

Composites Industry In India - Present Scenario

Vivek Patel

Indian economy is in buoyant mood with consistent growth track. The stock market index is at high and the gross domestic product (GDP) growth for 2009 is expected to be 8-9% while it was 6.7% for last fiscal year 2008. The per capita income in India stood at US\$ 687.03 in 2007-08 and has risen by over one-third from US\$ 536.79 in 2005-06 to US\$ 773.54 in 2008-09. India is home for over a billion people and it is predicted to be the world's most populous country by the year 2020.

Started in early 1960, the Indian composites industry is about 50 years old and still it is rapidly growing in the applications like windmill blades, underground petroleum tanks, oil and natural gas pipelines, tanks and vessels, insulation products, auto components, building materials and other recreational industry applications. The huge investments are being planned in several sectors, wherein composites can be successfully used in the areas of aerospace, automotive, gas, power, waste water treatment and water sanitation. The Indian composites industry has been steadily gaining growth momentum over the last few years and is expected to grow more than 20% in the current year, reflecting the upbeat economy and strong fundamental drivers for growth. India can be a manufacturing hub to cater



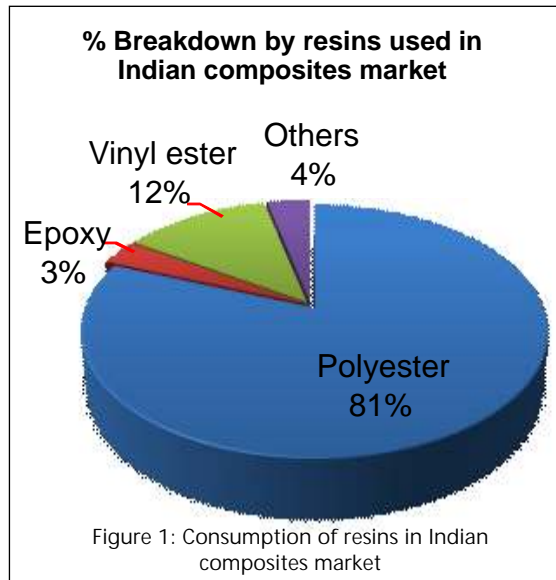
both domestic and overseas market mainly due to the large pool of workforce eager to work at competitive wages, skilled personnel, technology advancement, and a sizable and affluent middle class population.

Since last four years, approximately 30 multinational companies have started operation in India to cater Indian composites market. They are Jushi group, Saertex, Reichhold, Ashland, Georgia Pacific, Solvay, Axson, Saint-Gobain, Amiantit, Beluga Tanks, Hepworth, Angerlehner, Vestas, LM glassfibre, fibregate, Pentair, DIAB, fibrefil, Bay Systems, Mitsui Prime, Quickstep Holdings and others.

The total Indian composites materials shipment was 330 million pound (149685.5 MT) in the fiscal year 2008

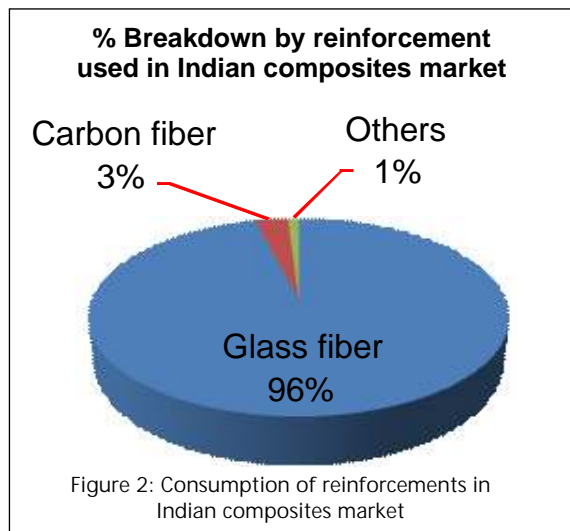
which represented a growth of 20% as compared to 2007, whereas, by the dollar million value it was \$ 1.1 in composites market. It is forecasted that the Indian composites market will grow at the rate of 25% in the coming 5 years. The major growth rate for pipes and tanks, wind energy, and transportation sector will be at 33%, 35 % and 27% respectively.

