PLASTINDIA FOUNDATION ®

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Over 25 Years of Service

PLASTICS

IN INFRASTRUCTURE DEVELOPMENT

PLAYING AN INFLUENTIAL ROLE

Its all about Performance!

The fact that we, Ferromatik Mialcron India, make a High Quality Injection Moulding Machine is very meaningful and it means a lot to our success.

The launch of Nova Servo has been the most successful Machine Launch and is well accepted by Plastics Industry. It is a combination of Efficiency & Effectiveness and a Strong Brand. It has got the Tremendous Success and is due to partnering a Quality Product with Energy Efficiency and Competitive Price. Enhanced Specifications & Features with Higher Performance & Productivity are all part of the Nova Servo Package.

Nova Servo is altogether a Newly Designed-New Generation-Energy Efficient-High Performance Toggle Injection Moulding Machine having Engineering Excellence.

FERROMATIK MILACRON India

TOGGLE INJECTION MOULDING MACHINE

NOVASERVO

The Most Successful Machine Launch

Highest Value Propositions

- Energy Efficient
- Compact Foot Print
- High Performance Machine
- High Repeatability & Precision
- Generous Specifications & Features
- Wide Combination of Injection Unit with Clamp

Key Application Segments

- Medical
- Packaging
- Automotive
- Caps & Closures
- Writing Instruments
- Electrical, Electronics & Telecommunications (EET)

& many more…

More than 150 machines running successfully since its launch in Oct' 12

Nova Servo IMM
Application Segment Presence (%)

Ferromatik Milacron India Pvt. Ltd.
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From the **Vice President's Desk**

R. A. Lohia

Dear Friends,

You all know that Building and Construction Industry is the second largest consumer of Plastics after Packaging Industry. There is a growing list of plastic materials which are used in Construction and infrastructure for structural, interior or decorative uses.

Use of plastic in Construction Industry offers superior corrosive resistance and are lighter, easier to install and more cost effective than their alternatives. Impervious to chemicals and sulphur bearing compounds, these qualities also have combined with Plastics' high strength to weight ratio to produce materials for different applications. For building construction, plastic materials will continue to add speed, save energy and reduce costs with thermal and fire resistance qualities. For commercial building that contains sensitive electronic equipment, plastics can provide highly protective housing that does not interfere with radio frequency or magnetic waves. From home to workplace and may be even on a bridge in between, Plastics are on the job. Plastics are also playing increasingly high role in the field of infrastructure depending on the merits of each material. Designers, structural engineers and architects now have a wide array of traditional materials, pre-engineered materials, plastic materials or blend of different materials to choose from. Transportation, today depends heavily on plastics to reduce load and meet energy efficiency. In the Energy sector, Plastics help in better insulation as well as creating superior construction. Moreover, Plastic waste is now also used in road construction.

I believe that the use of Plastics in Building, Construction, infrastructure and transportation sectors will continue unabated as the industry moves forward with more research and innovation. Our industry is going to continue to play a vital role of overall development to national growth.

Plastindia International Exhibition & Conference 2015, will be held at Helipad Ground, Near Mahatma Mandir, Gandhinagar. Lets all gear our efforts to make this event a memorable one, where contribution from each & everyone is definitely called for. We stand assured that Gujarat Government will extend desired support & co-operation for this prestigious event.

R. A. Lohia
Vice President - Plastindia Foundation

From the **NEC Chairman's Desk**

J R Shah
Chairman – National Executive Council

Dear Plastindians,

I am grateful to Plastindia Managing Committee for appointing me the Chairman of National Executive Council (NEC) for Plastindia 2015. Mr. Lalit Singh of Fixopan Machines Pvt. Ltd., Delhi has been appointed as the Co-Chairman of the NEC.

This time, the Foundation took a long time in announcing the venue for the Plastindia 2015 Exhibition. We are now pleased to inform the Industry that Plastindia 2015 will be held from February 5 – 10, 2015 at Helipad Grounds, near Mahatma Mandir, Gandhinagar, Gujarat.

The decision to hold the 9th Exhibition – Plastindia 2015 at a new venue at Gandhinagar, was prompted solely due to certain factors, which as the NEC Chairman I would like to share with the Industry:

1. Government of Gujarat (GOG) is creating a new and modern Exhibition facility at Helipad Ground near Mahatma Mandir at Gandhinagar.
2. GOG has not only shown a considerable interest in having Plastindia 2015 in Gujarat, but will be a great facilitator in providing several infrastructural facilities at the Exhibition venue.
3. Almost 60% of Plastic Processing Equipments Manufacturing and majority of Petrochemicals including Polymers, are produced in the State of Gujarat and therefore, holding an Exhibition in the neighborhood of the Industry, will be a great advantage to the Exhibitors.
4. The new venue will have larger area and will give us the opportunity to organize a much bigger event, than hitherto held at the Pragati Maidan.
5. The availability of uninterrupted electrical supply at the Exhibition venue will be a great source of relief to all Exhibitors and particularly the machinery manufacturers, who are demonstrating their equipments in live and working condition.
6. Added to the above, Mahatma Mandir offers an excellent State of Art Convention facility and perhaps the biggest in India. This facility is closely located to the Exhibition venue and will facilitate holding International Conference, Award Function, B 2 B Meetings and other Exhibition events with greater ease and convenience.
7. Further, our Overseas associates like Messe Dusseldorf GmbH, Pilatus International Pvt. Ltd., Adsale Exhibition Services and Euromap, all have happily accepted our decision and assured us their help, support and co-operation for a successful Plastindia 2015.

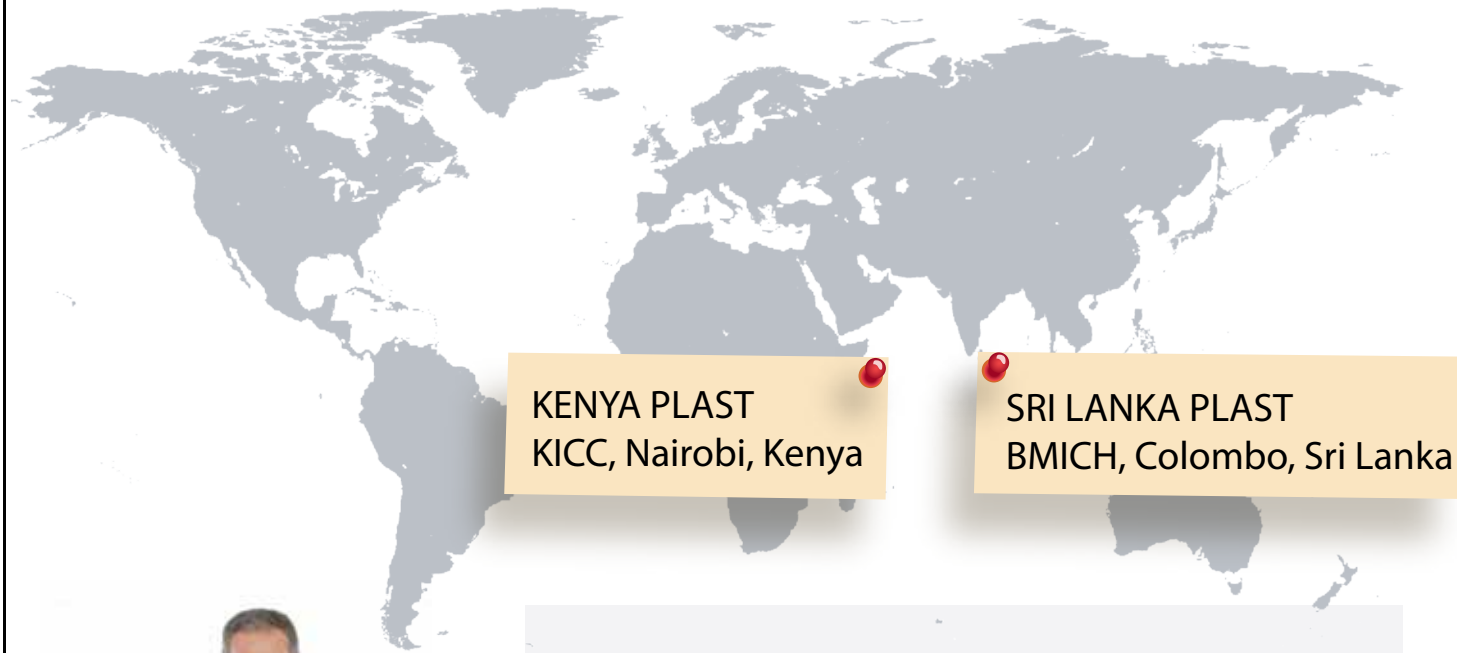
In respect to the above mentioned points, Plastindia Foundation feels that the new site at Gandhinagar, Gujarat will not only provide modern facilities, but altogether a new ambience for our event.

We are confident that Plastindia 2015 will be a memorable event and will greatly benefit all exhibitors & business visitors from India and overseas.

J R Shah
Chairman – National Executive Council
Plastindia 2015

Ride the next wave of growth in the **Emerging Markets** of…

EAST AFRICA & SRI LANKA



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Creating Opportunities and Delivering Values

From the **Editor's Desk**

Choices are in plenty... Opportunities in abundance

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Dear Members,

Nations across the globe depend more and more on improving their infrastructure for sustainable growth, progress & development. The infrastructure of India is still in a development stage. We are constantly reminded in our day-to-day life that our requirement for better infrastructure is growing rapidly. The increasing demand of our country for more electricity, more roads, more trains, more airports, more potable water, more housing, more irrigation resources, better land optimization, rapid means of transportation, faster communication, and cheaper energy alternatives all lead to higher usage of Plastics in achieving these goals. Plastics are increasingly emerging as the proven material of choice for creating a robust infrastructure. Plastics are cost effective, longer lasting, better process able, use less energy in conversion, and are able to marry utility with aesthetics.

In this issue, we bring you some of the most innovative means in which Plastics help in improving our infrastructure.

- Prof. K. Munshi from IIT Bombay has provided a fascinating article on how plastics along with reinforcements can provide modular construction which is cost effective & portable .....
- We also bring a latest preview of the role of Geosynthetics in infrastructure .....
- An article by Tipco on composites made from polymers & renewable natural fibres gives a unique option of using eco friendly wood substitute as a material of construction to prevent deforestation.
- Pipes & profiles made from plastics are playing an extremely important role in infrastructure development for water, gas & petrochemical transport. An article by Mr. Parshuraman informs on the enormous specific weight advantages of helical wound pipes.
- Mr Ravi Jalali from Jain Irrigation Systems addresses the role of Plastic pipes in India's Infrastructural need for water, waste water, sewerage and gas conveyance.
- Mr L K Singh's article throws light on use of Plastics in Road Furniture and interesting facts to modernise, update and maintain the roads & streets of our country.
- Finally, a historical prospective on the Indian Injection Moulding Machinery industry by Mr. Balgi is not only heart warming but also introspective ...

The Scope to invest in product of Infrastructure is in abundance as work is here at our door step. While global player is targeting India as their next destiny for work we have the big opportunity right here to build the infrastructure !!

Subash Kadakia
Chairman - Publication Committee
Plastindia Foundation

Plastics Injection Moulding Machinery Manufacturing - India Story

Shri Narasinh K. Balgi
Director - Ferromatik Milacron India Pvt. Ltd.

Industry is 50 Years Young....and growing

Injection moulding machinery manufacturing commenced in our country in mid 60s associating with the world's leading technology then, and, this trend has continued to date. The leading technologies of Western World (Europe and USA) and Japan are present in India producing the machines and supporting auxiliaries to globally prevailing current technologies.

Injection Moulding Machinery market has been growing at 15% CAGR over the past decade. The increasing use of plastics as replacement to natural material and, the growing consumption of basics to lifestyle products in our country, as the living standards are improving for the vast majority of people, are driving the demand for plastics machinery.

Industry Evolved to Meet Consumer's Needs

Advancements in the machinery capabilities and capacities are shaped by the customer's demand and increasing availability of newer technology products from the supplier base.

In this knowledge age every business strives to improve products and services through creative innovations to serve their customers better than their competitor and to make customer successful in his business. While injection moulding machine mechanical construction has evolved gradually over the years, the so called 'disruptive change' in advancements of machinery have come through developments in drive and motion technologies (Hydraulic, Electrical, elements supporting the motion such as- seals, bearings and linear and rotary motion elements) and intelligent electronic controls.

In recent years preference to technology products has grown in our markets as our customer base has become knowledgeable for all of us. Our customers as well as we, have learnt the operating economics and significance of quality-reliability for sustained business success from the multinational OEMs we serve. Some of us learnt more of it while serving customers in our export markets in developed countries. Today, the investment in machinery is made considering the long term useful life, per piece cost of production, life cycle cost and so on. Productivity is a priority while considering new investments - with resources, which include energy, space, time (because of speed at which life moves), materials and manpower, becoming scarce. Use of auxiliaries for automated conveying – drying – feeding systems are no more considered luxuries, but, essentials to get quality mouldings and good productivity.

Products are World Class... Kudos to Customers!

Customers appreciate value delivery - in terms of quality, reliability of performance, productivity and operating costs. Growing preference of processors to technology machines is clearly evident at the market place. It is a fact that there was no drop in volumes of technology machines sold in the market, where as volumes of 'Low priced- No uniqueness 'machines shrunk in the recent two recessionary phases of our economy.

Technology machines do come with a price tag which is higher than general purpose machines. They are bought after evaluating and understanding the benefits they deliver. Machinery suppliers sell them with their application knowledge support, as a solution to meet the specific need keeping the costs in view. Modularization of sub assemblies used in building a machine, helps configuring a tailor made solution from standard components, to serve the intended application and expected performance criteria.

Make Low Cost Products- Not 'Cheap' Products

Nevertheless customers continue to remain price sensitive, for people are becoming frugal globally. Reducing the costs simultaneous to raising the level of performance, quality and reliability of our machinery has remained at the centre of our product development. Newly added focus in product development is on providing sustainable solutions i.e. ensuring energy efficiency in process, and capability to produce reduced weight mouldings without loosing the functional needs. New

generation Servo hydraulics powered and all electric injection moulding machines have combined capability of energy efficiency, productivity and precision.

Current Status and Statistics:

Indian market received attention of technology leaders from Europe and Japan right from the beginning when Indian entrepreneurs evinced interest in domestic manufacturing of plastics machinery. They participated in domestic manufacturing thru joint-ventures or technology partnership. Early entrants were Windsor, Toshiba, Engel. Followed by Bueller, Kausy, Cincinnati, Demag, Niigata, Battenfeld, Sumitomo, Elite (Taiwan). Growing market attracts many players and competition intensifies. Some sustain and some succumb. The emerging survivors consolidate, some revive finding new partners.

Present status of industry is – the world leading technologies are present in India and market continues to attract others to enter.

Major Domestic Machinery & Auxiliary Manufacturers

Injection Moulding Machine	Auxiliaries
Windsor Machinery	Bry-Air
Toshiba, Chennai (Formerly L&T-Demag)	Motan
Electronica	Prasad Koch Technik
Ferromatik Milacron India	Nu-Vu Conair
ASB International	Wittmann Battenfeld
Negri Bossi	

Note: Sequence in the order of establishing manufacturing

IMM Market Growth and Domestic Manufacturing Capacities

Injection Molding Machines 08-09	08-09	09-10	10-11	11-12	12-13
Market Size (No, of Units)	3,288	4,236	5,500	5,675	4,600
Installed Machine Building Capacity in Organized sector (No. Of Units)	3,000	4,000	5,000	6,000	7,000
Installed Machine Building Capacity in Unorganized sector (No. Of Units)	SME production approx. 800 to1,200				

Driving Forces of Product Development - **Productivity, Precision, Energy Efficiency and Minimal Costs**

In simplest terms, customer demands - better overall efficiency, better quality, better productivity and ease of operating, all at a good price.

Productivity covers more no. of good parts produced per hour, as well as, more parts produced per kg of polymer processed which is possible by thinning down the sections without losing the rigidity / functionality of part by proper design.

Precision in a molded part comes from managing the consistency of process parameters and process repeatability.

Energy efficiency comes from sizing of the machine to suit the mould and polymer processed by using modular clamps, injection & plasticizing unit and power unit as well as selection of right energy platform for the application.

Cost control in moulding shop comes from right sizing of the machine, best utilization of space through smallest foot print of the machine, quick mould change, and, automated polymer drying and conveying, use of hot runner mould which avoids sprue waste and finally ensuring the high uptime of the machine making the entire system TPM (Total Productive Maintenance) compatible.

Meeting up all these requirements do make these machines complex but intelligence built into the Man-Machine interface (MMI) of machine control, makes it simple to operate and simple to maintain.

To make the machine to meet all the considerations above, domestic manufacturers offer range of machines customized to applications and other needs.

Cost Considerations:

Now a days, no one can allow himself with the 'luxury' of investing in machines which are equipped for all eventualities and fitted with the whole lot of functions. So machinery builders build them lean with just enough engineering, without sacrificing reliability. Even machines intended for high tech applications are now no longer 'over engineered'. On the contrary the trend worldwide continues to be- to install tailor- made injection moulding ideally suited to a particular class of moulding.

i) Machines are now designed using modular concept wherein machines can be built using standard modules of Clamp, Injection, Plasticizing and Power units. This permits optimum sizing of the machine to serve a mould or group of moulds.

ii) Two Platen Clamp units are offered in 500 ton and above for reducing the machine foot-print thus, one can accommodate more machine in a given floor space (As of now machines up to 3300 ton are produced in the country).

iii) Machines are also equipped to be adaptable to automation for QMCs, automated material feeding, part pick up, in-mould labeling, part conveyers, online recycling of the sprue etc

Application Considerations:

1) Packaging machines for thin-walled containers.

2) Special-designed Injection Units for PET Preform moulding, and, R-PVC / C-PVC pipe fittings.

3) Metal injection moulding machines (MIM)

4) Machines with two or more injection units to produce ready to use over moulded functional parts for automotive and other industries.

5) Machines to mold wood pattern finish furniture.

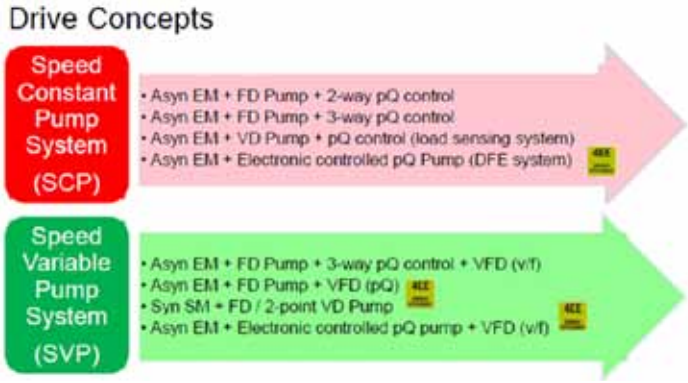
Various types of Plasticizing Screws

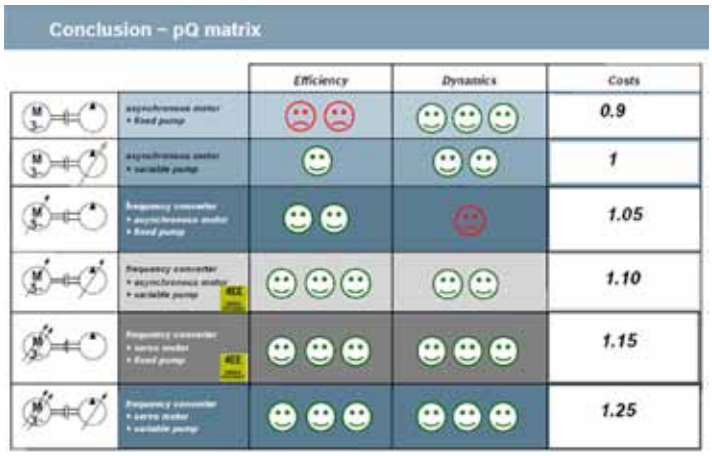
Energy Platforms:

a) Hydraulic machines use hydraulic oil to operate actuators of different axes – clamp, ejector, injection and screw rotation. The power pack of the hydraulic system is equipped with electronically controlled variable delivery pump OR Pumps driven by electric motor additionally equipped with variable frequency drive OR at the top end internal gear pumps driven by AC Servo motors in the order of their increasing energy efficiency.

