Aug 2016 Vol 12, No. 2

ROTOTALK

Quarterly Newsletter of Society of Asian Rotomoulders

www.starasia.org

Editorial Comment

The decade gone by has seen significant developments in the Indian rotomoulding industry; StAR played the role of a catalyst to bring about change. StAR Conferences & Regional meets, ARMO affiliation & ARMO conferences, Joint ventures & Technical tie ups with international companies have all contributed to the changing scenario of Indian rotomoulding. The time is ripe now to bring about a paradigm shift. StAR is currently visiting its members around the country to collect their vital inputs for programmes and activities which could make such a shift possible.

Dear Reader,

Among the biggest takeaways from the StAR Conference in Goa in February this year was a feeling of optimism in our industry. For StAR it was perhaps opportune time to rededicate itself to working for growth and development of the industry. The StAR Board Set the ball rolling with some new innovative ideas. It is now actively encouraging its members and the industry as a whole to create the right atmosphere and infrastructure for sustainable growth in the industry.

Rotomoulding needs to be promoted to sectors where there is scope for new rotomoulded products and applications, and conversion to rotomoulding of production being done by other processes.

The StAR board has also thought differently this time when it came to choosing the location of StAR's Annual Conference in 2017. The Conference will be held in the interesting historical city of Jaipur with ITC Rajputana Hotel known for its class and tradition as the venue.

S B Zaman
StAR Executive Director

A Baheti
StAR President

DR. ROY CRAWFORD ..... A TRUE ROTOMOULDING GURU ..... IS NO MORE!

Dr. Roy Crawford Professor at Waikato University, New Zealand, Speaker at StAR Conferences In 2004 and 2010 passed away on June 22, 2016 With a heavy heart we offer our condolences to his wife Renee and family; Dr. Crawford passed away in New Zealand. He was a true global rotomoulding guru who led the way to bring rotomoulding process out of a black box and explained it on scientific basis.

Roy was one of the most respected personalities from the rotomoulding world, especially in India. He enlightened us during our very first conference in Dec 2004 by offering his famous seminar on basics of rotomoulding, both in Mumbai & Delhi. He was again back in the StAR region in 2010 during the first ARMO related conference in Goa.

He will be sadly missed by all he interacted with. **RIP**

StAR - CHARTING THE COURSE FOR THE NEXT DECADE

Following an exciting and successful decade plus since its inception in 2004, StAR decided to visit and meet with its member companies, to review the past activities and accomplishments and solicit their feedback and suggestions for the coming years.

Charged with this responsibility Executive Director S.B. Zaman is meeting with most member companies during his planned regional visits. Aided by board member Mukesh Ambani, first visit was to Mumbai and Pune region from June 8 to 10. Companies visited were Supreme Ind, Nilkamal Ltd, BD Ind, Infra Ind, Reliance Ind - PARC & Corporate, apart from meetings with Maharashtra Mahapoly, Ingenia Polymers and Sharp Batteries.

Aided by board member Swetang Dave, second region visited was to Vadodara, Kalol and Ahmedabad from June 27 to 29. Companies covered were Reinhardt, A Schulman, Shree Momai, Sintex, Astral, Consta Cool, Promens, NAROTO, apart from meetings with Ashutosh Tanks, Abhinav Polymers and Vaghasia Plastics. Meeting was held with CIPET Ahmedabad. ...CONTD.

Key Comments & Suggestions Received from these Meetings Are:

- StAR has done a lot to help lift the industry over the past decade through services for technological knowhow, networking, global interaction and bringing the industry together.
- Companies are more willing to participate & help StAR activities. Most, all indicated their desire to attend the next conference in Jaipur Jan 29 to 31, 2017.
- Rotomoulding in general today is not a very significant part of their business, but all realize potential for continued growth, in present & new sectors.
- Many companies are developing & moulding innovative new products and entering various new sectors.
- The water tanks potential for rotomoulding is again looking promising; but moulders need to develop better more interesting products to gain an edge over the competition.
- Availability and knowledge for different grades & types of materials is still seen as a big need and opportunity.
- Industry product standards & and standardized third party testing are the need of the day.
- Skills development: There is a need for technical & practical workshop training for the factory floor level operators & supervisors; overcoming language barrier needs to be facilitated [Hindi]. Machine manufacturers & resin suppliers should be able to help with this.
- Top management of especially the more influential member companies need to come together for roundtable discussions to brainstorm for the future & continued growth of the industry.
- A generic industry directory of suppliers, both domestic & international, for materials, machines, moulds and other services that are available for India should be prepared by StAR.
- BIS standards committee participation is seen as a prime need; RIL & others are willing to help & support.
- CIPET relationship has the potential for both offering standardized testing and factory supervision & operator level workshop / training in participation with StAR.
- A big positive outcome of these travels is the intention received from six companies to become members of StAR; in progress.