The aerospace and defence segment has potential penetration in composites market, mostly governed by the government agencies (Hindustan Aeronautics Ltd., NAL, ISRO). These markets consume high performance raw materials such as prepregs, carbon fibre, BMI, cyanate ester, epoxy and honeycomb for the making of aerospace and military components. Mostly, these materials are imported and due to the



recent developments in policy changes by the Indian government, import has become hassle-free. It is a good time for international companies to enter the Indian composites market. In terms of composites production, India is behind many other Asian countries. There are over 900 fabricators and more than 60% of them use hand lay-up for their production. It is a good opportunity for industries abroad to utilize these facilities wherever hand lay-up is the fabrication method. The industry caters mostly to the domestic market with only 10-15 % of total production being exported.

The Indian composites raw materials industry is extremely fragmented and unorganized. The most widely used resin in India is polyester followed by vinyl ester and epoxy and mainly glass fibre is



used as reinforcement. Figures 1 and 2 show the resin, and reinforcement markets breakdown of the resin and fibre types. In the fiscal year 2008, polyester resin captures about 81% of the market whereas vinyl ester captures 12.2% and epoxy has very low share of about 3.2% while glass fibre reinforcement captures 96%. The total glass fibre production in India was only 200 million lbs in 2008 accounting only 3% of global glass fibre reinforcement consumption whereas the rest of the world consumed 8000 million lbs.

Indian composites market by manufacturing process: 2008

Hand lay-up process is the most dominating manufacturing process in the Indian composites industry and accounts for 42% of the total composites used in 2008 as shown in Figure 3. The second position is with filament winding manufacturing process which accounts to 16% and the third and fourth positions are retained by injection molding and compression molding (SMC/BMC) with 13% and 12% respectively. These processes are used in the making of components for a variety of industries such as automotive, wind energy, boat, pipes and tanks, and railway. Other processes include pultrusion, resin transfer molding (RTM), and vacuum assisted resin transfer molding (VARTM), all of which stand with low share percentages.

Indian composites market by applications: 2008

The Indian composites market by applications is mainly divided into seven segments.

The major composites consumption goes into pipes and tanks, thereafter transportation segments come, while wind energy retains number three position with aerospace and defence sector standing in number four position. Figures 4 and 5 give crystal clear picture of Indian composites market consumption by applications for the fiscal year 2008.

Automotive sector

In 2008, Indian automobile industry accounted for 26 % of the total Indian composites market and by value it was \$ 286 million. In automobile industry where significant amount of composite materials have been used in passenger cars, scooters, helmets and other components, there is a huge potential for use of composites for hoods, cabs, frames, and cargo containers that could be used as essential parts of automobiles. The future of Indian automobile sector is bright and it is predicted that their consumption of composites materials will grow by 20 % in the coming 5 years. That's why more and more MNC companies are investing in Indian automobile market.

There are many heavyweight players investing in Indian automobile sector. Currently, Mercedes-Benz invested \$ 700 million to increase the producing capacity of its trucks in its manufacturing plant in Chennai, while the infrastructure is expected to address the future expansion plans of the company. The German car maker is also on course to increase its headcount three-fold at its R&D centre in Bangalore by next year 2009 and will invest close to Rs \$90 million on infrastructure and people-related costs. Mercedes-Benz is currently a division of its parent company, Daimler. As per industry estimates, about 8,000 passenger cars were sold by luxury carmakers in India last year.

The Japanese car making major Nissan has decided to shift the entire production of its small car, Micra from UK to India which will be involving a total investment

% Breakdown of composites processes used by Indian composites industry

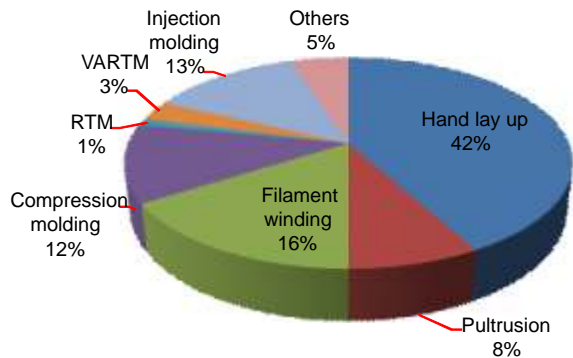


Figure 3: Composites manufacturing processes used for Indian composites industry

of over \$400 million. The move underlines the rush among automakers to rationalize production costs and move to locations that offer the best value and quality.