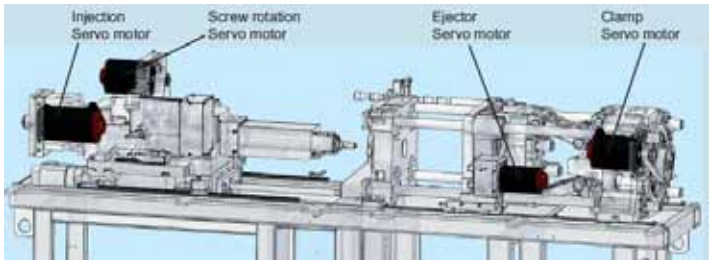
b) All Electrics in which Servo Motors are used to actuate the axes are now offered up to 450 ton from domestic production.

c) Hybrids are also offered in which electric servo motor is used for screw rotation and other axes are managed hydraulically.



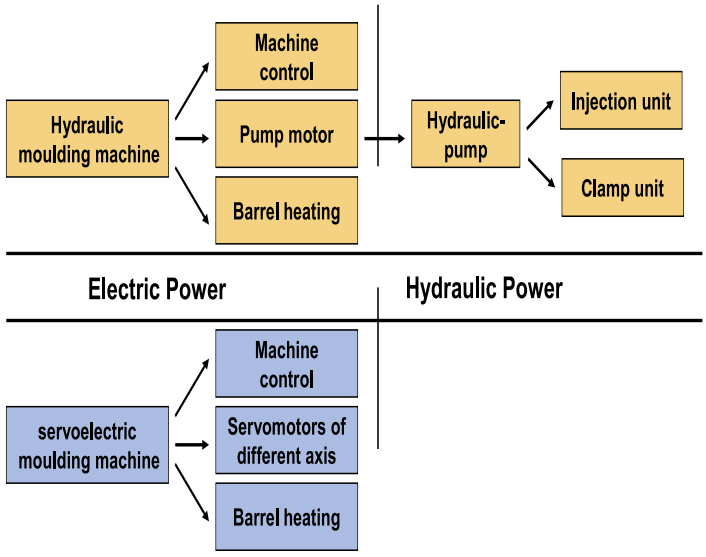


All electric drive lay out sketch

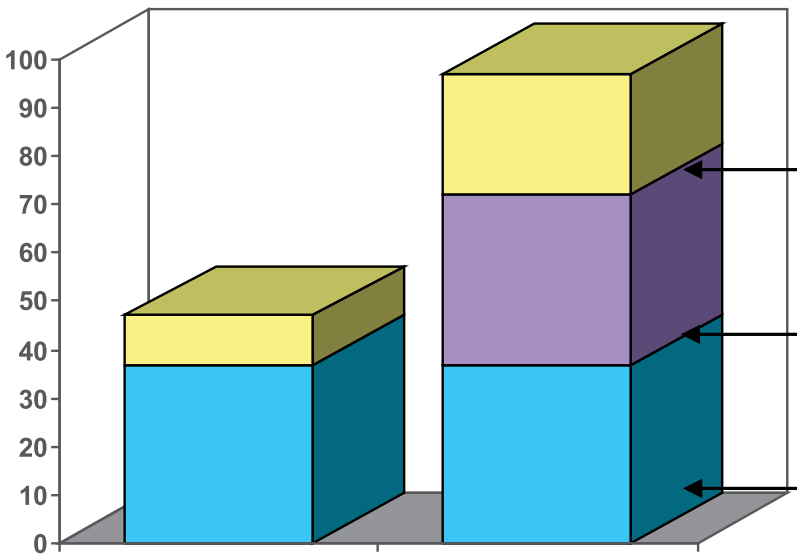


ENERGY SAVINGS:

- High Efficiency Factor
  $\eta > 0.9$ for Servo-Motors + Mechanical Gears
- No Dry Cycle Consumption
- No Cooling Water for Machine Cooling



Plastics Injection Moulding Machinery Manufacturing - India Story



Loss in Transformation:
Electric to Hydraulic – 25%
- Efficiency Rate of Motors
- Mechanical Losses
- Leakage of Hydraulic Pump

Loss in Transportation: 30% ~ 50%
- Loss of Pressure in Pipes & Hoses
- Losses in Valves
- Losses through Flow Restrictor

Work of Clamping & Injection Unit

Servo Electric Moulding Machine

Hydraulic Moulding Machine Injection

To Summarize

The domestic injection molding machinery has kept up with the advancements of Global peers as well as environmental compliances demanded by industry:

- Domestic Manufacturers Meet 95% of Processing Industry Needs on Technology & Product Range
- Product Technology Remains at Par with Leading Brands of Developed World
- Excellent Acceptance of Our Products in Developing Markets of Africa, Middle East, Russia, South East Asia and South America
  - We have Demonstrated Our Ability in,
  - Offering New Products & Variants to Industry.
  - New Technology Introduction on ongoing basis.
  - Meeting Requirements of Green Manufacturing.

Polymer Composites in Modular Housing Systems

Dr K. Munshi
Professor & Emeritus Fellow
Industrial Design / Mobility & Vehicle Design
Director, CTech Labs Pvt. Ltd
IIT Bombay

Mr S. Biswas,
Ms Sangeeta Baksi

INTRODUCTION

"In the next 35 years, 3500 million people will need places to live: 3500 cities of 1,000,000 residents each. Now there are less than 300 cities of this size. In the next 35 years, the need is for another 600,000,000 houses, more than exist in the world now."

The growing human population adds to the ever-increasing demand for shelter. There are thousands left without shelter when the nature plays havoc. Besides the normal housing shortage, India is facing the problems of shelter for people affected by the natural calamities like Gujarat earthquake or Tsunami wave, and also for the people affected by annual floods in various parts of the country. There is also requirement of shelter for the people displaced due to building of the dams and other development projects. Designing mass-produced housing and shelters with composite materials like GRPs can help alleviate the problem to some extent and at faster pace.

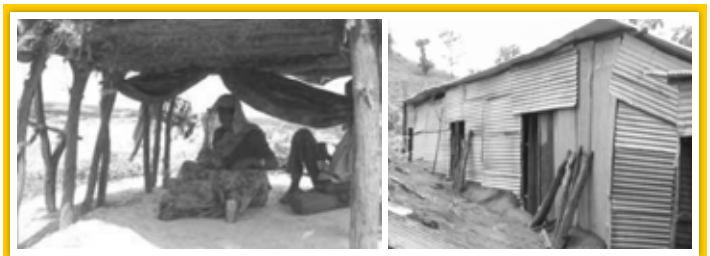
Composites as a word for describing materials, has varied connotations. Basically, it is a combination of two or more materials, which have properties better than the materials which form the composite. The concept of composite has been understood from ancient times and applied in structures like bamboo & plaster composite for making huts, straw & mud for plastering and applications in warfare for making swords of steel & soft iron. The most common composite today is steel reinforced concrete, where high tensile strength of steel is combined with high compressive strength of concrete to create a fantastic building material, whereby the concrete itself is a composite of cement, sand and gravel. With newer and newer materials being developed, fiber-reinforced composites have gained ground, which include glass-fiber reinforced plastics like polyesters or carbon-fiber reinforced epoxies, having such 'engineered' properties that these can be used in aerospace applications under extreme conditions. The word 'designer materials' aptly suits them as they can be 'tailor made' to have properties to suit the application in mind. We therefore believe that 'design' has a very close connect with composites and it is through design, the potential of composites can be fully realized. Of course, one does not have to turn a blind eye to the limitations of composites and here again these limitations can be offset by design strategies.

At Industrial Design Centre, IIT Bombay, we worked extensively with agencies like TIFAC (Composite Mission program), Department of Science & Technology, Government of India, and various manufacturers to develop variety of appropriate applications for composite materials, particularly GRPs to effectively compete with traditional materials in cost, and offer superiority in function and performance for housing construction.

Hereunder, are some examples which demonstrate how creative design strategies, modularity concepts, combined with humanistic approach help develop products much superior to the existing products and which also address the concerns of the users effectively.

Current Scenario

The current shelters in India are usually made from materials viz., canvas tents, tarps, plastic sheeting, tin sheets, etc. These provide inexpensive temporary shelter at minimal cost. However, the fabric tends to rot, canvas and plastic both disintegrate upon exposure to water and UV rays. The tin structures also prove inadequate with their minimal protection from the elements. The strong feeling of impermanence and physical vulnerability of the people living in these 'so called shelters' is gnawing.



Current Shelters Provided in Relief Camps

Polymer Composites in Modular Housing Systems

There are very few players in modular construction sector. Fair sized shelters or temporary work offices are copies or simplistic adaptations of normal brick and mortar or metal constructions. FRP composite material is generally used for small units like security cabins. These, quite often are not modular in nature, but single shell delivered from local manufacturer to the site. It is expensive to send it remote areas, where the need is more. FRP use is usually restricted to canopies covering atriums, making decorative façade elements or 'pseudo stained glass' panels. Much needs to be done to integrate appropriate materials, construction techniques, transportability, suitability of use, aesthetic & marketability and quality. There is no systematic research done in this area or in the use of composite materials for construction.

Challenges

- Appropriate use of FRP material and using its properties viz., high specific strength, thermal insulation, corrosion resistance, electrical insulation, and resilience.
- Easy and quick erection of shelters.
- Temporary shelters to be dismantled and kept away for future use.
- Portable and Transportable.
- Joinery to be made simpler by incorporation of specially designed elements.
- Variety to be offered for different users or to satisfy different customer demands.

Modular System

Using modular architectural concepts helped to meet the above challenges effectively, by designing separate components that could be connected together in a predetermined manner. The characteristic of modular system is that you can replace or add / remove / substitute any one component (module) without affecting the rest of the system. Construction, using modular elements provides flexibility, so that with minimal changes, the structures can be altered to suit variety of uses. Through modular design and construction, benefits and economies of industrial production were combined with customized requirements of use.

Modular construction has to be precisely designed, as the modules are replicable and interchangeable. Modules are manufactured separately and are joined at site with quick fastening techniques. All major systems including mechanical, electrical, plumbing and finishes are to be completed in manufacturing plant, prior to shipping and installation.

Some more advantages of Modular Construction

Speed: From start to finish, a modular structure / building is erected in a fraction of the time compared to the traditional way of on-site building.

Cost efficiency: Modular components due to their repeatability, offer cost efficiencies of bulk purchase of materials and employment of mass manufacturing techniques. These also result in transportation efficiencies and therefore lower cost.

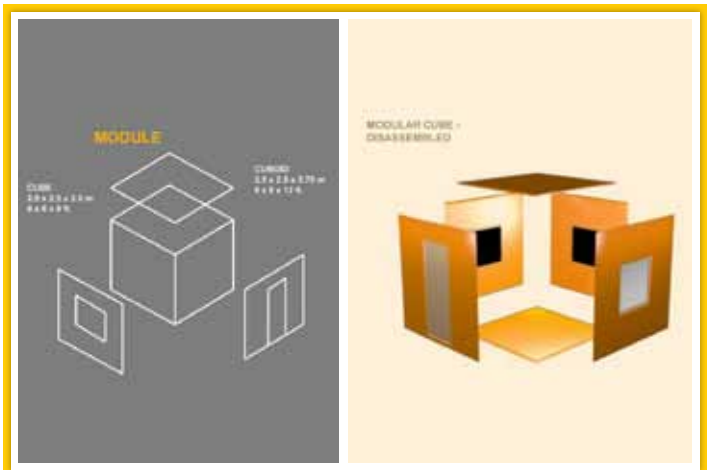
Portability: Temporary portable buildings can be relocated as needed, especially for schools, storage spaces, shelters, disaster relief camps, temporary hospitals / clinics, kiosks and project site offices, tourism and for seasonal events like festivals etc.

Keeping in view the above, modular construction was identified as the strategic design feature, around which research & design methodology was evolved. Another strategic feature was the collaboration with manufacturing and user agencies from the start of the project to get right feedback, improve the acceptance of the final product, and to ensure its implementation.

Following product (housing) ideas were generated and developed in detail.

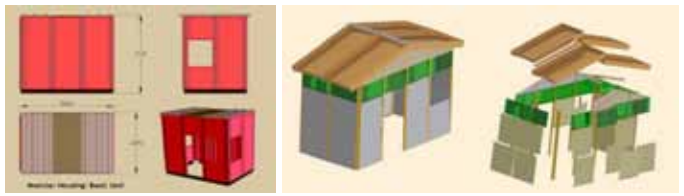
- Angan-wadi housing
- Beach Tourist huts
- Frangible cabins for housing instrumentation near airport runways
- Public toilet clusters

Conceptual explorations in modularity for housing applications



Modular Concept for enclosure and its structure

Extendable and interconnected 'Service Module' Concepts



Insulated Modular panels with uni-directional infinite extendibility

Concepts for Anganwadi:

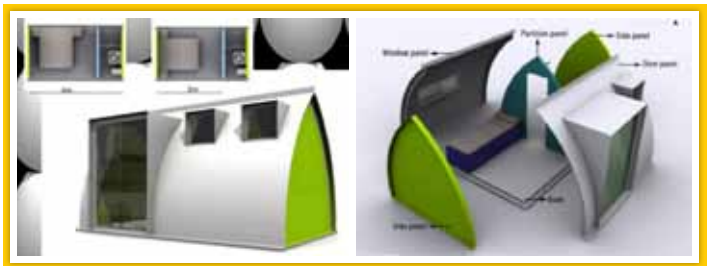
Insulated Modular panels with multi-directional extensibility

Experiments in Joinery

Joinery trials with models

Development of Tourist Beach Hut at Goa:

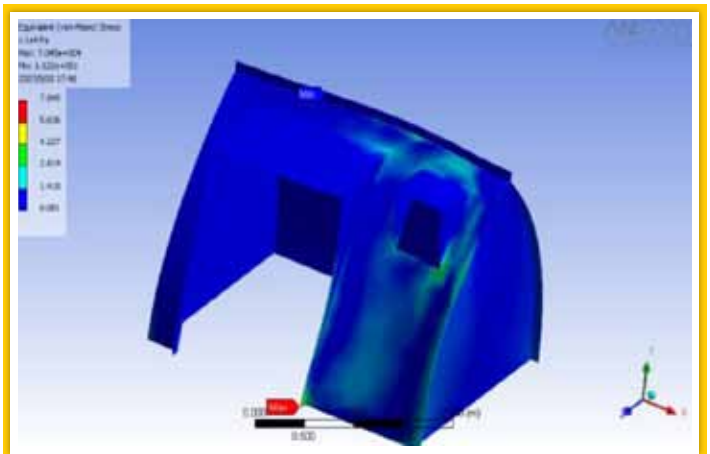
The condition of tourist shacks and huts was studied in Goa along with coastal zone regulations and local laws regarding such construction. Project aimed at developing habitable living room within the shacks to cater to tourist accommodation needs with appropriate amenities. The research conducted helped to develop appropriate, functional, economic and highly aesthetic concepts that can be rearranged, easily mounted & dismantled.



Double occupancy Beach Cabin

Single bed Beach Cabin

Polymer Composites in Modular Housing Systems



FE Analysis of the Beach Hut to check for wind load stability

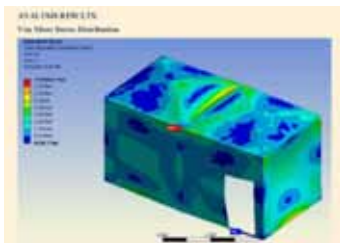
Development of Frangible Cabins for Bangalore Airport

The cabin is to house Instrument landing system and was erected near the runway. The special aspect of this cabin was that the structure would collapse on accidental impact from an aircraft so as not to damage the aircraft; and provide security to the instrumentation housed inside during normal times. FEM analysis was done to validate the concept.

Computer Model of Frangible cabin

Prototype of Frangible cabin

Exploded view Frangible cabin modules



FEM analysis of Frangible cabin

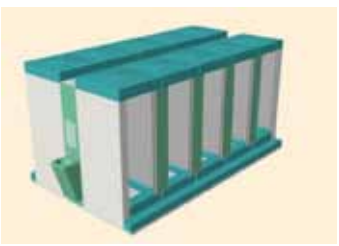
Outdoor Modular Toilet

It is necessary to install this utility where large public gatherings, like festivals, Melas take place, and in seasonal tourist resorts etc. Infrastructure, ergonomic requirements were studied and the design of 'modular toilet' for outdoor use was developed. The discharge from the toilet can be connected to the sewage or into a separate container from where it can be pumped out. The toilet unit comprises of Floor-cum-WC module, Roof module with 70-liter water storage tank, side, back and door panels. An urination panel has been incorporated in the back panel.

Fig. 14 Ergonomic / anthropometric evaluation

Single unit assembly with modules

Assembly for Toilet cluster-squatting type



Toilet cluster of 10 units

Unique Program

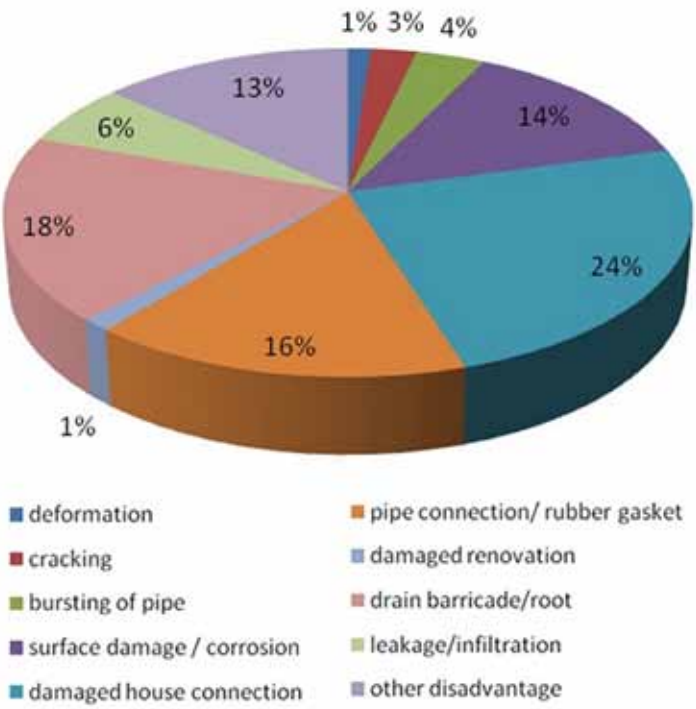
The above projects were supported by TIFAC (Technology Information, Forecasting & Assessment Council) ran a unique mission – Advanced Composite Program (ACP) to promote the use of composites in India. TIFAC has also supported projects like Modular Toilet for Rail Coaches, Luxury Houseboat for Kerala, Interior of 3-Tier Sleeper Coach for Indian Railways, all developed in composite materials, with technology and design inputs from IIT Bombay. In all these projects, design was the driving discipline and was integrated seamlessly with technology and manufacturing processes through appropriate product planning, conceptualization, human factors, aesthetic factors and concerns of all the stakeholders.

Helical Wound HDPE Pipes
A wonder material of construction

Mr A. R. Parasuraman
Chairman - Allied Solutions India Pvt. Ltd.