Next regional visit is being planned for the South region towards the end of August.

StAR AT 2016 ARMO – ROTOMOULD (ARMA) CONFERENCE

StAR moulder company BD Industries, Mumbai and supplier company Reinhardt Roto machines, Vadodara participated in the ARMO 2016 conference organized by ARMA at Gold Coast Australia from June 19 to 21.

A StAR presentation on **Rotomouldig Scenario in India** was made by Akshay Saini of BD Industries at the conference.

Akshay highlighted some of the significant growth sectors of the Indian roto industry in recent times. He also pointed out the positive impact of highly conducive Government programmes on economic sentiment and the rotomoulding industry in India. The roll out of these programmes has created new opportunities for rotomoulding companies to invest and to do business in India.

Participating in the StAR Rotomoulding Conference in Jaipur on Jan 29 – 31, 2017 has become highly attractive in such circumstances. Expression of interest and queries about the conference following the presentation was an indication of the response of the attendees to the new India Growth Story.

Some of the sectors of the Indian rotomoulding industry which were highlighted were **Automotive, Road Safety, Underground products - like UG tanks, Manholes, Septic tanks, Water harvesting etc – Toilet &; Sanitation.**

Boosting opportunities in these segments were Govt programmes like **Make in India, Swachh Bharat Abhiyan, Water Conservation etc.**

Akshay Saini
akshay.s@bdi-group.org

IMPACT PROPERTIES MODIFICATIONS IN ROTOMOLDED PRODUCTS

Objective: The objective of this work was to evaluate the effect of blending minor amounts of Impact Modifiers eg. Ethylene Vinyl Acetate (EVA) or Elastomer with Polyethylene Rotomolding grade on cycle times and impact strength in rotational moulding. The blends sintered significantly faster than polyethylene.

The sintering rates were primarily influenced by the melting points of the minor blend components, and not by differences in melt viscosity and / or elasticity at low shear rate. Blending EVA with polyethylene resulted in improved environmental stress crack resistance and decreased flexural modulus. In rotational moulding, blending EVA with polyethylene generally resulted in faster bubble removal, more uniform thickness and shorter cycle times. Ductile failure was generally observed at the peak mean failure energy (MFE). The blend containing Interpolymer yielded significantly increased MFE, possibly because the Interpolymer was compatible with polyethylene and was very well dispersed. The target products are Road safety Cones, Barriers, Bullnose, Garbage Chutes, Material handling devices, Dust bins , etc where product movement loading-unloading is very important.

Blending Details

- 10% EVA (18VA content and 2 MFI)

  was blended in Form 2

★ 10% Elastomer was blended in Form 3.

All the blends were prepared in Twin Screw compounding extruder in pellet from. The pellets were then pulverised.

We have taken Rotomoulding trials of different formulations in biaxial Rotomoulding machine in Cube mould and found observations like Smooth ejection, Smooth surface, and No warpage. We have successfully improved Izod Impact Strength in both the forms without any significant reduction in other properties. This exercise is well accepted by end-use industry in many rotomoulding products where Impact strength plays significant role.

Cubical shape rotomoulding product from cube mould

ASTM Laboratory testing results of the specimen prepared from Cubes:

Grade / formulations	Form-1	Form-2	Form-3
	Roto LL Butene	Roto LL Butene + EVA	Roto LL Butene + Elastomer
Density (gm/cc)	0.9247	0.9269	0.9215
Hardness (shore D)	56	53	52
Izod Impact Strength	Reference	200%	400%
Flexural Modulus	Reference	20%	15%
TYS	Reference	3%	12%
Strength at Break	Reference	111%	411%

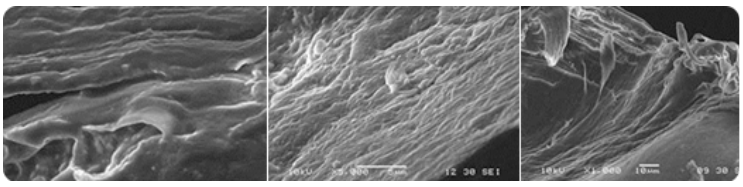
Product Testing and analysis:

Tests performed were for polymer properties like Oxidative Induction Time (OIT in minutes) Density (in gm/cc), Mechanical tests like Hardness (shore D) Izod impact strength (1/m), Flexural Modulus (MPa), Tensile properties and performance tests like Drop test and Hammer test.

