

Society of Plastics Engineers

Rotational Molding Conference 2005

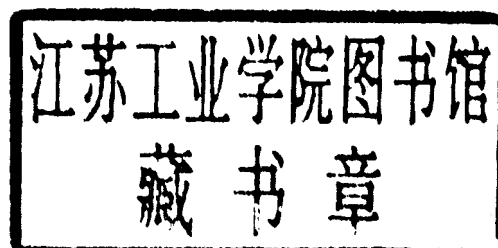


September 18 - 19, 2005
Chicago, Illinois, USA

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Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571
www.proceedings.com

CSIN: 9999900223

TABLE OF CONTENTS

- 1 Design As A Tool for Molder Growth (Paper)**
Design and Innovation as Tools For Molder Growth
(Presentation)
Jack Avery
Avery Plastics Consulting
- 25 Summary Presentation for Mark Dziersk (Paper)**
Creating execution that results in “WOW” factor designs.
(Presentation)
Mark Dziersk
- 49 Balance In Design: Achieving Customer Required Features and**
Moldability for the Rotational Molder (Paper)
Balance In Design: Achieving Customer Required Features and
Moldability for the Rotational Molder (Presentation)
Gregory Stout
Blue-Reed, LLC
- 81 Predicting Strength of Rotomolded Parts (Paper)**
Predicting Strength of Rotomolded Parts (Presentation)
Chuck Milton
Tennant Company
- 132 Color Trends and Consumer Preferences (Paper)**
Color Trends and Consumer Preferences (Presentataion)
Patricia Verlodt
Color Services and Associates, Inc.
- 174 Rotomolding Resins - Then and Now an Important Industry**
Challenge
Einar Voldner
Synergy Polymers Inc.
- 184 Developments in Polypropylene for Rotomolding**
Dr Nick Henwood
Matrix Polymers, UK

- 191 Cyclic Polyester Thermoplastics as New Reactive Rotational Molding Compounds**
Steven Bahr, Paul Willey, Anne-Marie Forcum, Jing Wang, Tohru Takekoshi and Jens Eggers
Cyclics Corporation, Cyclics Europe GmbH
- 205 High Performance Fluoropolymer Rotomolding Material**
Ted Hutton, Saeid Zerafati
ARKEMA Inc.
- 214 Problem Solving Using Analytical Chemistry**
Annette McManus
Lyondell Chemical Company
- 221 New Colors for Rotational Molding**
J. D. Ratzlaff,
Chevron Phillips Chemical Company LP
- 227 Rotational Molding: Is It Time to Fish or Cut Is It Time to Fish or Cut Bait?**
TOPCON 2005 Panel Discussion
Jim Throne
Sherwood Technologies, Inc.
- 255 The OEM to Molder Relationship**
Scott Jarman
John Deere Turf Care
- 261 A Historical Look at Rotomolded Products**
Dave Berg
Tennant Company

Design As A Tool for Molder Growth

Jack Avery

Avery Plastics Consulting

Has there ever been a more challenging business environment? Globalization, outsourcing, consolidation and increasing raw material prices are forces that impact our business. Daily questions of how to survive and grow must be addressed. No segment of the plastics industry has been impacted more than the molder.

One trend that has been evident has been the role that molders are being asked to play in the area of new product design. This is a result of OEMs consolidating their new product development and requiring their supply chain to take a greater role in new product development.

Of the members of the new product development supply chain, the molder is being asked to take a central role, including the design and development of new products. This is consistent with the molders taking a proactive role in bringing value to their customers.

Design and Innovation as Tools For Molder Growth

Jack Avery
Avery Plastics Consulting
Sept. 18, 2005



Trends Impacting the Plastics Conversion Industry

- 2000 – 2003 Recession
- Consolidation
- Engineering/Product Development “push-down”
- Globalization
- Product Complexity
- Product Development Cycle Compression
- Costs
- Quality
- Productivity

Processor issues:

- Raw material prices/pass-through
- Global competition
- Profitability

Product Development Cycle Trends

1. Decreasing product development cycles; $\sim 10\%$ /year
2. OEMs push product development to suppliers
3. Increasing differentiation and proliferation of product variety
4. Increasing reliance on electronic design and manufacturing techniques
5. Increasing globalization of the product development team

Global competitiveness has increased standards for production consistency and flexibility while reducing product development time and unit cost.

Customers demand higher performance/higher value

Materials Solution:

- Differentiated materials
 - High performance films
 - High heat materials
 - Improved clarity/strength/processability
- Multi-material systems
 - Film/sheet
 - Molded systems

Machine/Tooling Solution:

- Multi-material/multi-process capability
- More complex molds/machines

Creativity and Innovation Are the Keys To Growth!