Over the last decades the inherent weaknesses of concrete, clay, ductile, PVC and steel caused tremendous problems in existing sewer pipe systems, as they tend to be brittle or are too sensitive to aggressive chemicals and soil conditions. Failures had become a common occurrence worldwide in sewer and other large-diameter pipe applications. In addition they have a unprofitable relation between cost and benefit.

Problems in existing sewage pipe lines



So selective companiesderived benefit from the fact that the processing of polyolifines is very easy and the plastic materials provide superior properties against adverse effects of the ambient and the chemicals.

In addition to the permanent solution that lasts through generations, helical woundHDPE piping system is able to provide everlasting and economic solutions in wide-ranging fields of applications as for example;

Low Pressure System:
- ❖ Drainage and Sewerage System
- ❖ Outfall Lines
- ❖ Tanks and Containers
- ❖ Reservoirs, Storm Water Tanks
- ❖ Relining
- ❖ Landfill
- ❖ Industrial Application

Pressure Pipe System:
- ❖ Drinking Water Supply
- ❖ Power Plants, Desalination

Material

Polyethylene (PE63, PE80 and PE100) and polypropylene are thermoplastics with excellent properties for the application of water and sewer, as well as for the fabrication of containers for liquids and solid materials. The environmental friendly polyethylene and polypropylene are resistant to many chemicals and very suitable for conveying and storing various liquids.

Helical Wound HDPE Pipes

A wonder material of construction

Currently the Indian PE Pipe Industry manufactures pipes sizes ranging from 16mm to 1600mm. These are widely used in agriculture, drinking water supply, drainage & sewerage, under water piping, relining and also for domestic gas reticulation.

Helical WoundHDPE pipes are a redefined Polyolifines Pipe system with unique features which makes **it a super engineering material of construction.** They are a great contributor in the infrastructure projects which is the current thrust of our economy.

Helical WoundHDPE Pipes offers total system integrity with the following advantages:

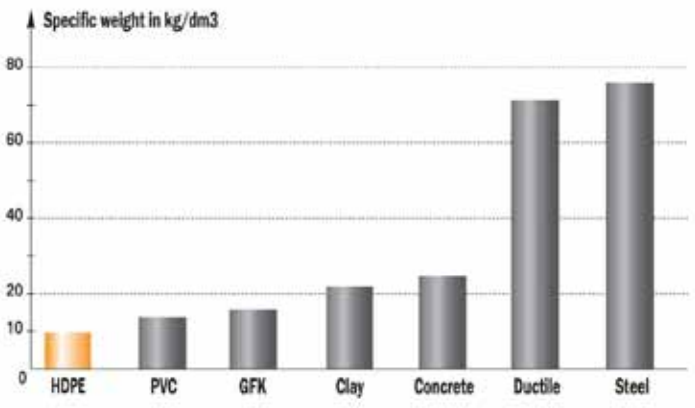
- Durability: Service life of over 100 years
- Time Saving in installation: Up to 30% savings when laying the light and flexible pipes with lengths of 6 mtrs
- Maintenance: The smooth inner surface reduces the maintenance and cleaning costs considerably
- Hydraulics: Due to the very good Hydraulic properties, smaller pipe diameters can be used compared to current traditional pipes
- Wider range: Sizes are upto 4000mm ID. In many occasions this wide range allows substantial saving from installing twin lines
- Tightness: 100% Tight Joints. No Infiltration or ex-filtration, no root penetration due to welded system
- Lengths: The standard length of 6mtrs reduces the number of joints
- Integrated Electro Fusion: Every length of pipe can have integrated Electro fusion arrangement
- Temperature Resistance: Can with stand temperature ranging from -40°C to +80°C.

- Environmental Friendly: All materials can easily be recycled and lead back into the production cycle
- Flexibility: The pipes are secure against fracture, even in case of earth movement
- Easy Handling: Due to light weight and the quick assembly, the pipes are very easy to handle
- Ductile material, No brittle fracture

Helical WoundHDPE pipes are produced through extrusion process, where a profile is wound on a collapsible steel mandrel. As required this profile can be of solid wall or structured wall.

Specific Light Weight

The Helical WoundHDPE pipes have a very low weight and therefore are easy to handle during installation, which makes the usage of a crane on site in most of the cases unnecessary.



Standards:

The pipes would meet also the current international standards such as DIN 16961, ASTM F894, JIS K 6780, ISO 9969, ATV A127, ATV A110, EN 1610, ISO 29561, ASTM F2720-08 etc.

The pipes can be produced of the following thermoplastic materials:

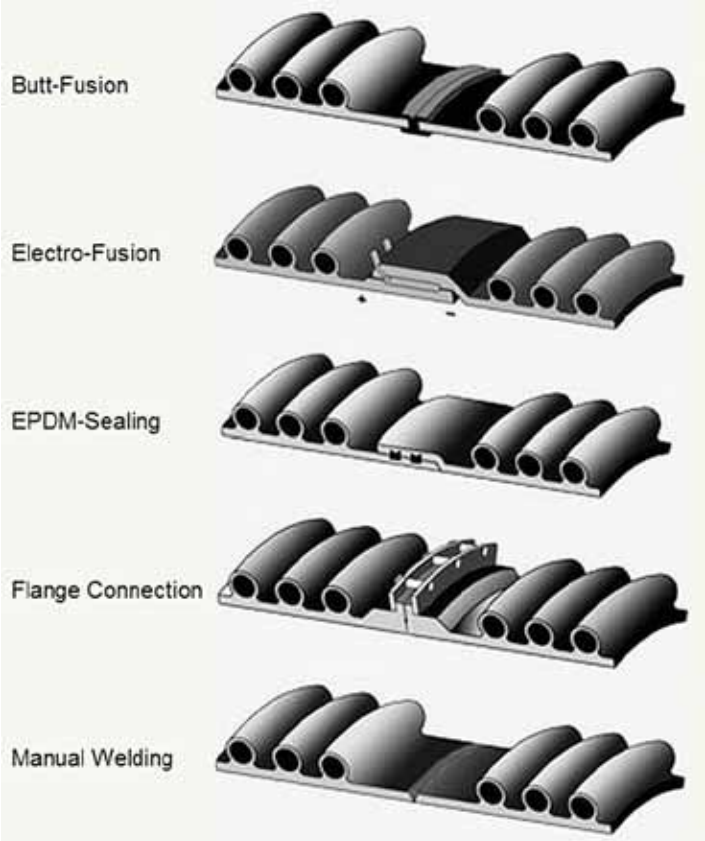
- High density polyethylene(PE80 and PE100)
- Polypropylene-random (PP-R)
- Polypropylene-homo (PP-H)
- Polypropylene-none-flammable (PP-S)

Welding Technology

The pipes are produced automatically along with socket and spigot, and can be joined through various methods such as extrusion welding, butt fusion welding, flange connection, gasket connection and electro fusion fittings.

Abrasion resistance

Polyethylene and polypropylene pipes are among the most abrasion proof pipes. This has been tested in the so-called Darmstadt procedure and confirmed the quality of polyethylene pipes. Tests have been performed at the "Süddeutsche Kunststoffzentrum" for its approval.



Effective Roughness

The absolute roughness of plastic is between 0,0015 [mm] and 0,1 [m]2.

- Due to this low roughness there is almost no accumulation on the pipe bottom for Krah pipes
- Hdpe pipes have the ability of "self-purification" (self-cleaning).
- Low roughness has an important economic advantage as the maintenance expenditures are reduced to a minimum.

COMPARISON Helically Wound HDPE AND CONCRETE/-PVC/-GRP/-CORRUGATED PIPES

Description	HDPE PIPE	CONCRETE PIPE	PVC PIPE	GRP PIPE	CORRUGATED PIPE
Handling costs	Extremely low weight therefore allows a much easier and quicker installation of the pipes, as in most cases no heavy machinery is necessary for the installation and handling of the pipes. Most of the handling can be done by a usual excavator on site.	The pipes are heavier and require lifting arrangements especially for large diameter pipes.	PVC pipes are about 1/5 the weight of an equivalent cast iron pipe and from 1/3 to 1/4 the weight for an equivalent cement pipe. Thus, the cost of transportation and installation is cut down enormously.	GRP pipes are light in weigh by 1/10 of P.S.C. 1/5 of steel and 1/8 of C.I. Thus, Fiber Tech GRP pipes provide easy and faster installation, handling, modification and repairs.	Corrugated pipes are tough, light and flexible pipe

Helical Wound HDPE Pipes

A wonder material of construction

Working Services (Life Time)	Life expectancy is conservatively estimated to be at least 100 years, using the standard design basis, compared to conventional pipe materials that often only have a life expectancy of about 10 – 20 years.	Concrete is a very brittle material and damages are often due to movements of the pipe during and after the installation	A 20 years safe life estimated for PVC Pipe.	There is no increase of friction losses in GRP pipes, depending on the ageing of materials along the 50 years lifetime of design and 100 years lifetime of service.	Service life of 50-100 years depending on soil type
Connection-Methods	Krah pipes are produced automatically along with socket and spigot, and can be joined through various methods such as extrusion welding, butt fusion welding, flange connection, gasket connection and electro fusion fittings.	The pipes are joined together through fittings with rubber seals to ensure no water leakage at the joints.	The pipes are joined together through rubber sealing	The pipes are joined together through special formed sockets and rubber sealing	The pipes are joined together through special formed sockets and rubber sealing
Soil Settlement Area	Resistance to acids, alkalis, high temperature or corrosive wastes, and corrosive soils	Resistance tocorrosive soils	Non-resistance to corrosive soils. Due to smoothness of inner surface of PVC Pipe, it prevents Algae, Bacteria and Fungi Formation inside the pipe.	Though GRP pipes have excellent corrosion resistant properties, they can suffer strain corrosion in acidic environments.	Resistance to corrosive soils
Flexibility	Because of the spiral-wall-construction the pipe is flexible and still has an axial flexibility – which is very helpful for good and quick installation of sewage pipes, by considering the spring line.	The pipes are not flexible	The pipes are flexible and resistance to breakage	The pipes are flexible and resistance to breakage	The pipes are flexible and resistance to breakage
Production	The setup time for a product change is very short (between 5-15min). So no big investment in a pipe stock is needed.	Long set up time	Short set up time	Long set up time 8 to 12 hours	Long set up time especially for large dia
Pipe Installation	According to EN1610	According to EN1610	According to EN1610	According to EN1610	According to EN1610

	Easy fusion with every diameter easy handling in cause of low weight pipes	For the fusion of the bigger diameter you need special chain hoist	Difficult fusion to other pipe materials	Possibility to connect to other pipe materials. Connection by integrated flanges	For the fusion of the bigger diameter you need special chain hoist
Pipe Quality and pipe application	Monolithic piping system, all components are made of the same material	Non monolithic piping system, not all components are made of the same material (jointing)	No monolithic piping system	Monolithic piping system when lamination is used	No monolithic piping system
	Easy to connect with valves, armatures etc. by integrated flanges	Special solutions necessary	Not easy to connect with valves, armatures	Easy to connect with valves, armatures etc. by integrated flanges	
Standards	-DIN 16961 -DIN 19568-100 -ASTM F 894 -ATV A127, ISO 9969 (static load) -ATV A110 (hydraulic dimensioning) -DIN EN 1610 (installation of pipes) -DVS 2207 (welding of pipes)	DIN EN 1916 -DIN V 1201 -DIN EN 639 -DIN EN 640 -DIN EN 1610 (installation of pipes)	-DIN 8061/62 -DIN 19634 -DIN EN 1401-1 -DIN EN 13598-2 -DIN EN 1610 (installation of pipes)	-ISO 12709 -ISO 14402 -DIN 16965-66 -DIN 61855 -ASTM D 3517, 3567, 3754, 3262 -ASTTM D 2992, 2996, 4161 -DIN EN 1610 (installation of pipes)	-DIN 16961 -DIN EN 13476 -ASTM F 894 -ATV A127, ISO 9969 (static load) -ATV A110 (hydraulic dimensioning) -DIN EN 1610 (installation of pipes) -DVS 2207 (welding of pipes)

Helically wound HDPEKRAH pipes provides wide range of diameter from 300mm to 4000mm ID in all pressure classes.

A complete monolithic system can be manufactured by using this Technology
Bends, branches, laterals and reducers

Manufacturer of this technology is Krah AG, located in Germany.Krah has manufactured these lines for the last 20 years and have numerous installations.

No. Of Installations Worldwide:

Sr.	Countries	No. of Machines
1.	North & South America	9 Nos.
2.	Europe	25 Nos.
3.	Pacific Asia	21 Nos.

As per the requirement of the customer, Krah AG can provide secured finance through the German Export Credit Insurance Agency "Euler-Hermes"

Krah pipes are approved by Becetel – Belgium

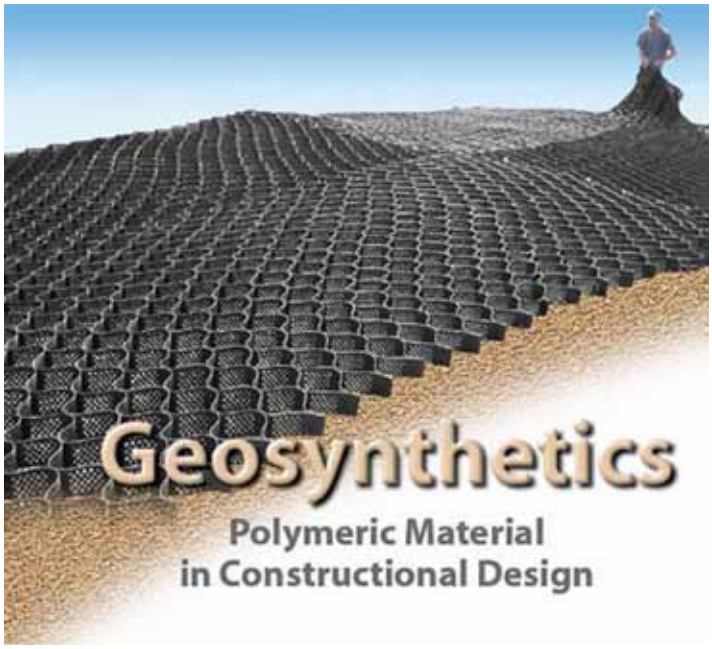
Snippets

Global demand for geosynthetics to increase 8.3% pa in 2015

Worldwide demand for geosynthetics is projected to increase 8.3% pa to 4.5 billion square meters in 2015, as per Freedonia. This growth rate is an acceleration from the gains of the 2005-2010 period, reflecting in part the reduced 2010 bases of the developed countries. Advances are being driven by the increasing market penetration and large-scale construction plans in place in many developing countries. In 2010, North America was the largest regional market, accounting for 31% of global sales. The US is the world's largest individual country market, with one-quarter of total sales. Growth in North America benefits from the massive size of its construction sector, which is expected to rebound through 2015 from a low 2010 base, as well as the need to maintain its large transportation infrastructure. Gains are also aided by the region's building codes and environmental protection regulations. The Asia/Pacific region was only slightly smaller, accounting for 30% of global geosynthetics sales in 2010. However, this region is projected to achieve the fastest growth rate through 2015, primarily driven by China, which is expected to account for nearly half of new global demand generated between 2010 and 2015. China's gains are primarily due to amount of available land, its ongoing development of large-scale infrastructure projects, and the need for erosion control. India is also expected to post double-digit annual growth through the forecast period, with sales nearly doubling by 2015, albeit from a much smaller base. In many of the least developed countries, however, growth for geosynthetics will be more limited, due to lack of adequate funding, a lack of regulations that require their use, and the presence of lower-cost alternatives. Western Europe and Japan are fairly comparable to the US in terms of the level of maturity of their respective geosynthetics markets, as well as the type of regulatory environment. Both of these areas are expected to rebound from reduced 2010 bases, benefiting from improved construction activity and high level of concern for environmental protection. Gains in these areas are forecast to be the slowest among all regions through 2015, indicative of Western Europe and Japan's relative maturity. However, the affluence of these countries allows them to use advanced geosynthetic technologies despite their larger upfront costs.

In 2010, the construction market accounted for the largest share of geosynthetics sales with 34%. It will also register the fastest gains through 2015, albeit from a reduced 2010 base, as construction activity improves. This market benefits from factors such as the passage of environmental regulations, including those regarding sedimentary runoff from construction sites, as well as the increasing need for erosion control and other practices to protect against soil loss in a growing number of countries. Transportation infrastructure, the second largest market in 2010 (28%), is expected to post above-average gains through 2015 aided by the increasing use of geosynthetics in these projects, and the ongoing extension of paved roads and railways. The landfill market is another key area for geosynthetics, as a growing number of countries adopt modern landfill designs and operations.

Geotextiles are permeable textile materials which are designed for use in civil engineering applications such as erosion control, soil stabilisation, reinforcement, separation and drainage. The use of geotextiles can save money by considerably reducing construction times, material costs and the costs of maintaining structures. As per textiles intelligence.com, geotextiles form part of a group of materials known as geosynthetics, together with geogrids, geonets, geomembranes and geocomposites. Geotextiles can be made from nonwoven, woven, knitted or knotted materials. Most, however, are nonwoven-including needlepunched constructions. Needlepunched nonwovens are used mainly in subsurface drainage applications along highways, within embankments, under airfields and athletic arenas. They are also employed in soil separation, permanent erosion control and geomembrane liners within landfills. Such materials are required to provide enough strength and abrasion resistance so that they can withstand stresses during installation and in use. The world geotextile market is enjoying strong growth but it is also highly competitive. In order to succeed, geotextile manufacturers have to develop cost effective, innovative products and processes. Furthermore, to increase their competitiveness in the global geotextile market, they must identify market requirements and introduce advanced products which are specific to customers' requirements.



The use of geosynthetics—geotextiles, geomembranes, drainage composites and geogrids—is an annual growth market in the U.S./ Canadian specialty fabrics industry, as per IFAI Market Research. Prior to 2009, the U.S./Canadian geosynthetics market grew 5-6% pa before the economic debacle of 2009. In 2009, the use of geosynthetics declined about 5% in the U.S. and Canada; but growth rebounded to about 2% in 2010.

Developments driving optimism in the U.S. market for geosynthetics include:s

- The U.S. EPA announcing in the spring of 2010 that it plans to regulate coal ash containment sites, requiring that all sites be fitted with liners (geomembranes); the result translates to US$300-350 mln for the geosynthetic industry over the next 5-7 years
- Improving U.S. GDP growth to 2.8% in 2010 after achieving an abysmal negative 2.6% in 2009; U.S. GDP for 2011 is projected to reach 3.3 to 3.6%

Constraining growth:

- Continued high unemployment in the U.S., which averaged 9.6% in 2010
- Rising oil prices in 2010 and 2011 will continue to lead to higher prices for raw materials such as polypropylene, polyethylene, etc.
- Local government reduced budgets that curtail funds available for geosynthetic usage in key markets like road and bridge construction

The 2010 U.S./Canadian geosynthetics market improved moderately in terms of sales and general business conditions. The majority of geosynthetic suppliers/distributors are optimistic that 2011 will yield increased sales and an overall improvement in general business conditions.

Source courtesy : plastemart.com

Snippets

Flexible geomembrane and solar PV technology for solar-powered landfills

Landfills are a highly engineered environment, designed to safely contain decomposing waste and methane while keeping out the elements. Energy and waste-disposal companies recognize that landfills are not just burial sites for garbage, but reactors where gases produced by decomposing waste can be used for energy production.