Drop test	Form-1	Form-2	Form-3
Cube dropped from 7 feet height filled with POP + Water	OK	OK	OK
Cube dropped from 11 feet height filled with POP + Water	cracked	OK	OK

Hammer test	Form-1	Form-2	Form-3
Cube Hammered with 5 kgs weight filled with POP + Water	Cracked in 5 stroke	OK after 8 stroke	OK after 8 stroke

(Form-1 / Form-2 / Form-3)



The dispersion looks to be decent

M.Patria & Dr.N.Joshi
Reliance Industries PARC

MODERNISING MACHINERY PRODUCTION FOR GROWTH IN ROTOMOULDING

At a time when the Rotational moulding industry in India is progressing with the production of new products and applications, corresponding up gradation and modernisation of machinery is equally important.

Machinery manufacturing in our country is gearing up to meet this new challenge and opportunity for product innovation.

NAROTO is successfully taking steps in that direction. It recently launched its new Rotocompact series of Rotomoulding Machines (see photo below).

Roto Compact Machine

The machine can accommodate 24 moulds of 2 mtrs length on its Straight Arm; thus 24 pcs. are possible in one cycle. It is already in successful operation with a customer in the Gulf region for road production. In 24 Hours, 22 Cycles are accomplished enabling production of 530 barriers! It's Fixed Oven – Moving Turret design leads to highly economized fuel consumption along with time saving.

NAROTO has channelised into its machine modernisation programme 34 years of experience as Machinery, Moulds and Ancilliaries manufacturer in manufacturing facilities spread across 16,000 sq m in Ahmedabad. Well equipped plants and efficient manufacturing practices are helping NAROTO stay in the forefront of change in Indian rotomoulding. It has a current capacity of 28 – 30 plants and 1300 – 1500 moulds per annum and track record of serving 1000 plus customers in 74 plus countries including all over India.

NAROTO has committed itself to consistently reinforce the advantages of the rotomoulding process through appropriate machinery, doing its best to be innovative at all times.

Bhavin Vasadava
bhavin@naroto.com
N.A. Roto Machines & Moulds

TESTING OF TOTAL LUMICENE® METALLOCENE POLYETHYLENE USED IN ROTOMOULDED FUEL TANKS

There are different ways to assess impact properties.

The most appropriate way to do this for fuel tank applications is to perform a drop impact test (see Figure 1).

Figure 1: Drop test set-up

The Total Lumicene® metallocene grades clearly outperform compared to C4 and C8 based LLDPE (see Table 1). At more severe conditions (3mm wall thickness and -40°C), the impact performance of Total Lumicene® metallocene grades are nearly equivalent to the impact performance exhibited by XLPE grades (see Table 2).

PE type	Rupture height at - 18° c(m)	Rupture height at - 40° c(m)
LLDPE C4 -0.940 g/cc density	< 2.0	ARMSA Awards Events
LLDPE CS -0.940 g/cc density	6.0	NA
1st. generation mPE Density - 0.940	6.0	NA
Total m4041uv - 0.940 g/cc	no break at 6.5 m	No break at 6.5 m

Table 1: Drop test drop test results - Potomolded Bottles -7 liters, 6.0 mm wall thickness

PE type	Minimum Rupture height at- 40 c(m)	Maximum Rupture height at- 40 c(m)
LLDPE CS -0.940 g/cc density	1.5	3.0
1st generation mPE Density - 0.940g/cc	2.5	3.0
1st generation mPE Density - 0.934g/cc	1.5	2.0
Total mPE4041UV -0.940 g/cc	4.5	> 6.5
Total mPE 3581UV -0.940 g/cc	6.0	> 6.5
XLPE	> 6.5	> 6.5

Table 2: Drop test drop test results -Rotommoded Bottles- 7 liters 3.0 mm wall thickness

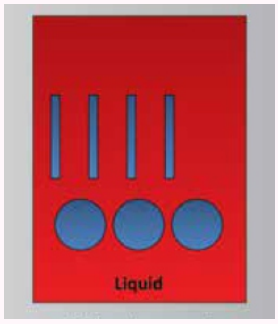


Figure 2: Chemical compatiblity with fuels - Bars

Cut bars immersed Chambers at 40° and 80° C

Specific Materials for Specific Applications

Every tank application has its own specific requirements and every material in Total Lumicene® portfolio has been designed and tested for a specific use.

