in film applications. These additives do not react chemically with each other, but rather can compete with each other for occupation of the substrate surface.

Amine and amide antistats are basic in nature. They can react with acidic additives. Halogenated flame retardants are particularly reactive with antistats. Acidic blowing agents can also react with antistats and might require modifications to standard formulations.

Resin crystallinity also influences antistatic performance. Crystallinity appears to affect the ability of an antistat to migrate through the resin matrix. The higher the crystallinity the more difficult the migration.

- LDPE and LLDPE behave similarly with respect to antistats. Diethanolamides provide the best performance in LDPE and LLDPE.
- Amine antistats appear to out perform GMS and diethanolamide antistats in HDPE.
- The presence of the polar functional groups in resins, such as EVA & EMA, appear to improve the compatibility of the polar antistats in these resins, limiting their migration and antistatic performance. The antistatic levels may need to be increased with such polar resins or when they are blended with polyolefins.

SUMMARY:

Several factors influence antistatic performance. The end application dictates the level of performance the substrate must provide. Resins, slips and other additives influence antistat behavior. Test standards allow antistatic performance to be accurately compared and communicated between different laboratories.

Disclaimer:

New Division Members Fall 2005

LAST	FIRST	COMPANY	STATE_PROVINCE
Abbas	Sahib	Al-Muhanad Company for Plastic Ind.	Iraq
Acuff	Susan	Acuff International	TN
Arnett	Marleen	Clorox Company	CA
Bates	Michael	Duratherm Extended Life Fluids	NY
Bayter	Johana		TX
Bogonovich	Rebecca		NJ
Borse	Robert		IL
Brown	Alfred		OH
Brown	Anthony	Cap-Pack Solutions Ltd	
Buckley	Rpm	Amerikan LLC	FL
Bueno	Carlos	Genese Projetos De Embalagens	sao paulo
Cheatham	Dave	3M Dyneon	MN
Choy	King Lun	Ladycare Amenitites Mfg Co Ltd	Hong Kong
Craine	Gary	ICM Plastics	MN
Cresseveur	Mary	First Index	NJ
Curello	Andrew	BIC Corporation	CT
DeKee	Daniel	Tulane University	LA
Dickinson	Dennis	AC Dispensing Equipment Inc	NS
Durham	Don	Uptime Plastics	TX
Edgeworth	William	Richards Packaging	WA
Fay	Jeff		OH
Fay	Richard	Danaher Industrial Controls	NH
Fisher	Mark	Honda of America	OH
Gatti	Joe		OH
Goscinski	Edward		PA
Grande	Joseph	Plastics Technology Magazine	MA
Gray	Al	Pentair Water	WI
Gunter	James	Sonoco	SC
Hall	Michael	Clorox Service Company	CA
Hanson	Herbert		MA
Harden	Larry	Blow Molded Products	CA
Hayes	Gary	Hayes Tooling & Plastics	KS
Heyer	Stephen	Clorox Products Manufacturing Co	FL
Hussain	Thamer	Al-Muhanad Company for Plastic Ind.	Iraq
Jacoby	Bill	Convergent Packaging	CO
Jepsen	Jason	Iceberg Enterprises LLC	IL
Kenning	Bill		
Korpanty	Nicole		PA
Kouba	Joshua	Schoeneck Containers Inc	WI
Kraus	Richard	Toyota Motor Mfg NA	KY
La Ganke	Robert	R & B Plastics Machinery LLC	MI
Lee	Chun	Lyondell Equistar Chemicals	OH
Lopez	Benjamin		OH
Macke	Ernie		WI
Mankos	George	Ingersoll Rand	NC
McGrath	Cy		ON
McGuffin	Marshall	Weco Products	MI
Mcmanis	James	University of Nebraska-Lincoln	NE
Mellott	Marsha		TX
Mizener	a	Industrial Mold & Machine	OH
Nguyen	Duy	Portola Pakcagin Canada Ltd	BC
Patabendi Hewa	Punyasiri Sujeewa		
Paul	Darin	Consolidated Container Company	IL
Perez	Martin		TX
Plafcan	Dan		TN
Rangelov	Tancho	Gotmar	
Resner	Richard	Hudson Metals Corporation	CA
Rusk	Douglas	Ampacet	OH
Sengupta	Pratip		
Shepard	Seth	Inergy Automotive Systems	MI
Smith	Dirk		FL
Sund	Paul		IL
Taylor	Dane		PA
Urban	Jason	Hotrun Inc	ON
Wilson	Doug	Beistle Company	PA
Young	Rick	Tigerpoly Mfg Inc	OH
Yuan	Zhen Hua	Cerestech	QC
Zimmer	Ron	Custom Pak	IA

Board of Director's Meeting

Minutes of the Board of Directors of the Blow Molding Division of SPE, Meeting held at Seagate Center, Toledo, Ohio.