At the Tessman Road Landfill in San Antonio, Texas, Republic Services Inc. has incorporated a biogas-to-energy recovery system into one of its 213 landfills. The project is taking energy recovery to a new level, including installation of a geomembrane landfill cover that includes flexible solar technology that will help power a sustainable energy park. By combining a first-of-its-kind solar technology with an existing biogas-to-energy system, the company is turning the landfill into a sustainable energy park. This green energy venture covers portions of the closed areas of active landfills with flexible, laminate-type photovoltaic (PV) solar collection strips. The flexible solar laminates, which capture the sun's rays for conversion into electricity, are adhered directly to the synthetic, green-colored geomembrane used to cover and close landfill cells as they reach capacity. Unlike traditional rigid solar panels, which are bulky and frequently cost-prohibitive to install, this system uses flexible, nonreflective collection strips less than 0.25in. thick. The flexible solar strips can be configured to maximize the hours of sunlight exposure throughout the year, depending upon a landfill's design and site contours.For this demonstration project, the company is partnering with CPS Energy, Greater San Antonio's electric and natural gas provider, to deploy 5.6 acres of the 680-acre landfill with the solar energy cover, attaching more than 1,000 flexible solar strips to the landfill's south-facing sideslope. The new solar cover will complement the landfill's existing biogas-to-energy system, in operation since 2002. The system collects and processes biogas, which is produced naturally at the landfill through the decomposition of waste. The solar strips, which have flexible photovoltaic silicon cells that convert sunlight directly into electricity, will complement the amount of renewable energy provided by the landfill. With more than 300 days of sunlight per year in San Antonio, Republic estimates that the energy produced by the two fully-operational systems, will continuously create about 9 megawatts of power-enough to power 5,500 area homes.

Spectral Power Cap has developed a first-of-its-kind 45-acre landfill cover combining flexible geomembrane and solar photovoltaic (PV) technology into a dual-purpose system to close the landfill and generate solar energy. The geomembrane is made of thermoplastic polyolefin, similar to the material used on commercial white roofs. It contours to the shape of the landfill and can flex over time, maintaining a snug fit. The innovation is the integrated solar panels. About 7,000 flexible 144-watt PV panels are factory bonded to the geomembrane, shipped to the landfill, unrolled on site, and welded together into a solid cover. The PV panels are Teflon-coated, durable enough to walk on, and connected by a million feet of wire to four inverters that sends the solar energy onto the grid. All in all, the Spectral Power Cap combines four 250-kilowatt arrays covering 10 acres into a total operating capacity of one megawatt, enough to power 224 homes. Best of all, the system makes money for the landfill operators through an agreement with Georgia Power to sell the energy into the wholesale electricity market. The Conley geomembrane is the largest of its kind, much larger with more generating capacity than two similar installations in New York and Texas, and its success could lead to many more systems across the country. Since a lot of these landfills are built in urban settings, and are close to transmission lines, this type of system can be built across the country.

The Hickory Ridge Landfill Solar Energy Cover uses approximately 7000 solar panels to generate more than 1 MW of renewable electricity. Republic Services, who used the EGSC system, has also used this technology to perform partial closure at its Tessman Road Landfill. The 35 acre closure at Hickory Ridge converts the landfill into a solar park, transforming a liability into a revenue stream with the following potential benefits:

- Landfill post-closure care cost savings
- Solar incentives and rebates for project construction
- Solar renewable energy credits
- Sale of renewable power
- Carbon cap and trade credits
- Positive image of sustainability and energy independence

The Hickory Ridge Landfill closure represents a milestone in the solid waste industry because it replaces the prescribed Subtitle D closure cap with an alternative cap system, which provides a number of environmental and economic benefits. The transformation of a landfill that has reached its design capacity into a commercial sized solar energy facility is an extension of the "solar moment" in the solid waste industry, realized earlier in 2009 with HDR Engineering Inc.'s design of Republic Services Tessman Road Landfill Solar Energy Cover. This project represented the first design and installation of a solar landfill capping system, integrating an exposed geomembrane cap design and modern photovoltaic technology with a landfill closure. The Hickory Ridge Landfill in Georgia capped the majority of a 35 acre landfill with the same type of alternative exposed geomembrane solar capping system as that at Tessman Road Landfill. This system allows a closed landfill to generate revenue while eliminating the ongoing maintenance costs of mowing and soil replacement. With this

technology, long term care has a new positive economic and sustainable component that may change the way landfill closures are approached in the future. The EGSC was engineered to meet all EPA landfill closure requirements, while providing a stable surface on which to mount an array of thin, flexible photovoltaic laminates for large-scale renewable electricity generation. For the geomembrane portion of the system, HDR used a 60-mil reinforced TPO (thermoplastic polyolefin) roofing material with a long history of successful application and performance characteristics, including UV resistance, seam strength, chemical and puncture resistance and interface friction. The Hickory Ridge solar energy cover caps three tiers of southerly-facing landfill side slope and crown. There are benches, or relatively flat areas, separating the tiers. The panel layout design includes 580 sub-arrays made up 12 panels each. The solar panel area of the closure is approximately 10 acres. The solar panels are laid out to allow access to landfill utilities such as landfill gas collection wells, while also designing it for cost effective wiring and efficient electrical operations. The entire array of panels and their accompanying infrastructure are installed on the exposed geomembrane to produce year-round renewable electricity during the 30-year post closure long-term care period and beyond. Exposed geomembrane caps are designed to outperform traditional landfill closure designs with greater environmental protection, at less than half the material cost of a conventional Subtitle D prescribed landfill closure. As per Mark Roberts, senior project manager for HDR, when comparing a solar energy cover to a traditional closure, what appears to be a missing component - the lack of topsoil or vegetative support above the geomembrane - is actually design strength. The exposed geomembrane anchors directly into the landfill whereas a traditional Subtitle D closure drapes the geomembrane atop the landfill, holding it in place with soil layers that shift and erode over time. The solar energy cover system takes advantage of the strength and flexibility of the geomembrane material to provide a final cover that is engineered to encapsulate the waste mass. A traditional cover system uses soil to act both as a ballast for the underlying geomembrane and also as a material to support the overlying vegetative growth. Furthermore, at many landfills, weather conditions can make it difficult to consistently maintain the vegetative cover, leading to an overall loss of top soil materials and organic nutrients. Conversely, a solar energy cover is designed for both long-term outdoor exposure and to withstand specific weather events. The solar energy cover is anchored directly into the landfill with a series of horizontal and vertical anchors. These strengthen the overall liner system by limiting the stresses and strains the material encounters during a storm. Veneer type slope failures resulting from saturated soil conditions are a critical consideration inherent in conventional landfill closure systems. Saturated cover soil conditions can occur for a number of reasons such as changes in flow due to differential settlement, erosion, and clogging of the drainage layer. With a solar energy cover system, there are no soil or geosynthetic layers that can slip, slide and pull away from the liner in the event of saturated soil conditions. The design of the solar energy cover creates an easily maintained, durable and stable surface that conforms to landfill surface variations with long-term reliability for both energy generation and environmental protection. In conclusion, a solar energy cover creates a new source of renewable energy, helping communities pave the road to energy independence with creative land re-use and potential for widespread application on many other types of brown fields.

Source courtsey : plastemart.com

Increased spending on infrastructure development and construction to drive robust growth for geosynthetics

Geosynthetics is a term that is being increasingly heard across the construction industry these days. Although geosynthetics has been in existence for a well over five decades now, it is only in the last decade or so that the utilization of the technologies on a regular basis has been done for infrastructure, in most parts of the world.

Global demand for Geosynthetics is expected to reach 6.9 bln sq. yards by 2015, as per report by Global Industry Analysts, Inc. Increased spending on infrastructure development activities, residential and non-residential construction operations are expected to drive demand for geosynthetics, globally. Geosynthetics are polymer-based synthetic materials, which are used with rock, earth, soil, or other materials associated with geotechnical engineering, for facilitating cost efficient projects in transportation, building, construction and environmental sectors. Transportation sector offers growth opportunities due to the ability of geosynthetic products in enhancing durability of roads, improving drainage facilities, and facilitate construction of erosion-preventing structures. All these are achieved at a lower cost as compared to traditional products. Landfill market represents another key focus area for geosynthetics (geomembranes), owing to their increased usage in sealing waste containment areas and leachate pits. Asia-Pacific, Europe, and the United States dominate the global geosynthetics market while emerging markets such as Russia, China and India are expected to exhibit robust gains, driven by enhanced focus on infrastructure development, change in regulations pertaining to environmental protection and development of construction codes. Rising consumer preference for geosynthetics over traditional materials is expected to increase demand for geosynthetics in China. In the United States, growth in the geosynthetics market is led by increased spending on highway and road construction sectors, as part of the infrastructure rehabilitation and rebuilding programs. Demand for geotextiles is expected to grow steadily, owing to low cost as well as structural and drainage support properties. Major players profiled in the report include CETCO Lining Technologies Group, CONTECH Construction Products Inc, Firestone Specialty Products Company, Propex Operating Company LLC, Royal TenCate NV, Tenax Corporation, and Tensar International Corporation Inc.

Demand for geosynthetics in the US is expected to increase 7.7% pa to US$2.9 bln in 2015, as per reportlinker.com. This rate is acceleration over the gains posted from 2005 to 2010 given that sales of certain types of geosynthetics were sharply restrained during the recession that occurred in the latter half of that period. Funds made available through the American Recovery and Reinvestment Act, however, helped mitigate the recessionary effects and spurred sales in 2010. Going forward, growth will be driven by a projected recovery in construction spending and transportation infrastructure expenditures through 2015. Gains will also be boosted by strengthened regulations regarding

landfill containment and stormwater runoff from agricultural, construction and industrial sites. The continued development of time- and costsaving applications for geosynthetics, as well as the increasing availability of more durable and effective geosynthetics, will also contribute to value gains. Geosynthetics in the landfill market made up 34% of value demand in 2010. This position is primarily because of regulations that result in landfills using high value geomembranes more frequently than many other markets. Geomembranes help prevent contamination of the surrounding land and groundwater with leachate. In terms of area, transportation infrastructure, which benefited most strongly from the stimulus funds, was the largest market for geosynthetics in 2010, with one third of demand (but only 20% of value demand). The most commonly used geosynthetics in this market are geotextiles, which are relatively low cost products compared to other geosynthetics. Through 2015, geosynthetics used in the construction market are expected to post the fastest annual growth rate in both value and area terms, although from reduced 2010 bases, as construction spending activity recovers. Additionally, increasingly strict stormwater runoff regulations will boost sales of geosynthetics used on construction sites. The small but growing market for geosynthetics in residential landscaping and decorative applications will also contribute to demand gains. In terms of value, geomembranes made up the greatest share of the geosynthetics market, with 50% of demand in 2010. However, geotextiles was the largest segment in area terms in 2010, representing 72% of demand. Through 2015, geonets, a relatively niche product, are expected to achieve the fastest gains, employed in drainage applications due to stricter government regulation requiring their use.

As per a report by Freedonia, US demand for geosynthetics is projected to advance 6.8% pa through 2015. Nonwoven and woven/knit geotextiles will remain the dominant segment and offer good growth prospects, driven by construction and transportation infrastructure markets. Geonets will achieve the fastest gains from a much smaller base. Gains will be promoted by increased road and highway construction spending as federal, state and local transportation agencies rebuild and rehabilitate the nation's transportation infrastructure. The construction market will continue to be the leading market for geosynthetics, in area terms, primarily due to the application of geotextiles to provide support, drainage and erosion control in construction projects. The transportation market will offer the strongest growth rate for geosynthetics through to 2012. The report further shows that increased interest in recycling and reducing wastes, as well as the durable nature of geosynthetics used in the landfill market, will restrain advances. Other markets may provide some niche opportunities, especially agriculture and mining, due to interest in increasing crop yields to make biofuels and an expansion in the US mining industry.

As per an earlier report by Freedonia, demand for geosynthetics is projected to advance 2.5% pa to 905 mln sq yards in 2012. Gains will be promoted by increased road and highway construction spending as federal, state and local transportation agencies rebuild and rehabilitate the nation's transportation infrastructure. Geosynthetics can be used to improve the lifespan of roads and other structures by stabilizing foundations, promoting drainage and preventing erosion, generally at a lower cost than alternative

products. As many construction projects are subjected to competitive bidding processes, use of geosynthetics will be specified instead of more expensive materials. Further gains in demand for geosynthetics will be promoted by continued nonresidential construction spending and an acceleration in residential building construction expenditures. In value terms, demand for geosynthetics is forecast to advance 4.2% pa to US$2.1 bln in 2012. Advances will be spurred by demand for high per formance geosynthetics such as geomembranes, geogrids and preformed geocomposites. These geosynthetics offer improved performance properties than less costly geosynthetics and can provide better long-term value. Geomembranes to continue claiming most market share In 2007, geotextiles accounted for 71% of demand in area terms because of their low cost and their drainage and structural support properties. In value terms, however, geomembranes accounted for the largest share of the market, comprising 47%, as geomembranes are significantly more expensive in unit terms than other geosynthetics. Geomembranes will continue to hold the leading share of demand in value terms in 2012, although demand gains will be restrained by moderating petroleum prices.

Through 2012, the construction market will continue to be the leading market for geosynthetics, in area terms, primarily due to the application of geotextiles to provide support, drainage and erosion control in construction projects. The transportation market will offer the strongest growth rate for geosynthetics through 2012, as geosynthetics will be used to make roads more durable, to improve drainage and to construct structures that prevent erosion. In value terms, the landfill market accounted for the largest share of geosynthetics demand in 2007, due to the frequent use of high-cost geomembranes in landfills to seal off leachate pits and waste containment areas. Through 2012, however, demand gains in value terms will advance at a below-average pace. Increased interest in recycling and reducing wastes, as well as the durable nature of geosynthetics used in the landfill market, will restrain advances. Other markets may provide some niche opportunities, especially agriculture and mining, due to interest in increasing crop yields to make biofuels and an expansion in the US mining industry.

With the increased emphasis on sustainability and with Geosynthetics helping in improving long-term environmental security, across various sectors including, road building, waste management, wall reinforcement, etc, it is not surprising that specialized geosynthetic products are in demand in India. Several leading players, global, as well as domestic, have now established base in India, which is a pointer to the rising demand. Some of the industry leaders in the field include names such as Terram Geosynthetics Pvt Ltd, Techfab India Industries Ltd, Geosys India Infrastructures Pvt Ltd, and Gabion Technologies. While the Indian market may be still at a nascent stage and have some catching up to do with its developed counterparts, there is no denying the growth pattern. The potential of the Indian market can be gauged from a FICCI 2009 report on the industry, which had indicated that it would be an Rs.300 crore market for geosynthetics in 2012. Given the fact that the industry is growing at a CAGR of 10-12%, the current market for geosynthetics can be pegged at around Rs.270 crore. With the 12th Plan Period envisaging an investment of US$1 trillion for infrastructure development and a buoyant real estate sector, the next few years could herald a new era of rapid growth for the geosynthetics industry. The continued impetus to infrastructure development in India has meant that the demand for geosynthetics is expected to rise quite significantly in the near future.

Geotextiles find typical application in areas such as separation, erosion control and filtration & drainage. They offer a slew of advantages over conventional methods, improving construction efficiency, while at the same time being a cost effective solution. Major areas comprise of RE walls for flyover construction, ground improvement, engineered landfills, pavement strengthening, slope protection, erosion control, etc., thus highlighting the important role played by geosynthetics in infrastructure development.

Geosynthetics is an area where rapid changes are taking place in almost every aspect, whether it is geotextiles, geogrids, geosynthetic clay liners, geofoam, geocells, drainage infiltration cells, or geocomposites. The fact that geosynthetics enable a range of functions including separation, reinforcement, filtration, drainage and containment is what is making geosynthetics the favourite with engineers and contractors globally. With increased emphasis on sustainability, there has been widespread research going on in the field of geosynthetics and their ability to help in reducing environmental impact in construction sites. The last few years have seen an increase in the number of published examples of demonstrated reduced carbon footprint in projects where geosynthetics were used. The use of geosynthetics, particularly in the case of bunds and embankments, walls and road construction

has been examples of the key role that geosynthetics can play in enhancing sustainability. Apart from reduced costs of material, geosynthetics also enable short-term environmental benefits such as reduction in noise pollution and wastage. The long term benefits include reduction in embodied CO2, in projects where geosynthetics have been used.

Geosynthetics is one field where the need for specialized expertise cannot be but, overemphasized. It is often stressed by experts in the field that geosynthetics will work only if they are properly understood by design engineers and handled/installed property on site. The process however, is easier said than done because geosynthetics are more often than not buried and therefore, don't get the necessary attention. Poor handling on site or a sharp construction equipment can quite easily pucture or tear a geomembrane. The successful adoption of geosynthetic products is heavily reliant on experienced understanding in design and installation. With increased R&D focus, it is not surprising that the application areas of geosynthetics today range all areas of civil engineering. Few application areas include:

- Subgrade separation and stabilization in highway and airport pavements
- Reinforcement of the granular subbase/base layers of highway and airport pavements
- Railway trackbed stabilization
- Moisture proofing and reinforce-ment of asphalt overlays
- Drainage of roads, airports, railway tracks, sports fields etc.
- Reinforced soil retaining structures for approaches to flyovers, road over rail bridges, underpasses and bridges, hill roads, development of residential and commercial sites etc.
- Reinforced soil slopes for construction of embankments, hills roads, landslide repair etc.
- Gabion retaining walls
- Construction of road and rail embankments on weak ground
- Reclamation and ground improvement for ports
- Coastal protection
- Riverbank protection
- Scour protection of bridges and hydraulic structures
- Lining systems of municipal solid waste and hazardous waste landfills
- Tunnel linings
- Rock-fall protection

The Indian market for geosynthetics is gradually evolving with newer products and technologies, making their impact. Intensifying competition has meant a wider choice of geosynthetic products is available in the market. Leading players are leaving no stone unturned when it comes to offering quality products that also hold an edge over competiting products. Thermally bonded nonwoven geotextiles are manufactured using continuous filaments of polymer which are sprayed onto a moving belt. The sheet of sprayed filaments is passed through an oven where the filaments are compressed and bonded together at a high temperature. This process gives High tensile strengths and high Puncture resistance (CBR) with optimum pore sizes and required permeability. Terram has a unique polymer composition of polypropylene (PP) and polyethylene (PE). This unique polymer combination provides excellent resistance to chemical attack within aggressive soil conditions. As per www.masterbuilder.co.in, just as in the case with other areas of civil engineering related products and services, the typical Indian customer today is no longer driven only by price. Increased emphasis on quality and sustainability issues has meant that customers today want a value proposition and not just a product. While it is true that geosynthetics is a growing field in the country, it must be also accepted that there is still some catching up to do, if the Indian market were to be spoken of in the same breath as some of its developed counterparts. Just as in the case with all other civil engineering concepts, the dissemination of reliable information on geosynthetics holds the key to how fast the market for geosynthetics grows in India. The communication mechanism, whether it is within professional associations, or in educational institutions, or from the manufacturers to the contractors and customers, holds the key to the growth of the market. However, there is also no denying the fact that the growth process has started in the right earnest, in the last decade. With the continued emphasis of the government on infrastructure development and other key areas such as ground improvement, waste management, coastal and river bank protection, irrigation and flood control, ports, etc, the gradually rising awareness levels, geosynthetics is one area, whose growth chart can be confidently said to be going only in one direction- upwards.

Source courtesy : plastemart.com

Role of Plastics in Infrastructure on Streets and Roads

Mr L K Singh
Managing Director, Fioxopan Machines Pvt. Ltd.

In today's age and date, some things can't be avoided. All of us have to use the roads and streets, practically daily and most of the day and probably night. Roads are the main mode of goods transport in India and almost all over the world. They have become one of the most important man created facility.

As always Plastic has multi-folded applications on streets and roads. Since roads are the most apparent and obvious part of a country, they have to be modern and updated and well maintained, ill maintained streets and roads, give a very poor impression to the users and specially the tourists. It is necessary to modernise the roads, signages, advertisements, and road side facility for the travellers. Plastic plays a major role in providing safe, efficient and economic solutions.

We may not notice but in fact plastic in road furniture could be as much as 20 tons per km in the advance countries.