Changing Face of the Materials Industry

- Rising prices
 - Energy prices & derivatives
 - Benzene price historically:
 - 5 yr. avg. - \$1.35/gal.
 - 10 yr. avg. - \$1.15/gal.
 - Past 12 months: \$4.00 - \$2.60 - \$4.00 - \$3.10/gal.
 - Supply constraints
 - Lack of N. A. capacity expansion since 1990s
 - Growth rate strains capacity
 - Production issues exacerbate tight supply issues
 - Consumption shift from N. America and Europe to Asia
 - Lower resin prices in Asia due to lower raw material prices
 - Lower labor costs impact productivity
- OEMs focus on cost forces shift
 - N. American & Europe focus on innovation

Reality of Marketing - 2005

- Market dynamics are constantly changing.
 - Consumer desires
 - Market windows are shorter
 - Increased competitive pressures
 - Highest raw material prices
 - Demanding challenges daily:
 - Innovative products
 - Functionally and usability
 - Highest raw material prices
 - Increased manufacturing throughput
 - Lower manufacturing cost
 - Higher product quality
- In today's environment, traditional iterative product development process is no longer relevant.
 - Supply Chain must collaborate to meet OEM's requirements

Role Processors Play in New Product Development

- Product design
- CAE support
- Process input
- Material selection
- Moldfilling simulation
- Prototyping
- Mold design
- Costing

Processor may play a number of roles in the new product development process.
Must be a key member of the supply chain.

New Product Risks

- Technical risk
 - Product performance
 - Manufacturing technology
- Market risk
 - Early marketing involvement
 - Customer feedback
- Financial risk
 - Product costs
 - Sales forecast
 - Product target cost is not met

Balancing speed and risk are critical to success of new products!



New Product Risk Amortization

1. Develop new product plan
 - Functional description for new product
 - Include market and consumer information
 - Define testing/validation requirements
 - Identify project drivers and constraints
 - Include members from all supply chain members in planning cycle
2. Form a collaboration team
 - Develop thorough understanding of all team members
 - Define/train in collaboration techniques
3. Develop a time-line & review process

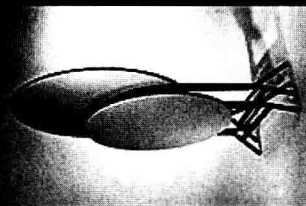
Management buy-in and communication are critical elements for successful new product introduction



Rotational Molding Design Advantages

- Parts consolidation
- Functional integration
- Inserts
- Low stress
- Dimensional stable parts
- Low material waste
- Consistent wall sections

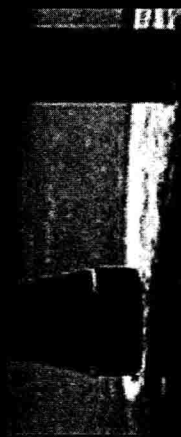
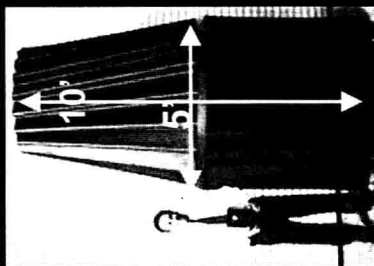
Rotational molding enables large, complex hollow Products to be cost effectively be manufactured.



Intella-core Folding Tables

Miti-Lite

- Skin-foam-skin construction
- Molded-in stiffeners & leg mount joints
- Flatness
- Lighter than thermoformed or plywood tables
 - 60" round table 18% lighter than plywood table
- Hold up to 1600 lb. load
- 12 year warranted for indoor or outdoor use.



Bridgeshark

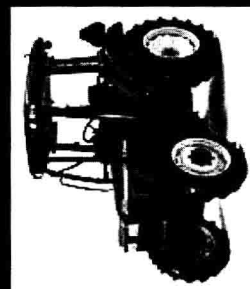
- Cross-linked polyethylene
- UV stabilized
- Process handles fin wall transitions of 0.35 – 0.50
- Molded with two inner chambers
 - Upper filled with 2 lb. foam PU
 - Allows unit to float
 - Lower hollow chamber fills with water to stabilize unit.
- Decreases debris damage around columns.

Rotationally Molded Roof Module John Deere 5000 Series

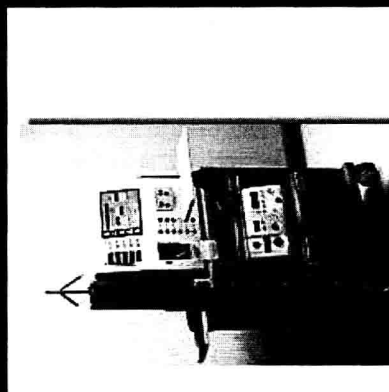
Centro, Inc.



- HVAC components integrated into roof
- 8 Cored features
- 63 molded-in inserts
- LDPE skin
- LDPE foamed inner walls
- Eliminates seals & mounting hardware
- Provides thermal and sound insulation



Surgical Cart Omnica Corp.



- Single rotationally molded part replaced 120 metal housing, hardware and assembly parts.
- 60 lb. weight savings
- Eliminated painting