- ★ M3581UV, M4041UV and M3421UV are ECE34 approved for diesel
- ★ M4041UV is EN13341 approved for heating oil tanks
- ★ M3421UV has been intensively tested for biodiesel fuel tanks
- ★ M3671 is tested for gasoline (C10 or E10) in monolayer or two layer application in combination with PA11 (TP-SEAL® technology, CARB and EPA approved) Diesel and gasoline material testing and validation is performed on both cut bars and rotomolded 7 liter bottles.
- ★ Bars are immersed into diesel at 80°C and into gasoline at 40°C for 12 weeks (see Figure 2)
- ★ Rotomolded bottles are filled with diesel at 80°C and with gasoline at 40°C for 12 weeks (see Figure 3)

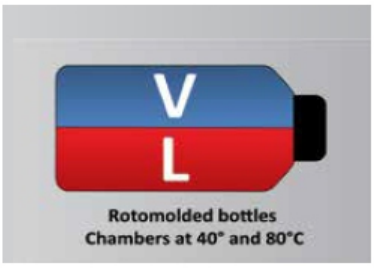


Figure 3: Chemical compatibility with fuels- Rotomolded bottless

Figure 4: Diesel stacking test set-up

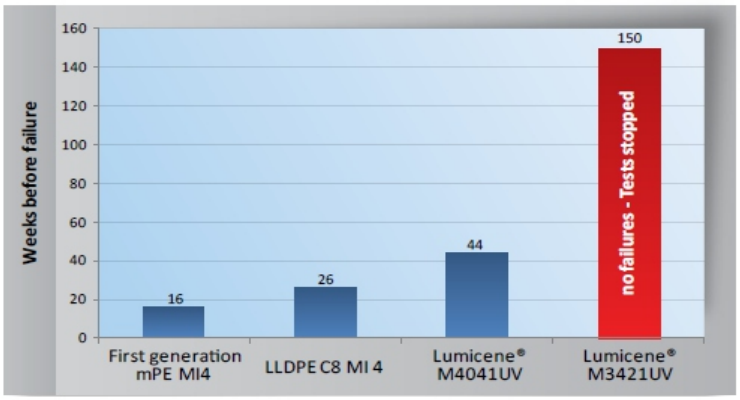


Figure 5: Stacking test results

Tensile and impact testing is performed before and after a 12 weeks soaking period to demonstrate that there is no degradation in properties.

To further develop its understanding of the material performance in contact with diesel, Total developed a dedicated in-house stacking test. During this test, rotomolded bottles are filled at 98% of the volume and tested in stacking mode with an internal calculated wall stress of ~6.0 MPa (see Figure4). A comparison of the time to failure versus competitive PE resins (see Figure 5) confirms the outstanding performance of Total Lumicene® Technology.

To test material compatibility with biodiesel it is recommended to test the oxidation behavior of the PE. Therefore rotomolded bottles filled with Nitric Acid (HNO3) at 55% concentration are stored at 40°C and PE degradation is monitored over time.

Eric Maziers
eric.maziers@total.com
Total Petrochemicals

FORTHCOMING EVENTS

DATE	VENUE	EVENTS
Aug 17 - 20, 2016	Detroit Marriott at the Renaissance Center, Detroit, MI	IDSA INTERNATIONAL CONFERENCE "Making Thing Happen"
Sep 22, 2016	South Africa	ARMSA Awards Events
Sep 24 - 27, 2016	Marriott City of New Orleans, LA	ARM Annual Meeting 2016 & 40th year Celebration
Oct 19 – 26, 2016	Dusseldorf, Germany	K2016
Nov 7- 8, 2016	Bad Segeberg & Trappenkamp, Germany	ARM-CE Annual Meeting
29 – 31, 2017	Hotel - ITC Rajputana, Jaipur, India	StAR 2017 Annual Rotomoulding Conference

WELCOME NEW MEMBER

Company	Category	Primary Contact
GEEPEE Industries Ltd, Nigeria	Moulder	M D Valecha

Rototalk is the newsletter of Society of Asian Rotomoulders(StAR) for internal circulations only.
Editorial Contributions can be sent to S.B. Zaman, Executive Director, StAR, Email: sbzamanp@gmail.com