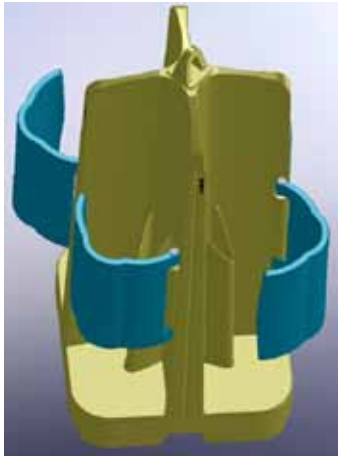
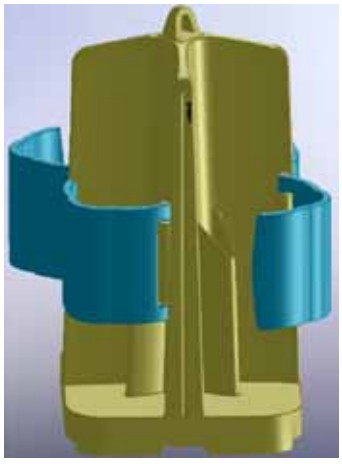
Besides renovating existing road projects, the new projects of 35,000 Km alone may need over half million tons of polymer, if not more.The existing road upgrades will also call for a substantial demand of these products in the infrastructure. This is excluding any geothermal or automobile applications on road.

There are applications like :

- **Road barrier -** it is safer, saving human lives, minimising vehicular damage, very easily handled, transportable, stackable, in very bright colors, making it the most visible product dividing the road traffic. It can be used for human safety to avoid passerby in unwanted areas.

- **Road cones -** it is safe, very easily handled, transportable, stackable, in very bright colors, making it a very instant use product under normal or maintenance or accident emergency conditions.


- **Toilets and urinals -** an obvious necessity, often neglected in our country.

- **Septic tanks -** a necessity to go with the remotely located toilets and urinals.


- **Waste bins -** an absolute necessity to avoid littering and keep our streets clean.

- **Traffic lights -** a necessity on streets.
- **Traffic bollards –** to direct the traffic to the right direction on crossings.


- **Road signages-** a necessity and India needs to improve the lit and plain signages.

- **Billboards -** an inevitable utility, for easier, lighter and practical product.
- **Benches and seats -** an inevitable utility, for easier, lighter and practical product.
- **Decorations -** like planters, country logos etc.

These are a few examples and the calculations can reach huge consumption of polymers.

There are other applications like storm water and sewage drainage, electric inspection chambers, breather pipes, and access chambers, which are also used in urban areas, which can account for a large consumption and a future application in India. Many electric poles and electricity distribution panels are often made by fiberglass or SMC process.

Most of the products, being large come from the rotomolding industry, as they are very large in dimension. The appearance is very important and has to be given a well designed look to make them appear modern and international.

Some of these uses may not be so prevalent in India. However, the applications are fast rising, due to multiple advantages. For example the road barrier filled with water is safe in case of accidents, better visible and can be easily setup. The road markers like cones are fast gaining popularity. The ready to use toilets and urinals on road side and urban areas are a necessity in the country.

Tourism is on the increase, and we need to make a string effort to attract overseas investments.These products have to be used to make the country comparable to any advanced countries in the world and to make India an attractive & safe destination.

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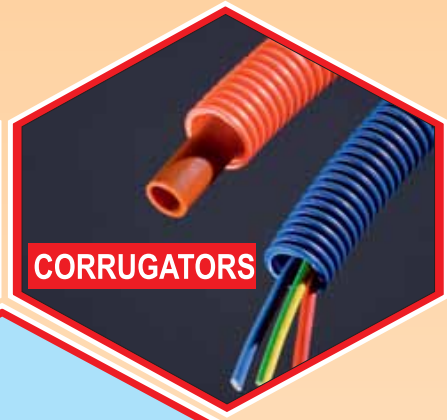
satellite

500
MACHINES SOLD

3
JOINT VENTURES WITH GAMMA MECCANICA, SICA & BORGHI ITALY


CORRUGATORS


RECYCLING LINES

PRODUCT DEVELOPEMENT


DOWN STREAM FOR PIPES

PROMPT DELIVERY OF SPARE PARTS


BRUSH FILLING MACHINES

PROMPT AFTER SALES SERVICES

CUSTOMER SATISFACTION GAURANTEED


THERMOFORMING

satellite plastic industries

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Recent Trends
Thermoset Natural Fibre Composites

Mr Aniruddha Sarin
Marketing Director - Tipco Industries Limited.

A New Generation Eco-Friendly Thermoset Composite Suitable for Wood Substitution

Continuous logging of forest cover, agricultural land & natural calamities such as forest fires are resulting in massive amounts of global de-forestation. Loss of forests has tremendous long-term adverse effects on our fragile eco-system and is resulting in climate change, soil erosion, species extinction and depletion of our valuable natural resources.

India is amongst the leading countries with the highest rate of deforestation, in league with China, United States of America, Canada, Russia, Brazil, etc.

The rate of sustainable re-forestation & tree plantations is much lower than the rate of depletion of our valuable forest cover.

In recent past, we have realized that the solution to this problem is in a suitable marriage of Plastics with an annually renewable / replenished natural fibrous crop which does not harm our environment and also replaces wood. Thus, a new class of composites was created which combined modified synthetic Resins with natural Jute fiber. This new type of material is called Tipwood® Natural Fibre Composites

WOOD REPLACEMENT

Humans have been using wood since prehistoric times. Due to deforestation, development of wood substitutes has accelerated in recent times. Some examples of wood substitutes in use today are:

- PVC profiles
- Recycled Plastics lumber
- Wood+ Plastic Profiles
- Thermoset Glass Fibre Composites

All these materials offer some advantages over wood. However, they are not quite near the properties or cost of naturally occurring Wood. Some major drawbacks of these wood substitutes are poor strength to weight ratios, high cost, conventional tools do not work & the product is not suitable for load bearing or compressive applications.

Ideally, a good wood replacement material should have the following traits:

- Stronger and longer lasting than wood
- Offers better properties than wood (density, strength, stiffness, etc.)
- Can be used just like wood using the same conventional tools
- Cost of the final product should be near to that of wood
- **And finally, it should also look & feel like wood**

Tipwood® composite material meets almost all of these requirements. After several years of research & development, an ideal wood substitute was found using a combination of modified Thermosetting Resin and Natural Jute fibres.

MATERIAL DEVELOPMENT

With over than 7 decades experience in manufacture of specialty Thermoset Resins, Tipco developed a modified phenolic resin which is highly compatible with naturally available Jute fibers. Jute is grown abundantly in India, it is an annual crop and thus there is no threat to the environment of using Jute in reinforcement of Thermoset resins.

Jute has a high level of lignin (a naturally occurring organic polymer in plants), which helps it form a strong bond with synthetic resins such as Phenolics.

With the increasing use of thermoplastics woven sacks which are replacing jute bags, the jute industry & many world-wide organizations such as the UNDP have supported the development of new uses of Jute. Since it is an annual crop, a new development in composites would be not only an eco-friendly substitute of wood but also support the jute industry which provides employment to millions of Indians.

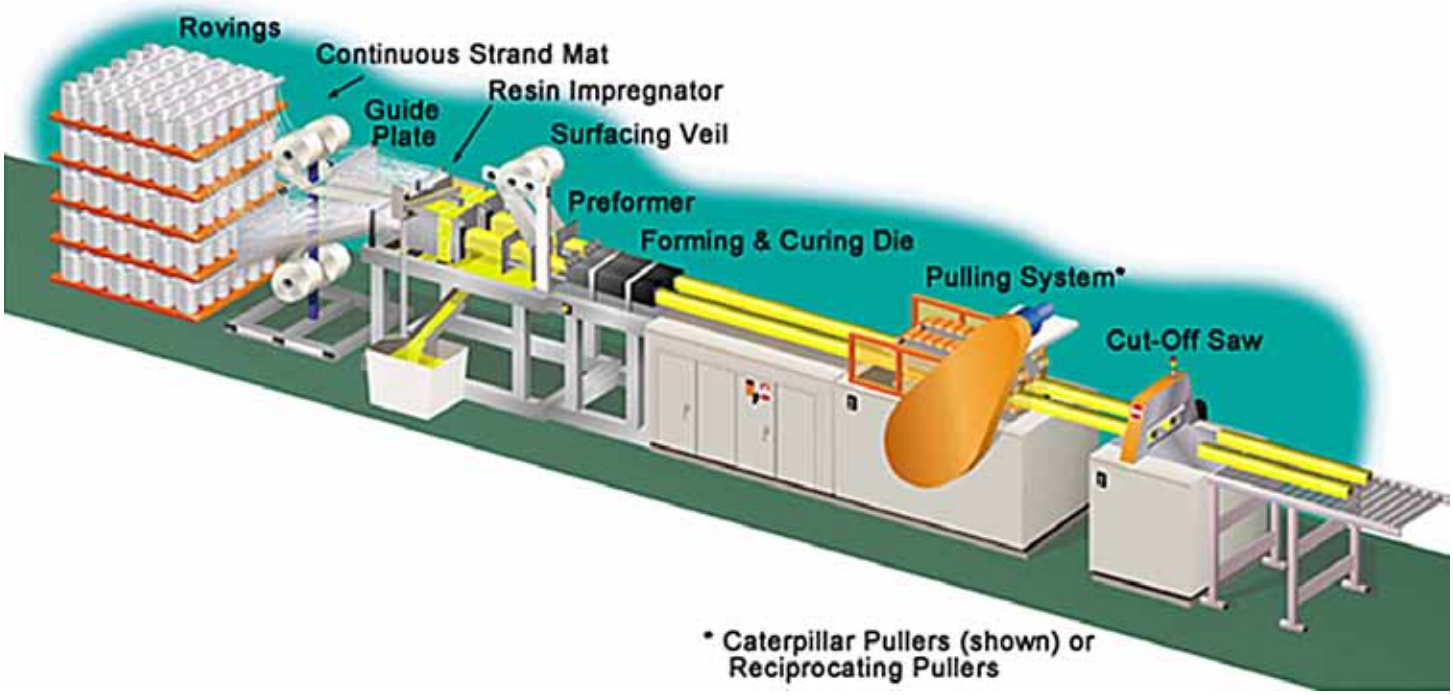
For manufacturing Tipwood® composites, various forms of Jute are used. Jute Cloth, Jute Fabric, Jute Felt & Jute Rovings (twisted & normal) in different proportions and specifications are treated & modified before production of composites. This combination of Jute reinforcements provides both, uni- and bi-directional strength to the final product, and also gives a special surface finish & texture to the composite profile.

THE TIPWOOD ® PROCESS

Tipco is one of the few companies in the world, which has developed thermoset composites using natural fibers like jute, using the conventional composites production methods, such as the pultrusion process, RTM, etc.

Jute is selectively sourced, treated and modified in several forms so that it can be easily processed on a conventional pultrusion machine.

Pultrusion is the process of manufacturing continuous composite profiles using Jute natural fibres which are impregnated with the resin and then goes through heating, shaping, curing & forming .



TIPWOOD® PROCESS

The resultant product a Pultruded profile which has improved properties which looks and feels exactly like wood

One of the most important advantage of the pultrusion process is that the composite profile can be made hollow and thus the final weight & cost of the product can be lowered substantially.

TIPWOOD® HOLLOW PROFILES

Recent Trends
Thermoset Natural Fibre Composites

The process developed by Tipco utilizes the least amount of energy to produce profiles as compared to metals and hybrids. In fact it is practically impossible to make a hollow wood profile with lengths over 8 feet. On the other hand, Tipwood process allows manufacture of continuous hollow profiles of lengths over 40 feet.

GREEN TECHNOLOGY

Plastics, including composites, use the least amount of energy for conversion per kg compared to other conventional materials like metal, wood, etc. Advantages such as weight reduction and energy conservation actually makes plastics the friend of the environment compared to energy & chemical guzzlers such as metals & paper.

Natural Fibre Thermoset composites such as Tipwood ®, which use annually re-generated crops, such as jute, further make the product eco-friendly.

Furthermore, the use of pultrusion technology, results in low power consumption, and negligible raw material wastage.

These attributes & process capabilities makes Tipwood® a "Green Product" with an extremely low carbon footprint.

TIPWOOD® PROFILES

UNIQUE FEATURES

The combination of Phenolic Resin and Natural Jute Fibre results in a unique combination of properties, advantages and benefits such as :

- Flame retardant (HB to V0 ratings)
- Extremely High strength
- High Durability and higher ELV
- Extremely Low water absorption
- Anti-Termite properties
- Anti-Fungus properties
- High heat resistance
- High Dimensional Stability & very low warpage
- Increased resistance to fatigue and corrosion
- Good electrical insulation

Over and above these properties, Tipwood® Natural Fibre Composites can be painted, varnished, polished, coated in the same manner as wood. This makes it the most environmentally friendly product that can substitute wood.

It even looks like wood!

WOOD-LIKE INTERIORS

UNIQUE PROPERTIES

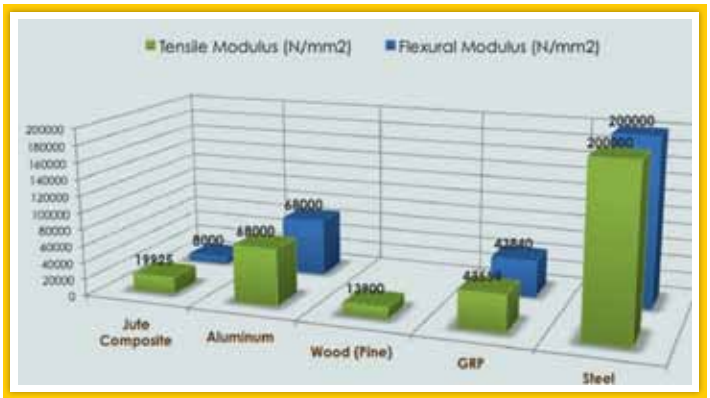
Tipwood® Natural Fibre composites have good balance of properties as compared to wood and to the traditional materials used in building and construction, thus allowing designers the freedom of not only light weight but also high strength. At the same time Tipwood® are flame retardant and does not decompose like wood.

TIPWOOD® - TYPICAL PROPERTIES

Tipwood ® Composites	ASTM	Units	Typical Values
Specific Gravity	D 792	—	1.2 ± 0.05
Tensile Strength	D 638	N/mm²	120-180
Flexural Strength	D 790	N/mm²	70-105
Flexural Modulus	D 790	N/mm²	6000-8000
Compressive Strength	D 695	MPa	70-100
Impact Strength	D-256	J/mm	0.85-1.0
Flammability	UL-94	Rating	UL-94 V0
Moisture Absorption (in water)	D5229	%	0.3 - 0.8
Screw Withdrawal Strength	-	N	6955

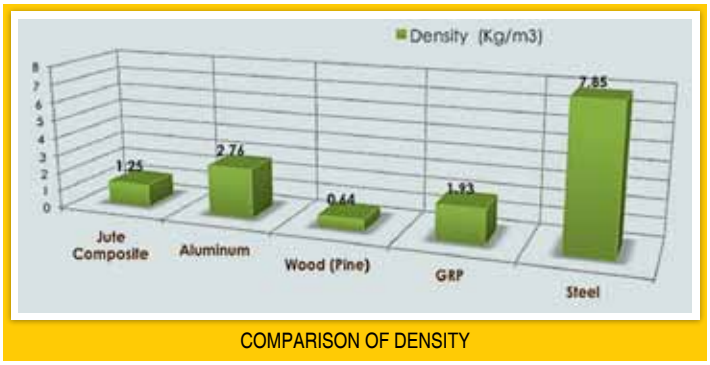
PROPERTY COMPARISON WITH TRADITIONAL MATERIALS

MATERIAL	Density gm/cm³	Tensile Strength N/mm²	Flexural Strength N/mm²	Flexural Modulus N/mm²
Tipwood®	1.15-1.25	180	105	8000
Wood	0.64	65	102	-
Aluminum	2.76	260	-	68000
GRP	1.93	414	591	43840
Steel	7.85	425	-	200000



COMPARISON OF MODULUS PROPERTY

COMPARISON OF STRENGTH PROPERTY



COMPARISON OF DENSITY

SOME END-USES OF TIPWOOD® NATURAL FIBRE COMPOSITES

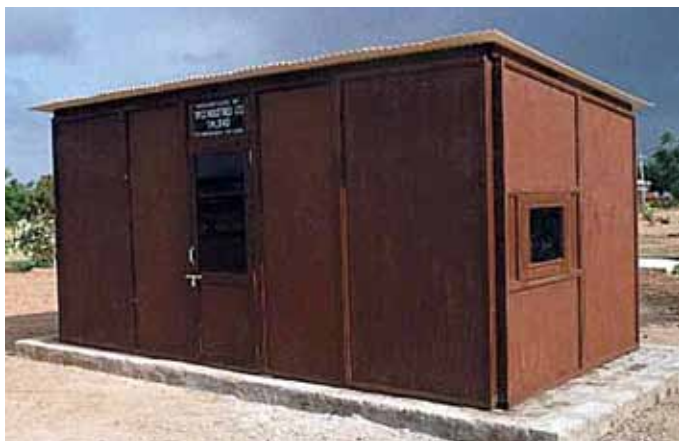
Similar to wood, the end-uses of Tipwood® are various. These start from usage in each and every wood application to even in usages where generally wood is not considered. Some examples of these end applications are given below.