- **Call to order at 2:15**
  - BOD Members present: Ron Puvak, Joe Altimari, Bob DeLong, Jonathan Meckley, Mark Heitker, Bob Jackson, Lewis Ferguson, Surendera Agarwal, Dave Holliman, Gary Carr, Winn Burrington, John Rathman, Scott Steele, and Bob Fitch
  - BOD Members Excused: None
  - Recognized Geoffrey Ward, Larry Schult, and Bob Slawska as visitors to the meeting
  - Reading of Non-Disclosure/Non-Compete Statement
  - No resignations from the Board.
  - We have been able to complete tasks with a smaller group.
- **Treasurer's Report - Mark Heitker**
  - Transfer of funds from the disbursement fund to the operating fund was done
  - Tax return was completed and submitted
  - The books were audited by Winn Burrington, Bob Fitch, and John Rathman
  - There is not prudent reserve to transfer
  - Will transfer $6000 back to Disbursement Fund when the funds are available in the Operating Fund
  - Ron Puvak moved to Accept and Surendera Agarwal seconded the move, Board Accepted the Report.
- **Councilor's Report - Bob DeLong**
  - SPE membership growth
    - SPE priorities
      - Growth (1)
      - Retention (2)
  - SPE finances are in good shape
  - Plastics Technology Magazine is losing money
  - SPE is Changing its constitution
    - Operating Policy
  - Pinnacle Award
    - Paperwork due November 15th
    - Reward Sections & Divisions
  - Bob DeLong is leaving the board
    - January meeting will be his last
- **Nominating Committee Report – Ron Puvak**
  - Need to fill the Councilor and Secretary positions
  - New slate will be routed – New BOD members have been solicited.
- **TPC – Surendra Agarwal**
  - ABC 2005 – Scott Steele
    - 105 paid registrants
    - Proposed $20 donation from each attendee to American Red Cross for hurricane relief.
      - Surendera Agarwal seconded, motion failed
    - Meals and AV costs were higher than expected
    - Need coverage of Moderators & Registration Desk
  - ABC 2006 – Bob Jackson
    - Dates – October 11 & 12
    - BOD meeting – October 10th
    - Dates have been cleared with SPE International
    - NPE year
  - ABC 2007 – Surendra Agarwal / Dave Holiman
    - Phillips Technical Center
    - K-Show year
  - ABC 2008
    - Open
  - ANTEC 2005 – Lew Ferguson
    - Reviewers for Papers
      - Bob DeLong, Jon Meckley, Dave Holliman, and Surendera Agarwal

- Awards Report - Dave Holliman
  - Lifetime Achievement
    - Dr. Saleh Jabarin will be honored tomorrow night
  - Fellow
    - Will resubmit Lew Ferguson
  - Honored Service
    - No candidates
  - Outstanding Board Member
    - Will vote at winter board meeting

- **Education - Mark Heitker**
  - Scholarship checks have been sent out
  - Scholarship reviewers
    - Bob Fitch, John Rathman, Mark Heitker, and Dave Holliman
  - Will talk to Gail Bristol to send checks to students rather that to the schools
  - Requirement on scholarships
    - Recommendations from Education Committee
  - University Grant
    - 1 Accepted
    - 1 Pending

- **Marketing - Bob Jackson**
  - Newsletter
    - Well received
    - Next Newsletter – Late November
    - Build a Processor's Corner
  - Membership
    - Membership is cycling
    - 567 Primary
    - 354 secondary
    - Slightly lower than last year
  - Sponsorships
    - Good start – almost $23,000 generated – cost about $600.00
    - 17 Platinum Members
    - 3 major groups to market
      - Resin Suppliers
      - Mold Makers/Secondary Operations
      - Machinery Manufacturers
    - Have an agenda to talk to with potential attendees
    - Need to continue the effort. Sponsorship packets will be sent to all BOD members.
    - Needs list of potential sponsors from BOD members – Send to Mary
  - Web Site
    - Ron Puvak will stay in-charge

OLD BUSINESS:

- There was no Old Business

NEW BUSINESS:

- Winter Board meeting
  - Orlando or Jacksonville or Las Vegas
- Pride Award
  - Dave Holliman to complete
  - Will skip Pinnacle this year
- Reduce the number of board meeting or change location
  - Move ANTEC meeting to NPE
  - Lew Ferguson to find location for a teleconference

ADJOURNMENT:

- Motion to adjourn made by Bob Jackson, seconded by Surendra Agarwal
- The Board accepted the Motion

Board of Directors

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