LARGE OUTDOOR STRUCTURES

LARGE OUTDOOR STRUCTURES

Recent Trends

Thermoset Natural Fibre Composites



LOW COST HOUSING

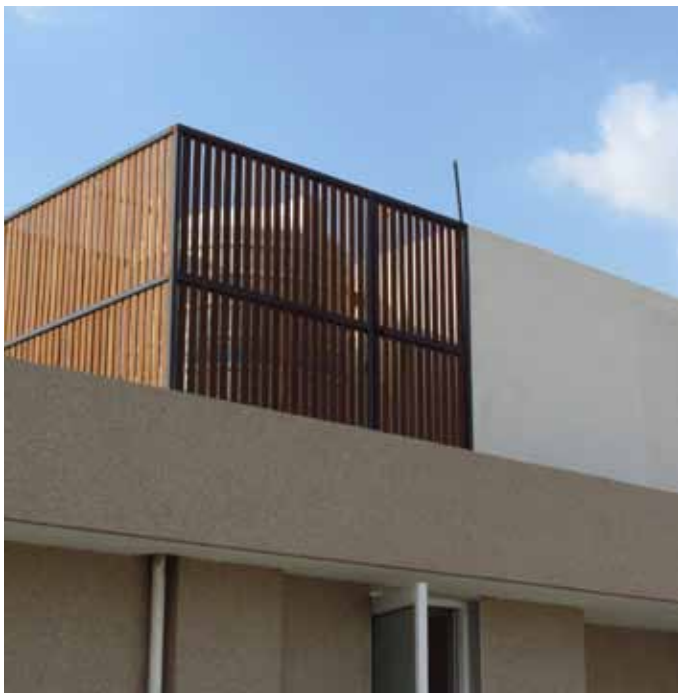
DECKING – BACKYARD, COURTYARD, FARMHOUSES, SWIMMING POOL SKIRTINGS

FLOORING

DECORATIVE FENCING - FARMS, COTTAGES, BUNGALOWS, COMPOUNDS, SOCIETIES

PARTITION SCREENS

EXTERIORS – TRELLIS, ROOFS, SIT-OUTS, CABANAS, SCREENS



LOUVERS – EXTERIOR LOUVERS, ELEVATIONS, CONCEALING PIPING

TIPWOOD® LOUVER PROFILES

Some more uses where Tipwood® Natural Fibre Thermoset Composites are commonly used:

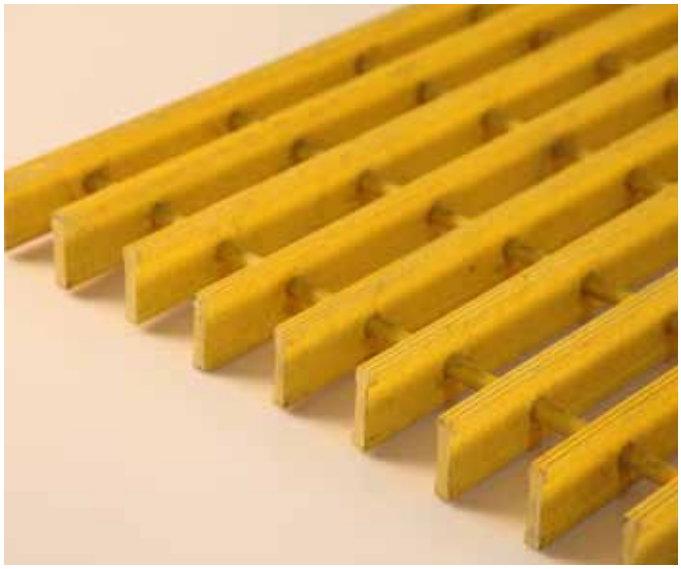
Industrial: Ladders, Cable Trays, Gratings

Interiors: Doors & Frames, Windows, Panels, Partitions, Wardrobes, Beds

Outdoors: Pot holders, Planters, Cabanas, Porticos

Gardens: Picnic Tables, Park Benches, Lounge Chairs, Tables

Office: Partitions, Conduits, Chairs, Cabinets, Desks

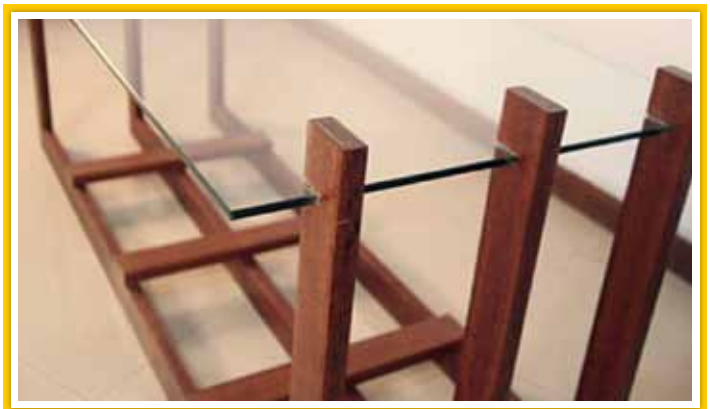


GRATINGS

Recent Trends
Thermoset Natural Fibre Composites

OUTDOOR FURNITURE

BENCHES



FURNITURE

Apart from in-house R&D at Tipco, the following institutes have provided testing services in the development of Tipwood® Natural Fibre Composites:

The Indian Institute of Technology, Mumbai (IIT Mumbai) ; University Department of Chemical Technology (now UICT), Mumbai ; Central Building Research Institute, Roorkee ; VJTI Mechanical Engineering Dept., Mumbai ;

SOCIAL RESPONSIBILITY

Tipco's Structured Products Division manufactures Tipwood® Natural Fibre Composites and also recycles waste plastics into various products as an on-going CSR initiative since last 3 decades. It is also developing new generation polymeric materials & composite products that are not only highly energy efficient & cost-effective solutions, but allows for substantial weight reductions and ultimately lowers our carbon footprint.

Mr Ravi Koul Jalali
Ex. Vice-President (Exports), Jain Irrigation Systems Ltd.

ADDRESSING INDIA'S INFRASTRUCTURAL NEEDS FOR WATER, WASTE WATER, SEWERAGE, GAS CONVEYANCE

1. ***What are PE Pipes :*** PE pipes are Plastics pipes made from Polyethylene (PE) Raw Material, which is the major thermoplastic produced globally (others are Polypropylene or PP, and Poly-Vinyl Chloride or PVC).

PE is one of the major commodity Polymersmanufactured from Petrochemicals. The PE raw material (for piping, Extrusion, Injection Moulding, Blow Moulding, Film, etc) comes in the form of granules , and is supplied by Companies like IPCL, GAIL, IOCL, RIL, HPL (in India) and Borouge, Borealis, Basell, Total Petro, Ineos, SABIC, Prime Polymers, Thai PE, etc. (globally).(Fig. 1) The PE Pipe raw material grades are specified as PE63 , PE80, and now the third generation , as PE100.

Over the years, scientists have improved the PE Pipe grade on properties which are required for improved/foolproof performance in the field. The present third generation raw material, PE100, is an improvement over PE80 and PE63 basically on three parameters : MRS (Minimum Required Strength at 20oC& min. 50 year life), SCG (Slow Crack Growth) , and RCP (Rapid Crack Propagation). Importantly , the wall thicknesses of pipe also came down due to these technical improvements, by as much as 35% , leading to cost reduction as well as increased ID for fluid flow.

Some of the technically leading Petrochemical Companies (present outside India) are providing pre-compounded materials with low sag property, making it possible to produce large diameter pipes upto 2500 mm OD (JISL has the capacity to make PE pipes & Fittings upto 2000mm, in Indai). (Fig. 1) Pre-Compounded grades lend themselves to better processability and have better carbon (or other colour) dispersion leading to uniform and improved UV resistance across the matrix.

Fig. 1 Pre-Compounded Resin vs Natural Granules to which Black Master Batch is added

2. ***Why PE Pipes :*** Of all the pipes used globally, Plastics (PE and PVC) pipes form around 40% share(Fig. 2). India is no exception to this, although there is a slight lag in under-standing of Plastics as piping materials . Designers & Utility authorities used to stick to the traditional piping and were seen not taking risks with materials they did not know. This is definitely changing now with the world wide popularity of PEPiping(Fig.3 & 4).

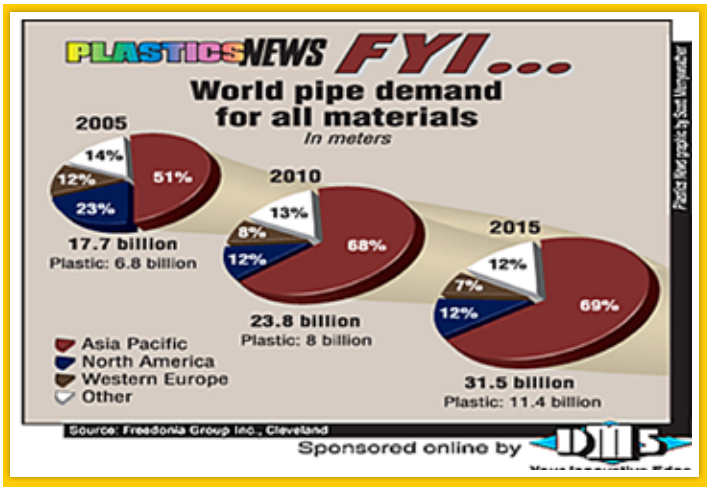


Fig. 2 : World Pipe Demand for All Materials

Fig. 3 : Global PE Pipe Demand

Region	1990(KT)	Growth %	2000(KT)	Growth %	12010(KT)
Asia	95	27.9	360	21.9	1150
Japan	70	2	84	1.9	100
M. East	25	26	90	11.1	190
S. Africa	25	18	70	12.9	160
Africa	20	20	60	7.5	105
E. Europe	80	12.5	180	9.2	345
W. Europe	395	9	750	7.7	1330
NAFTA	335	16.9	900	7.8	1600
TOTAL	1045	13.9	2494	10	4980

Fig. 4 : India - PE Pipe Demand

PE Pipe End-Use Segment	2011 (KT)	2015 (KT)
Trade-Agri	54	95
Water	39	65
Sewerage		14
Industrial	25	50
Gas Distribution	3	22
Telecom Duct	47	56
Total	168	302

Source - Polymer AssociationCARG - 17%

Plastic pipes are gaining ground faster now that their relative advantages/benefits/low carbon footprint/cost of ownership vis-à-vis traditional Metal/DI/Cement piping are being realized . Some of these factors are :

a) **Green Product :** Low embodied energy of raw-material, low energy consumption from production to transportation upto site, to in-service pumping energy(highest Hazen's Williams C valueof 150 , or lowest coefficient of friction, which is sustained over its service lifetime) – relevant to today's times.(Figs. 5, 6 & 7). Moreover, the quality & potability of water is maintained in the inert PE pipes as compared to metal pipes prone to corrosion & incrustations.

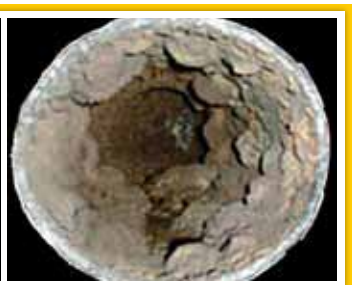


Fig. 5PE Pipe after 50 Years Fig. 6Metal Pipe after 30-40 Years

Fig. 7How London's Victorian Water MainsFig. 8 Monolithic Joint with Butt Fusion looked like; replaced with PE pipes

b) **Easy & Fast installation :** The low weight and easy handling of Plastics piping systems helps faster project execution leading to lower cost/time over-runs

c) **Leak proof monolithic joint stronger than the Pipe itself:** Globally proven record of lowest joint failures and lowest %age of NRW (Non-Revenue Water)(Fig. 9). Muncipalitiesare choosing PE pipes to reduce water loss and provide 24 x7 water availability (eg. Karnataka, Nagpur, New Delhi, etc)

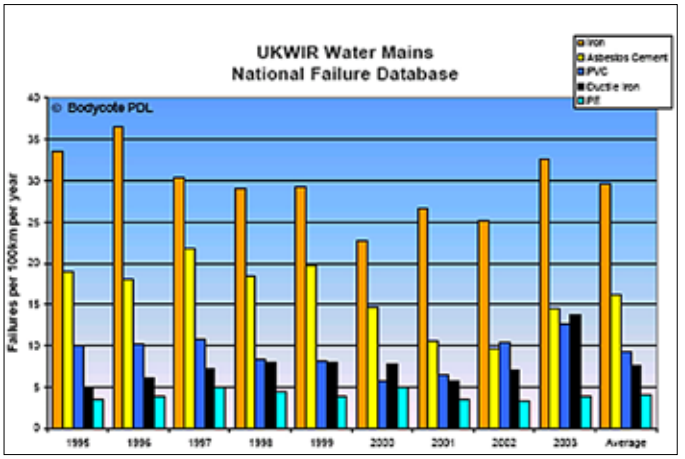


Fig. 9United Kingdom Water Mains National Failure Database

d) Lower cost of appurtenances: Ability to withstand higher water hammer or surge pressures

e) Lesser requirement of specials/bends: Unique cold bending radius property (20-25 times the diameter of Pipe) of PE pipes leading to lower capital cost

f) Suitable for soil settlement/earthquake prone areas: PE pipes are have flexibility and ability to take the contours of the most undulating of terrains

g) Long service life of 100 years or so (for Pipe of proper quality, correct jointing and installation) .

Fig. 10PE piping for underground Fire Hydrant

h) Highest abrasion resistance amongst Piping materials: Mining industry uses PE piping for dewatering/slurry transport

i) Suitable for trenchless procedure , and HDD (Horizontal Directional Drilling) applications: CGD (upto 16 bars) &Telecom Networks invariably use PE piping for Gas conveyance and for carrying OFC. These pipes are being laid by no-dig or trenchless procedures thereby preventing traffic/ public disruption and inconvenience.

Fig.11HDD or Trenchless Installation in Graphics

j) Excellent Chemical Resistance : Ideally suited for aggressive (alkaline / acidic) soils , Process Plants and Effluent discharge.

k) Ideally suited for Sewerage application: PE pipes are inert to Sewer Gases such as H2S, etc. Crowns of Cement pipes fail due to aggressive nature of sewerage

Fig. 121200 mm PE pipes for Sewerage Force/Pressure Mains in Delhi

l) Ideally suited for Sea/River water intake Piping, and marine outfalls: Unlike metal pipes, PE pipes do not corrode. Desalination Plants (SWRO, BWRO) across the world use only PE piping.

m) No failures due to galvanic action in soil: No requirement of cathodic protection)

n) No protective internal/external linings required : As in DI pipes and Cement pipes

o) Low first cost : At least upto 700-800 mm diameters, as compared to DI piping

p) Lowest Life Cycle Cost (or Cost of Ownership)

The Challenge in Emerging/Developing Nations : With the fulcrum of global economy shifting eastwards, emerging economies such as India, China, Brazil, South Africa, ME, Malaysia, Indonesia, Vietnam, Phillipines, etc. are realizing the need to bring higher proportions of their population under Piped Water and Sanitation/Sewerage collection networks. Moreover, the UN Millenium Developmental goals in Water and Sanitation are the reference points for the second rung of countries, such as those in Africa and elsewhere. An acute need to give entire people access to Water & Sanitation is being felt all across.

The major challenges facing some of these emerging, and yet to emerge economies, are the burgeoning populations, subjecting these countries to environmental degradation (polluted rivers and water-bodies due to untreated sewer/waste water, drying underground aquifers due to over-drawing of water, sea water ingress in coastal areas, soil salinity, drying up of water bodies, deforestation etc.) and consequently water stress.

Muncipal Corporations/Utility Bodies in India and other countries, have realized the need to control non-revenue water (NRW - euphemism for water loss) and make their citizens sensitive to finite availability of potable water, and water conservation. PE pipes are coming in handy to fulfill these objectives .

The challenge in Developed Countries: PE pipes are seeing a resurgence of growth in developed world also due to the need of these countries to replace the old networks (come up progressively over the last 100 years or so) made with traditional piping like metal (CI, GI, MS, etc) and cement pipes (RCC & AC pipes). Increased activity in Coal Seam Gas/Shale Gas generation, Desalination, Broadband Networks, Mining etc. is also leading to increase in use of PE piping materials at a much higher rate of growth than anytime in the past.

An Opportunity of Joint Ventures/Collaboration with a European Partner for the Polymer Industry by Plastindia Foundation

Plastindia has taken a major leap in promoting and upgrading the existing SME polymer industry, especially in green technology. Plastindia has tied up with Wiintech and will sign a formal agreement with them at K 2013 in Dusseldorf, Germany.

Plastindia took a major step and organized a meeting with Wiintech, "**Exploring Business Collaborations and Trade opportunities in Europe with Plastindia**" to offer an opportunity in Europe for Indian Plastics industry, in Mumbai on 4th March 2013.

This was indeed a major stride towards exploring what India and Europe can do together. The interaction was very successful and there were nearly 50 interactive meetings that took place.

Later a committee was formed for promoting the activity under a "Plastindia Foundation – Wiintech Initiative" which included Mr L K Singh, the International Relations Committee Chairman, Ms Sonam Monga, PIF General Manager, Mr Rakesh Shah, Mr Sunil Jain, Mr Amit Puri and Mr Subodh Gupta as committee members.

Wiintech is a group of clusters which represent 3000+ SMEs, 300 research centres & universities, in 7 countries, currently consisting of 8 clusters, 1 government body & 1 Innovation agency in Europe. Wiintech has a focus on USA, Brazil, India and Japan where promotion efforts are being made.

Wiintech European Clusters:

1. **Proplast –**Technology Focus – Polymers / Plastics (Processing) Biobased Materials, Manufacturing Processes.
2. **Plastival –** Market Focus – Waste Management and / or Recycling and Water / Air Treatment. Technology Focus – Polymers / Plastics (Processing).
3. **Poolnet –** Market Focus – Green Transport.Technology Focus – Biobased Materials, Polymers / Plastics, Manufacturing Processes, Electronics.
4. **Platipolis –** Market Focus – Green Transport, Renewable Energies like Photovoltaics, High Efficiency Building. Technology Focus – Polymers Processing, Bio-based Materials.
5. **Veneto Nanotech –** Market Focus – Green Transport, High Efficiency Building, Renewable Energies.Technology Focus – Bio-based Materials, Metallic / Ceramic Materials, Polymers / Plastics, Nanotechnology.
6. **Clusterland –** Market Focus – Waste Management and / or Recycling and Water / Air Treatment.Technology Focus – Polymers / Plastics and Manufacturing Processes.
7. **NEPIC –** Market Focus – Green Transport, Waste Management / Recycling, Water Treatment, Renewable Energies.Technology Focus – Biobased Materials, Metals, Polymers / Plastics, Manufacturing Processes, Nanotechnology, Electronics.
8. **Chemie Cluster Bayern** Market Focus – Green Transport, Waste Management / Recycling, Water / Air Treatment, High Efficiency Building.Technology Focus – Biobased Materials, Metallic / Ceramic Materials, Polymers / Plastics, Manufacturing Processes, Nanotechnology, Electronics.

Plastindia Wiintech Initiative plans to Organize : Business collaborations, Trade opportunities, Investment opportunities, Joint R&D projects, Extension of value chain, Business acceleration in the fields of New & Renewable materials, Biobased energy systems, High efficiency building and construction, in Green transportation systems & components, Water and air treatment systems, Waste management & Recycling and Metallic/ceramic materials. More subjects in the field of processing development, machines and moulds etc., is being discussed and would be added in due course.

Plastindia is offering an opportunity to:

Participate in New Developments in clean technology, Technology transfer, Entry to European networks, JV opportunities, Flexible highly innovative SMEs.

Plastindia Wiintech will support and co-operate in:

Proposals for joint activities, Offer approach to Wiintech representative, Identify suitable partner, Initiate contact, Organize visits & business meetings with international partners,

Organize or participate in business conventions, Share technology opportunity data bases,

Encourage and promote exchange of business, major interaction in European events and Plastindia 2015 exhibition.

The Plastindia - Wiintech areas of Co-operation:

As quoted by Mr. John Brady, Senior Project Manager, NEPIC "Plastindia Foundation – Wiintech Initiative" will have a very significant level of input from the whole polymer supply chain and the results endorsed by companies and clusters across the EU, India, USA and Brazil."

Plastindia - Wiintech realize that there is market and technical innovation in occurring, which will impact a number of crucial globalised consumer markets. These include Alternative/ Renewable Energy, Automobiles, Aeronautics & Defence, Medical & Biomedical, Construction/Building Materials, Electronics and Packaging. This initiative can substantially contribute to the development of the Polymer industry in the developed and developing nations.

There are new polymer innovations, new uses for polymers under development.

• Fossil based polymer manufacture	• Energy available from non-recyclable polymers
• Biomass Based polymers	
• Polymer Additives	• Disposal of polymers
• Natural occurring polymers	• Biodegradable polymers
• Recycling of polymers	• High performance polymers
• Recovery of polymers	• Polymer Nano composites
• Reuse of Polymers	• Conductive & Electronic Polymers

Plastindia has also planned an interaction meet for bilateral relations at the K 2013. If you wish your company to interact/ collaborate /looking for joint venture with a European partner, please email to wiintech@plastindia.org. Plastindia will be glad to assist and will organize your meet with your partner at the K 2013.

Plastindia Foundation in association with Wiintech presents

'The European Road' at K - 2013;

An opportunity to seek Joint Ventures and Technology Collaboration from Europe's Best

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Wiintech

www.againsttheflow.in

For further details contact: wiintech@plastindia.org

Foundation Activities
India at K - 2013

Indian Exhibitors at K - 2013

A & B Toolers	12 / D05-6	Gayatri Rub Tech (R) (AN ISO 9001-2000 Co.)	12 / D05-15
A One Extrusion Co.	12 / C33-3	GCL India (P) Limited	12 / C33-10
Abhilash Enterprises	12 / C33-5	Gharda Chemicals Limited (Polymer Division)	05 / B05-2
Acme Die Systems Pvt. Ltd.	01 / F17	GRP Limited	7.2 / F11
Aerodry Plastics Automation Pvt. Ltd.	10 / C07	Hi Tech	12 / D23-3
Aeromec Marketing Co. Pvt. Ltd.	03 / D38	Hitco Electricals Pvt. Ltd.	12 / C48
Aksons Engineering Co.	12 / D05-8	HPL Additives Ltd.	5 / B37
Alok Masterbatches	8A / B12	IEEC-PBJ Industrial Electronics Pvt., Ltd.	11 / G33
Alteem Instruments	12 / D05-14	Image Gravures	12 / C33-2
Ambica Engineering & Wire Industries	12 / D14	Indian Oil Corporation Limited	7.0 / B15
Anupam Heaters & Controls Pvt. Ltd.	11 / F66	Indofil Industries Limited	7.2 / E23
Ashutosh Mukhopadhyay	12 / C32-5	J J Plastalloy (P) Ltd	7.1 / A02
Auto Steel and Rubber Industries Pvt. Ltd.	7.1 / C05	J P Extrusiontech Limited	17 / C78
B. R. Engineering Works	03 / G96	J. K. P. Master Batch Pvt. Ltd.	7.2 / F24
B. R. Exports	7.2 / B03	J.V.M. Plastchems (Pvt.) Limited	05 / B05-8
Bajaj Superpack Pvt.Ltd	7.1 / A53	Janatics India Pvt. Ltd.	12 / D05-12
Beta Computronics Pvt. Ltd.	03 / D03	Jogindra Engineering Works Pvt. Ltd.	09 / B76
Bhavin Industries	7.2 / G08	Kabra Extrusiontechnik Ltd.	16 / B71
Bihani Group	7.2 / B02	Kadakia Plastics & Chemicals Pvt. Ltd.	05 / B05-1
Blend Colours Pvt. Ltd.	7.2 / B05	Kaivanya Extrusion Technik	12 / D05-5
C. Trivedi & Co.	12 / D05-13	Kalpataru Organics Pvt. Ltd.	05 / B03-4
Calco Poly Technik Pvt.Ltd	7.2 / C13	Khanna Polyrib Pvt. Ltd.	8A / B31
Cirwind Machine Mfg. Co.	03 / B66	Kishore Industries Pvt. Ltd.	12 / C33-9
Clips Poly Engineering	12 / D23-2	KLJ Plasticizers Ltd.	05 / D42
Continental Carbon India Limited	05 / B05-3	Kody Equipments Pvt. Ltd.	03 / G58
D.B. Engineering Private Ltd.	10 / D04	Konark Plastomech Pvt. Ltd.	12 / D12
Daniel & Sons	02 / D03	Liberty Chemicals	8B / H30
Darshan Industries Darshan Heat Electricles	02 / E06	Lifeline Technologies	7.2 / A05
Devu Tools Pvt. Ltd.	12 / D05-2	Lohia Corp Limited	12 / C51
EICL Limited	8A / H29	Loxim Industries Limited	8B / C78
Expert Industries Pvt. Ltd.	04 / D46	M. Plast (India) Ltd.	12 / A06
Fine Organics	06 / C24	Machinecraft	03 / G87
Fixopan Machines Pvt. Ltd.	12 / D23-7	Mahesh Twisto Tech Pvt. Ltd.	12 / C33-4
Formulated Polymers Limited	8B / H83	Mamata Extrusion Systems Pvt. Ltd.	17 / C73
Gabbar Engineering Co.	12 / D23-1	Mamata Machinery Pvt. Ltd.	03 / A32
Ganesh Corporation	12 / C32-1	Merit Polyplast	7.2 / F12

Foundation Activities

India at K - 2013

Micro Quick Engineers	12 / C32-6
Minocha Enterprises Pvt. Ltd.	7.1 / D09
Moldwell Products India Private Limited	12 / C33-8
N-Tex Engineering Works	12 / D05-10
N. A. Corporation	12 / D20
Nassolkem (P) LTD.	8B / E56
Navrang Machinery Pvt. Ltd.	12 / D05-16
Neoplast Engineering Pvt. Ltd.	13 / D13
Next Polymers Ltd.	05 / B05-9
Niknam Chemicals (P) Ltd.	05 / B03-7
Omega Plasto Compounds Pvt.Ltd.	8B / A86
Packaging Solutions (An ISO 9001-2008 Co.)	12 / D05-17
Panchal Plastic Machinery Pvt. Ltd.	12 / D05-7
Pelican Rotoflex PVT. LTD	03 / G33
Penguin Engineers	12 / C33-6
Perfect Belts, Ltd.	12 / C35
PIECO - Pioneer Engineering Corporation	12 / C32-3
Plastemart.com	12 / C33-1
Plastiblends India Limited	8B / A33
Plastichemix Industries	7.1 / A45
Polyform Technologies	12 / C33-7
Polygraph Printing Technologies Ltd.	12 / D23-4
Power Additives (India) Pvt. Ltd.	05 / B05-4
Prakash Chemicals International Pvt. Ltd	05 / B03-6
Prasad International Ltd.,	8A / E48
Pratik Heat Products Pvt Ltd	02 / C18
Prayag Polytech (P) Ltd.	05 / F41
Precious Products (India) Pvt. Ltd.	12 / D05-4
Presto Stantest Pvt. Ltd.	12 / D23-5
Prima Chemicals	05 / B03-5
Prism Design and Tooling Technology Pvt Ltd	02 / G19
Proofex Packagings PVT. LTD.	05 / B05-7
R. H. Engineering	12 / D05-09
R. R. Plast Extusions Pvt. Ltd.	12 / C19
Rajhans Plastic Machinery Pvt. Ltd.	12 / A27
Rajiv Plastics Limited	7.1 / B21
Rajoo Engineers Ltd.	15 / B58
Reliance Industries Limited	06 / D11
Repin Masterbatches PVT Ltd.	8B / D47
Resource Engimech (India) Pvt. Ltd.	03 / F65
Rishiroop Polymers Pvt. Ltd.	05 / B03-1
S M Chemicals	05 / B03-2
S.C.J. Plastics Ltd.	05 / E11
Sahil Enterprises	01 / B06
Sai Machine Tools Pvt. Ltd.	12 / D23-6
Sakkthi Polymers	05 / B05-6
Sangir Plastics P. Ltd	05 / B03-3
Sheela Foam Pvt. Ltd	7.2 / A01
Shri Ram Sons Wax Pvt. Ltd.	7.2 / A03
Shubham Extrusion Technik Pvt. Ltd.	12 / D05-1
Shyam Plastic Machinery	14 / C34
Simplicon	11 / C12
Smart Machineries and Moulds Pvt. Ltd.	12 / C32-2
Soltex Petroproducts Ltd.	7.2 / F07
Som Shiva (Impex) Limited	7.2 / G04
Specialty Polyfilms (India)	8B / D61
Steer Engineering Pvt., Ltd.	12 / B20
Stitchman	12 / D05-11
Sudershan Paper (Surplusstocklot.Com)	7.2 / A10
Sujay Packaging	12 / C32-8
Supreme Petrochem Ltd.	8A / B27
SVP Packing Industry Pvt. Ltd	7.2 / A08
Swastik Rubber Industries Pvt. Ltd.	7.2 / B07
Technoshell Automations Pvt. Ltd	04 / B12
Tradeindia.com Infocom Network Ltd.	12 / C32-4
Uflex Limited-Engineering Division	12 / D23-8
Ushma Engineers	12 / C32-7
Vasantha Tool Crafts Pvt. Ltd.	02 / C24
Vihan Engineering Pvt. Ltd.	12 / D05-3
Vikas Global One Ltd.	05 / B05-5
Volcano Flexi Tech Industries	12 / B46
XL Plastics	03 / C53
Zylog Plastalloys	05 / B05-10

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Founder Members Activities

ORGANISATION OF PLASTICS PROCESSORS OF INDIA

OPPI Annual Get Together – 15th July 2013

The 29th Annual Get Together of Organization of Plastics Processors of India was held on 15th July 2013 at Golconda Ballroom, Trident BKC, Mumbai. Mr. John R. Verity, Vice President, Global Polyolefins Business Unit, ExxonMobil Chemical Company, U.S.A. was the Chief Guest and made a presentation on – "Evolution of Shale Gas and the Impact on Industry".

Mr. V.K. Taparia, Executive Director, The Supreme Industries Ltd. delivered the Welcome Address. While introducing Mr. John R. Verity to the audience, he said – "Mr. John Verity is a chemistry graduate from Oxford University, England. During the early part of his career, Mr. John Verity worked in a series of sales, marketing and strategic planning roles within Exxon Chemicals' European PE business as well as a period in manufacturing management in a synthetic rubber plant. In 1998, Mr. John Verity moved to the U.S. to take on a worldwide planning role in the PE business. At the beginning of 2000, he moved to the position of PE Americas Marketing Manager for ExxonMobil Chemical Company. He was appointed to the position of President, Univation Technologies LLC in February 2001. In January 2005, Mr. John Verity was appointed to the position of Vice President, Research and Development, ExxonMobil Chemical Company and in October 2006, he was appointed to the position of Vice President, Polyethylene Global Business Unit. In October 2008, Mr. John Verity assumed responsibility for both the Polyethylene and Polypropylene Global Business Units and became Vice President, Polyolefins Global Business Unit."

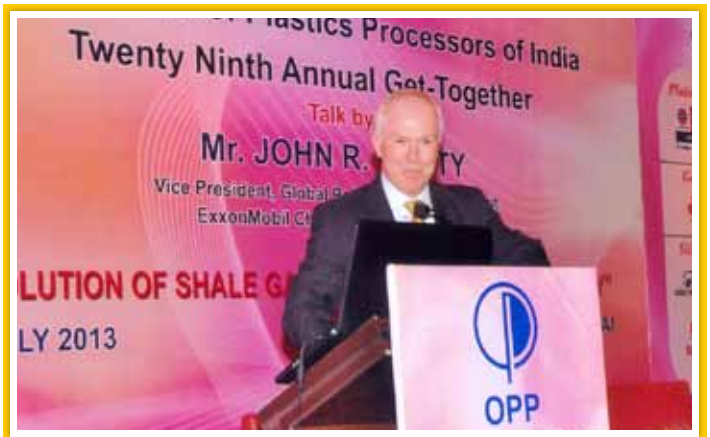
Mr. V.K. Taparia while speaking about the Shale Gas and Oil in India said – "Since India is looking at ballooning gas and electricity prices, which are of concern for its manufacturing sector and the economy as a whole, it should tap its shale gas reserves on a war footing. The potential is substantial given India's large energy deficit and the huge shale oil and gas reserves that can be tapped. The world's fourth largest consumer of oil and petroleum products, India imports as much as three fourths of its oil requirements and around a third of its gas needs. Large-scale shale oil and gas production would cut trade imbalances and the current account deficit, now causing the rupee to plummet. It would also reduce our dependence on Middle Eastern oil. Though identification of prospective areas of shale gas and oil has only just begun, initial estimates are encouraging. They show that technically recoverable shale oil resources are 3,800 million barrels while that of shale gas is 96 trillion cubic feet. This is about two-third of India's current oil reserves and more than double its estimated natural gas reserves."

Mr. John R. Verity made a detailed presentation on – "Evolution of Shale Gas and the Impact on Industry".

Mr. C. Bhaskar, Vice President, OPPI proposed a Vote of Thanks on behalf of Organization of Plastics Processors of India.

A film on – 'Indian Oil Corporation' was also screened on the occasion.

Mr. V.K. Taparia delivering the Welcome Address



Mr. John Verity making his Presentation

Houseful audience in rapt attention

Mr. M. P. Taparia(Right) presenting a Memento to Mr. John Verity

INDIAN PLASTICS INSTITUTE

INDIAN PLASTICS INSTITUTE

SYMPOSIUM ON "RESOURCE EFFICIENT POLYMER PROCESSING" & IPI DAY CELEBRATION

Symposium on "Reserve Efficient Polymer Processing" commenced from 4.00 p.m. onwards and continued till 7.00 p.m. This symposium provided informative, interesting and excellent lectures on topics related to 'Energy Savings & Polymer Processing".

The function commenced with the welcome address of IPI Chairman, Shri. N. K. Balgi. At the outset Mr. Balgi thanked and welcomed Mr. Vimal Kedia, Chief Guest, Mr. Y.R. Anand, Session Chairman & other dignitaries and friends amongst the audience. He gave a brief on IPI and its significant role of spreading knowledge on plastics and benevolent role in the life of mankind. Besides, he also shared his observation on optimum use of our resources to make our production process energy efficient. He opined that our per capita plastics consumption could be 14 to 15 kgs instead of 8 to 9 kgs subject to taking into consideration of finished plastics goods.

Mr. Y.R. Anand, Managing Partner of Unimark was the Session Chairman of the symposium and he chaired all the session. He himself being a professional handled all the speakers and conducted each lecture session professionally.

Mr. Shrish V. Divgi, Managing Director, Ferromatik Milacron India Pvt. Ltd was the first speaker of the evening. He made an interesting presentation on "Resource Efficient Polymer Processing – Modern Trends in Injection Molding".

Next speaker of the evening was Mr. Bhargav Joshi, Dy. General Manager, Bosch Rexroth India. He gave an informative presentation on "Energy-efficiency up, unit cost down".

Mr. Venkatraman Kannan, Managing Director, Mold-Masters Technologies Pvt. Ltd was the next speaker. He made a presentation on "The Coolest Way to Use Hot Runners..... Efficient Use of Energy in Hot Runners".

Subsequently Mr. Jayesh Mehta, Regional Manager, Sales & Marketing, Prasad Group gave a presentation on "Innovative Solution for Zero Waste in Plastics Processing by – Auxiliary Equipment". Mr. Mehta made an interesting presentation on application process on IMM, ISBM, IBM, Extrusion sheet, films, pipes, Profiles etc.

Mr. Ajit Patel, Manager, Technical Services PARC, Reliance Industries Ltd made presentation and delivered lecture on "Innovations in Polymers & Additives – For Productivity Enhancement and Energy Savings". Mr. Patel's presentation covered how material performance enhances Product Quality, Productivity and Energy Savings in different application spectrum.

Lastly, Mr. Shantanu Sharma, Area Manager, Industrial Lubricants, ExxonMobil Lubricants Pvt Ltd delivered an interesting lecture on 'A New Generation Energy Efficient Hydraulic Lubricant for Injection Moulding Industry" supported by excellent presentation.

All the speakers covered more on current and contemporary topics with innovative and research contents which are the current needs of our industry.

Lecture meeting was followed by Q & A session. Many interesting questions were posed to all the speakers and speakers gave satisfactory explanation to the audience.

Symposium was attended by 150 + participants which include both members and non-members of IPI, Special Invitees, Chairmen and representatives from various chapters, Past Presidents & Chairmen and others.

Finally the symposium session concluded with the Vote of Thanks proposed by Dr. E. Sundaresan, Vice-Chairman, IPI. He thanked all the Governing Council Members, Organising Committee Members, all Special Invitees, delegates and others for gracing this function and sharing their thoughts and inputs. Further, he conveyed his special thanks to all the speakers of the symposium for their interesting and informative presentations.

Besides, Dr. Sundaresan extended his sincere thanks and appreciation to all the Advertisers in our souvenir and Sponsors for sponsoring this event like : M/s. Ferromatik Milacron India Pvt. Ltd, M/s. Bosch Rexroth India Ltd, M/s. Mold Masers Technologies Pvt. Ltd., M/s. Prasad Group of Companies, Reliance Industries Ltd and M/s.ExxonMobil.

Symposium ended with a good and positive note.

*** *** ***

IPI DAY CELEBRATION

The function commenced with the welcome address delivered by Dr. Y. B. Vasudeo, President of Indian Plastics Institute. He welcomed all the members of IPI, Chief Guest of the function Mr. Vimal Kedia, Guest Speaker and other Special Invitees who have graced the IPI Day celebration. He said that he is happy to share with all the participants, that over the years IPI has made a 'Giant Leap' and completed 28 years in dissemination of knowledge, information and manpower training to plastics industry. Subsequently he shared some of his ideas and views concerning Forward Path of IPI.

Inaugural address was followed by lecture of Chief Guest Mr. Vimal Kedia, Managing Director of Manjushree Technopack Ltd. Shri. Kedia gave an interesting speech about removing myth surrounding plastics. He said we should endeavour to highlight valuable positives of plastics to improve the image of plastics industry. He emphasized that it is difficult to imagine Life without plastics. It has become as much as necessity as food, water our housing. He complimented IPI for grooming several plastics processing and packaging professionals through their manpower development programme.

Subsequently, Mr. Kedia released IPI Day souvenir in the presence of Guest Speaker and other dignitaries present in the dais. The contents and layout of the souvenir was well appreciated and complimented by all the participants.

Mr. Imitiaz Ahmed, Regional Manager (West) Industrial, ExxonMobil was the Guest Speaker of the evening. In his address, he briefed the participants about ExxonMobil and Its activity, forecast on energy outlook on 2040. Further, he explained about Lubricants and Sustainability and also energy efficiency benefits with lubricants for sustainability.

Subsequently IPI Award Function followed after the address of Chief Guest and Guest Speaker. Mr. Francis Pinto, Past Chairman of IPI & Ms. Kavita Shah were the joint Master of Ceremony for the Award function sharing the announcement of awards and reading their citations. Mr. Pinto, after exchanging pleasantries with the Special Invitees and other participants announced the awards and invited the awardees to the stage to collect their respective awards. Mr. Pinto read out the citation of major awardees and subsequently he handed over the stage to Ms. Kavita Shah, who announced and read out the citations from most contribution by a members onwards. We give below the list of Awards and its recipients:

Awards	Name of the Recipients
Lifetime Achievement	Shri. Arvind Athalye
	Shri. Madhu Shah
Hon. FIPI	Shri. N. Sitaram
	Dr. S. P. Potnis
Outstanding New Generation Entrepreneur	Shri. A. Dayananda Reddy
	Shri. Sandeep Engineer
Excellent Contribution to Polymer Industry or Academia	Late C.N. Doshi
	Dr. S. Sivaram
	Mr. Arshad Khan
Most Notable Contribution by a Member	Mr. S.K. Ray
	Mr. Achal Thakkar
	Mr. Prabuddha Dasgupta
	Mr. Alok Ghosh
	Mr. Sameer Joshi
	Mr. Prashant Trivedi
	Mr. T.C.N. Sairam
	Mrs. Geetha Bhaskaran
	Ms. Ish Walia
	Mr. Jitendra Sheth
Best Chapter with Members > 200	Ahmedabad
Best Chapter with Members < 200	Bangalore
Best Chapter for enrolling New Members	Chennai
Best New or Revived Chapter	Vadodara
Best Chapter for starting New Student Chapter	Chennai
Best Student Chapter By Region	Kamaraj College of Engg., Chennai
	L.D. College of Engg. Ahmedabad
	Delhi College of Enng., New Delhi
Best Performance by a GC Committee	International Conference

Finally Dr. P.D. Trivedi, Imm. Past Chairman proposed the vote of thanks. He thanked the Organising Committee, Speakers, Sponsors, Awardees, IPI Members, Special Invitees, Chairman & Vice Chairman GC, Mumbai Chapter MC Members and others for their excellent contribution and efforts in making this function a memorable event.

*** *** ***

Founder Members Activities

IPI Day Celebration Photo's

Shri Vimal Kedia relining the Annual Day Celebration & Symposium Souvenir

Dr. S. P. Potnis receiving the Honorary FIPI Award from Shri J. R. Shah

Shri Arvind Athalye receiving the Life Time Achievement Award from Shri Vimal Kedia

Shri S. K. Ray receiving the Most Notable Contribution by a Member Award from Dr. P. D. Trivedi

Shri Mahu B. Shah receiving the Life Time Achievement Award from Shri Vimal Kedia

Shri T C N Sairam receiving the Most Notable Contribution by a Member Award from Shri Shailesh Bhoolabhai

Shri Dilip Shah receiving the Best New OR Revived Chapter Award from Shri Francis Pinto

Dr. E. Sundaresan receiving the Best Performance by a GC Committee Award from Shri S. K. Kadakia

Shri Rajiv Trivedi & Shri Abhay Upadhya receiving the Best Chapter with Members Award from Shri N. K. Balgi

IPI Photo's of Symposium

Mr. Hemant Minocha addressing the audience. L to R : Mr.Bhargav Joshi, Mr. Shrish V. Divgi, Mr. Venkatramankannan, Mr. Jayesh Mehta, Mr. Ajit Patel, Mr. Shantanu Sharma and Session Chairman Mr. Y. R. Anand

Shri Tushar Parikh &Shri Prashant Trivedi receiving the Best Student Chapter by Region Award from Dr. M. A. Shenoy

Session Chairman Mr. Y. R. Anand addressing the audience. L to R :Mr. Shrish V. Divgi, Mr.Bhargav Joshi, , Mr. Venkatramankannan, Mr. Jayesh Mehta and Mr. Ajit Patel

Indian Plastics Federation

INDIAN PLASTICS FEDERATION

Technical Lecture on Plastic Composites to Substitute Natural Wood – Latest Developements

L – R : Shri Pradip Nayyar, Shri Saurabh Khemani, Shri N R Bose & Shri T K Banerje are on the dias

Indian Plastics Federation (IPF) and Indian Plastics Institute- IPI (Kolkata Chapter) jointly organised a technical lecture at IPF Conference Hall on 10th January 2013. The Theme of the lecture was "**Plastics Composites to Substitute Natural Wood – Latest Developement".** The speaker was Dr N.R.Bose, Ex Principal Scientist, C.G. & C.R.I., Kolkata, who is also associated with both IPF and IPI.

A View of the Audience

Glimpses

A Workshop on Union Budget 2013-14

A workshop on Union Budget 2013-14 was held on Saturday, the 2nd March 2013 at IPF Conference Hall at 8B, Royd Street, Kolkata 700 016. Two eminent speakers viz. Mr. Sumarmal Surana - Direct Taxes and Mr. Sushil Kr Goyal -Indirect Taxes spoke during the workshop. The workshop started at 3.45 pm as scheduled, wherein more than 35 people attended.

Mr. Rajesh Mohta, President, IPF, who was in the dais along with Mr. Pradip Nayyar, the speakers welcomed the Hony. Secretary, IPF, and members. After the welcome address Hony Secretary introduced both the speakers to the members. Mr. Sumarmal Surana an Advocate, mainly practicing in Income tax Appeal and Tribunal cases has got vast experience in direct taxes. He spoke in detail about the budget and the amendments announced by the Hon'ble Finance Minister, Govt. of India, it's complexities, advantages and disadvantages.

Mr. Sushil Kr Goyal, Chartered Accountant by profession who has vast experience in indirect taxes regularly providing services in the field of service tax since 1997 to all types of clients starting from examination of taxability of services to representation before the adjudicating authorities, the Commissioner (Appeals) and the CESTAT. (Custom, Excise & Service Tax Appellate Tribunal) He is Regional Council Member of ICAI, author of book titled 'Service Tax Guide' and also worked as a visiting faculty. He spoke in detail about the Government's budget and actual tax collection during last two years.

There were so many points which are not aware by the members such as amnesty scheme, penalty, etc. etc.

Mr. Goyal has circulated monthly voluntary disclosure scheme service tax bulletin titled 'Tax Talk' published by him amongst the members which contain important changes in services, other changes in the Budget 2013 and Amnesty scheme etc.

The workshop ended with a question answer session.

THE ALL INDIA PLASTIC MANUFACTURER'S ASSOCIATION

Inauguration of AIPMA South Zone Office and Plastivision Networking & Business Meet at Hotel Savera, Chennai, on 27th June, 2013 during Iplex 2013

Team AIPMA Inaugurated New Office at Gaiety Palace, .. on the auspicious day of 27th June., 2013 at 3 pm. The Puja was performed by learned Pandit with full rituals and Our VP (South) Mr. Anil Bansal and his wife completed all formalities along with Dr. Asutosh Gor our President. All Office Bearers, Mr. Arvind Mehta, Team Plastivision India-2013- Mr Raju Desai, Mr. Kailash Murarka, Mr. Harish Dharamsi, Mr. Y. V. Raman, Director Pondyoxide were witnessed and participated in the Puja and ribbon cutting ceremony of President's cabin. All Association Heads and Office Bearers of Southern Regional made their presence to share the joy and congratulated Team AIPMA for the New Office. About 50-60 Industry members graced the Puja and Inauguration ceremony. Vastu compliant, 870 sq. ft. 4th floor office of AIPMA in Gaiety Palace Office is Centrally located with metro, railway station, shopping areas and essential requirements in close proximity, adequate parking facilities within the compound and is suitable in all respects. Wishes and congratulations poured in form of flower bouquets.

Thanks giving were accorded in hands of President Dr Asutosh Gor to Mrs. Anil Bansal for gracing the occasion and doing the Puja. Thanks giving was extended to Mr. Raman, who was instrumental in purchase of AIPMA New office and organizing Inauguration etc, Negotiating and Booking of Hotel for stay and for function etc... Thanks giving were also accorded to the Presidents and Office Bearers of Plastics Associations of South India who graced the ceremony.

Mr. Arvind Mehta - National Advisory Board Plastivision, Mr. V. Anil Reddy - Managing Committee Member, Mr. Meela Jayadev - Managing Committee Member, Mr. Harish Dharamsi - Co- Chairman Plastivision India 2013 & Mr. Manish Dedhia - Vice President West Zone along with organizers, exhibitors & Visitors of Iplex 2013 at the inauguration of AIPMA South Zone Office.

Ribbon cutting ceremony in the hands of AIPMA President Dr. Asutosh Gor along Mr. Arvind Mehta - National Advisory Board Plastivision, Mr. Anil Bansal - VP South Zone, Mr. Raju Desai - Chairman PVI 2013, Mr. Harish Dharamsi - Co- Chairman Plastivision India 2013, Mr. Haren Sanghavi - Hon. Jt. Secretary & Mr. Sanju Desai - Hon. Treasurer, AIPMA during the inauguration of South Zone Office.

Mr. Y. V. Raman - Co-ordinator South Zone being felicitated in the hands of Mr. Arvind Mehta - National Advisory Board

Mr. V. Anil Reddy being felicitated in the hands of Mr. Hiten Bheda - Hon. Secretary, along with Mr. Meela Jayadev - Managing Committee Member, Mr. Anil Bansal - VP South Zone, Mr. Arvind Mehta - National Advisory Board Plastivision, Mr. Y. V. Raman - Co-ordinator South Zone, Dr. Asutosh Gor - President AIPMA, Mr. Manish Dedhia - VP West Zone

Plastivision India Networking and Business Meet

On the 27th evening at 6.30 pm onwards Plastivision India Networking and Business Meet and Celebrating Inauguration of our New Office was organized at Hotel Savera. The Function was Presided over by eminent personalities of the Industry such as Shri. S. Mitra, Executive Director - Petrochemicals, Indian Oil Corporation Limited, Shri. Kailas P., Managing Director, Toshiba Machine Chennai as Guests of Honors and Chief Guest, Dr. S. K. Nayak, Director General, CIPET.

President Dr. Asutosh K. Gor, welcomed the Honourable Guests as well as the Audience and spoke on prevailing Industry scenario and its projected growth in next five years. He also gave details of all Activities of AIPMA and appealed to join hands with AIPMA in its rising graph of services. Mr. Raju Desai Chairman, Plastivision India 2013 discussed about new initiatives taken in our 9th Plastivision, International pavilions, media promotions etc so that all exhibitors are at ease to do voluminous business. He projected the promotional film of PVI and requested all those who have still not booked their space, to do the same immediately as we are full, by means of space. Mr Arvind Mehta, Chairman Advisory Board gave details of spectrum of his NAB members and also informed of the first Indo-US Summit in pipe line during PVI-2013. He underlined growing relations between Indian Plastic industry with that of various countries which is a sign of India being preferred business place in the world.

Our Guests were honoured with bouquets of flowers and mementos. Both Shri. S. Mitra, Executive Director - Petrochemicals, Indian Oil Corporation Limited, and Shri. Kailas P. Managing

Director, Toshiba Machine Chennai thanked AIPMA for inviting them to preside over the function and assured of their fullest support and co-operation to AIPMA at all times. The Chief Guest Dr S. K. Nayak also thanked AIPMA and spoke about all academic facilities CIPET is offering to the Indian Plastic Industry. Vote of Thanks was given by Shri Anil Bansal, Vice President (South), AIPMA. Mr Harish Dharamsi Co-Chairman PVI-2013 was master of Ceremony. The function was followed by Cocktail & Dinner.

Over 350 people all belonging to Plastics Associations of South Region, exhibitors of PVI-2013 Industry stalwarts, and VIP guests of the Industry participated and the venue was truly a happening place for the evening. Team PVI offered Memento of PVI wall clocks to all guests.

Mr. Harish Dharamsi - Co-Chairman Plastivision India 2013 addressing the audience during the launch function of Plastivision India 2013 in Chennai

Lighting of Lamps - Dr. Asutosh Gor, Mr. Arvind Mehta, Mr. Hiten Bheda

Dignitaries addressing the audience during the launch Function of Plastivision India 2013 in Chennai

Dr. Asutosh Gor - President AIPMA

Mr. Raju Desai - Chairman, Plastivision India 2013

Mr. Arvind Mehta - Chairman National Advisory Board Plastivision

Dignitaries Mr. Hiten Bheda - Hon. Secretary, Mr. Arvind Mehta - Chairman National Advisory Board Plastivision, Mr. S. Mitra - Executive Director, Petrochemicals, India Oil Corporation Limited, Dr. S. K. Nayak - Director General, CIPET, Dr. Asutosh Gor - President AIPMA, Mr. Kailash P. - Managing Director, Toshiba Machines Chennai, Mr. Anil Bansal - VP South Zone, Mr. Harish Dharamsi - Co- Chairman Plastivision India 2013, Mr. Raju Desai - Chairman, Plastivision India 2013

Founder Members Activities

AIPMA Booth at Iplex-2013

The organizers of Iplex-2013 offered 18 sqm complimentary Booth No. 53 to AIPMA in Hall B2, at Chennai Trade Centre. Iplex is organized by 4 state level plastics manufacturers' associations Tamilnadu Plastics Manufacturers Association, Andhra Pradesh Plastics Manufacturers Association, Kerala Plastics Manufacturers association and Karnataka state Plastics Association, supported by AIPMA, PIF, CIPET with an objective to promote Plastics Industry of South India.

The Organizers claims to have 150 exhibitors covering two Halls with 10,000 sqm. Space visited by over 50000 visitors over 4 days. AIPMA Staff Ms. Umaa Gupta, Mr. Aditya Tripathi, Mr. Rohit Gupta, and Mr. A. Ramarathinam (AIPMA SOUTH) attended this Exhibition. The team was dedicated to heavy marketing and promotion of PLASTIVISION INDIA 2013 over 4 days of the exhibition. Appx. 661 sqm including 169 sqm of CIPET, was confirmed for PVi-2013. 3 new members were generated. AIPMA stall was visited by all Industry stalwarts and Associations Heads. Presence of AIPMA President, Office Bearers, Team PVI-2013 made the Booth most vibrant and busy with flow of important visitors.

There were enquiries for PVA but due to PVI and K exhibitions ahead of this event, confirmation by way of Cheque did not happen. M/s Cox & Kings marketed K-delegation from our stall.

Dignitaries at AIPMA Stall in Iplex 2013: Mr. Arvind Mehta, Hon. Jt. Secretary - Mr. Haren Sanghavi, Hon. Treasurer - Mr. Sanju Desai, CEO Plastivision India 2013 - Mr. Aditya Tripathi, President - Dr. Asutosh Gor, VP West Zone - Mr. Manish Dedhia, South Zone Co-ordinator South Zone - Mr. Y. V. Raman

CENTRAL INSTITUTE OF PLASTICS ENGINEERING & TECHNOLOGY

Inauguration of CIPET Murthal

CIPET Murthal was inaugurated and formally dedicated to the nation on May 11, 2013 jointly by Shri Srikant Kumar Jena, Hon'ble Minister of State (Independent Charge) for Chemicals & Fertilizers and Statistics & Prog. Implementation, GOI and Shri Bhupinder Singh Hooda, Hon'ble Chief Minister, Haryana for the manpower development in the field of Polymer Science and Technology in and around Haryana.

Inaugurating of CIPET Murthal by Shri Srikant Kumar Jena, Hon'ble Minister of State (Independent Charge) for Chemicals & Fertilizers and Statistics & Prog. Implementation, Government of India and Shri Bhupinder Singh Hooda, Hon'ble Chief Minister, Government of Haryana

CIPET Murthal Inaugurated by Shri Srikant Kumar Jena, Hon'ble Minister of State (Independent Charge) for Chemicals & Fertilizers and Statistics & Prog. Implementation, Government of India and Shri Bhupinder Singh Hooda, Hon'ble Chief Minister, Government of Haryana

Welcome Address by Prof (Dr.) S K Nayak, Director General, CIPET

Special Address by Shri Indrajit Pal, I.A.S., Secretary to Government of India, Ministry of Chemicals & Fertilizers

Inaugural Address by Shri Srikant Kumar Jena, Hon'ble Minister of State (Independent Charge) for Chemicals & Fertilizers and Statistics & Prog. Implementation, Government of India

Inaugural Address by Shri Bhupinder Singh Hooda, Hon'ble Chief Minister, Government of Haryana.

Founder Members Activities

Vote of Thanks by Shri V K Subburaj, I.A.S., Additional Secretary & Financial Advisor, Department of Chemicals & Petrochemicals, Ministry of Chemicals & Fertilizers, Government of India.

3rd National Awards for Technology Innovation in Petrochemicals & Downstream Plastics Processing Industry (2012-13)

In order to promote and encourage the development of environmental friendly cost effective polymeric material, products and processes / technologies in line with the guidelines of National Policy on Petrochemicals, Department of Chemicals & Petrochemicals (DCPC), Government of India has announced National Awards for Technology Innovation in Petrochemicals and Downstream Plastics Processing industry, with the core philosophy of 'Reward the Innovation Suitably with an Award'.

Accordingly the Department had implemented the 3rd National Awards thru' Central Institute of Plastics Engineering & Technology (CIPET) and winners were rewarded by award by Shri Srikant Kumar Jena, Hon'ble Minister of State (Independent Charge) for Chemicals & Fertilizers and Statistics & Prog. Implementation, GOI in a colorful award presentation ceremony organized at New Delhi on May 7th, 2013.

Welcome Address by Shri V. K. Subburaj, I.A.S., Additional Secretary & Financial Advisor, Department of Chemicals & Petrochemicals, Ministry of Chemicals & Fertilizers

Special Address by Shri Indrajit Pal, I.A.S., Secretary to Government of India, Ministry of Chemicals & Fertilizers

Presidential Address by Shri Srikant Kumar Jena, Hon'ble Minister of State (Independent Charge) for Chemicals & Fertilizers and Statistics & Prog. Implementation, GOI

Release of souvenir by Shri Srikant Kumar Jena, Hon'ble Minister of State (Independent Charge) for Chemicals & Fertilizers and Statistics & Prog. Implementation, GOI

Glimpse of Prize Distribution during 3rd National Award on Technology Innovation 2013

GUJARAT STATE PLASTIC MANUFACTURING ASSOCIATION

CHINAPLAS 2013

GSPMA participated in CHINAPLAS 2013 held during 20th to 23rd May, 2013 at Guangzhou PR China. A delegation of about 70 members visited this international plastic fair. The exhibition was spreaded over 220,000 sq.mts. area and about 2900 exhibitors participated in it from 38 countries across the globe. The exhibition promised to focus on sustainable development of the industry and the integration of plastics and rubber applications and innovative technology into the manufacturing trade around the world.

View of GSPMA delegation to Chinaplas 2013

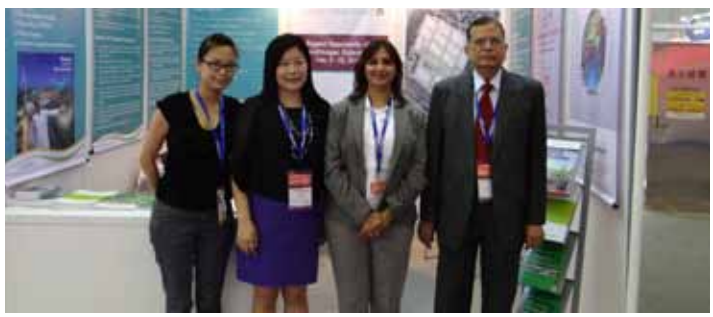
Glimpses of Annual get to gather

Annual get to gather function was organized by GSPMA on 30.03.2013 at Gujarat University Conventions Center, Ahmedabad followed by Dinner & Entertainment Program Large Number of Member, Invitees and member of plastic fraternity attended the function.

Left to right Ketanbhai Shah, Harshit Shah,Pinakin Shah, lighting the lamp at inugration of Annual tet to gather

Events & Participations


Polyindia 2013 from 25 -27 April 2013 at Chennai Trade Center, Chennai




Chinaplas 2013 from 20 – 23 May 2013 at China Import & Export Fair Complex, Pazhou, Gaungzhou, PR China.


IPLEX 2013 from 27 – 30 June 2013 at the Chennai Trade Centre, Chennai

Injection Moulding & Blow Moulding Conference from 25 – 26 July 2013 at The Lalit, Mumbai, India

Upcoming Exhibitions

Sr. No.	Date	Meetings/ Events	Venue
1	October 16 - 23, 2013	K-2013	Duesseldorf, Germany
2	October 24 - 26 2013	India Composites Show	New Dehi - India
3	October 28 - 30, 2013	Green Middle East	Expo Centre Sharjah, United Arab Emirates
4	October 30 - November 02, 2013	Plastex Siberia 2013	Russia
5	November 5 - 7, 2013	Pace India - 2013 (Packaging & Converting Executive Forum	Singapore
6	November 14 - 17, 2013	2013 Myanmar International Plastics,Rubber, Packaging,Printing and Foodtech Industry Exhibition	Myanmar
7	November 20 - 23, 2013	Mould & Die Indonesia 2013	Kemayoran - Indonesia
8	December 03 - 05, 2013	CPhI India - Pharmaceutical event	Bombay Exbh. Centre, Mumbai
9	December 05 - 08, 2013	PlastEurasia 2013	Istanbul - Turkey
10	December 12 - 16, 2013	Plastivision 2013	Goregaon, Mumbai
11	December 13 - 15, 2013	Plastic Packaging, Paper & Print Asia	Karachi - Pakistan
12	January 10 - 11, 2014	The 11th National Conference And Technology Exhibition On Indian Medical Devices & Plastics Disposables Industry 2014	Ahmedabad - India
13	January 28 - 31, 2014	Interplastica 2014	Moscow - Russia
14	February 11 - 13, 2014	Oman Plast 2014	Muscat - Oman
15	February 12 - 14, 2014	Pace Europe - 2014 (Packaging & Converting Executive Forum	Brussels, Belgium
16	April 16 - 19, 2014*	Chinaplas 2014	Shanghai - China
17	April 17 - 20, 2014	Arabiamold 2014	Expo Centre Sharjah, United Arab Emirates
18	May 08 - 14, 2014	Interpack 2014	Dusseldorf - Germany
19	September 30 - October 02, 2014	Interplas 2014	Birmingham, UK

PLASTINDIA 2015

9TH INTERNATIONAL PLASTICS EXHIBITION & CONFERENCE,
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