The world's largest car maker, Toyota Motors (TMC) plans to utilize the proposed Indo-Thai free trade agreement (FTA) to make India a hub for small cars to be exported to its global markets. A few auto-parts already enjoy duty free status but the Indo-Thai FTA that is currently under negotiations will make most auto-parts used by Toyota and other car makers duty free. Toyota has earmarked \$ 640 million for 2008-11 to set up a second plant in Bangalore to make 2 lakh cars from the current 80,000 units.

DSM Engineering Plastics has set up an automotive centre in Pune to cater to the automotive industry's requirements of new bonnet and transmission parts for the Tata Nano car.

Wind energy

India is the fourth largest generator of wind power in the world and the growth of composites' uses would be 30% in the next 4-5 years. In the fiscal year 2008, it accounted 16 %

with \$ 176 million. India has made tremendous progress in the wind power sector where composites consumption has exceeded that of China and Japan. It is estimated that roughly 100, 000 MW of power can be produced in India from only small wind turbines of 10-500 KW capacity. The leader in wind power sector, Suzlon Energy has plans to raise its manufacturing capacity to 5,700 MW by later this year acquiring with Germany's REpower Systems AG.

The PSU, National Thermal Power Corporation (NTPC) planned to install 1,000 MW wind power across Karnataka, Gujarat and Andhra Pradesh over the next few years. The Bharat Forge Ltd (BFL), the flagship company of the \$2.4 billion valued Kalyani Group, is set to

enter the wind energy business. The company will supply critical components for wind turbines of Tata Power's upcoming 10 MW capacity power plants in Maharashtra.

Chemical equipment

The oldest user of Indian composites industry is the chemical industry. Due to the highly corrosive environment, the entry of FRP was comparatively easy and the typical applications are vessels, tanks, pipes etc. This is a well accepted and matured application with established molders, industry standards, and many engineering consultants as well as clients.

The petroleum sector is another important segment which has a massive potential for FRP tanks. The underground tanks, piping systems and signages have been the common applications with the petroleum companies. The public sector petroleum refineries and marketing companies in India, however, largely use steel tanks both for underground storage and also for transportation. With the initial opening up of the petroleum retailing market to private players, the FRP/GRP tank industry has received tremendous boost.

The FRP pipes and tanks sector has the largest application of composites in India because of its excellent corrosion resistance properties and rightly forms the backbone of Indian composites industry. Applications in this sector include chemical storage tanks, ducts, pressure vessels, large-sized overhead water storage tanks, underground petroleum storage tanks and also for petroleum transportation and equipments.

This sector constitutes 32% of total composites consumption amounting to \$ 352 million in 2008.

Gail India, the country's largest gas transportation company will invest \$ 152 million in building India's longest gas pipeline of 2,050-km from Jagdishpur in Uttar Pradesh to Haldia in West Bengal. It

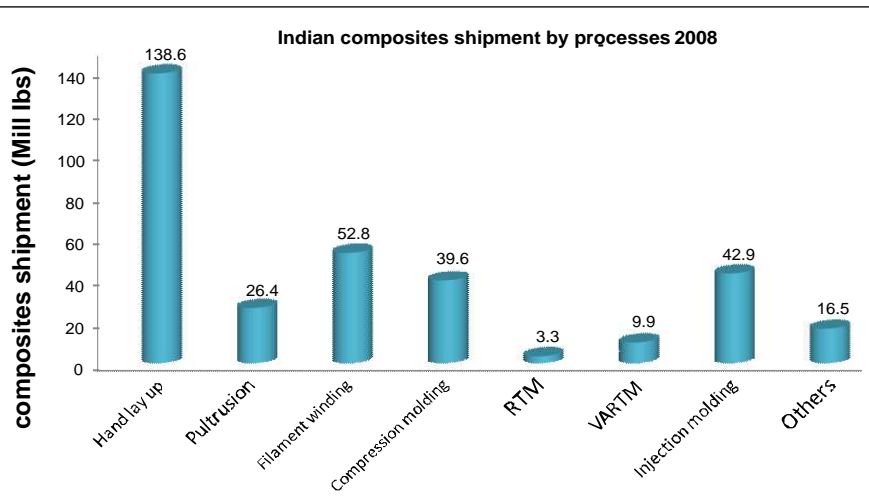
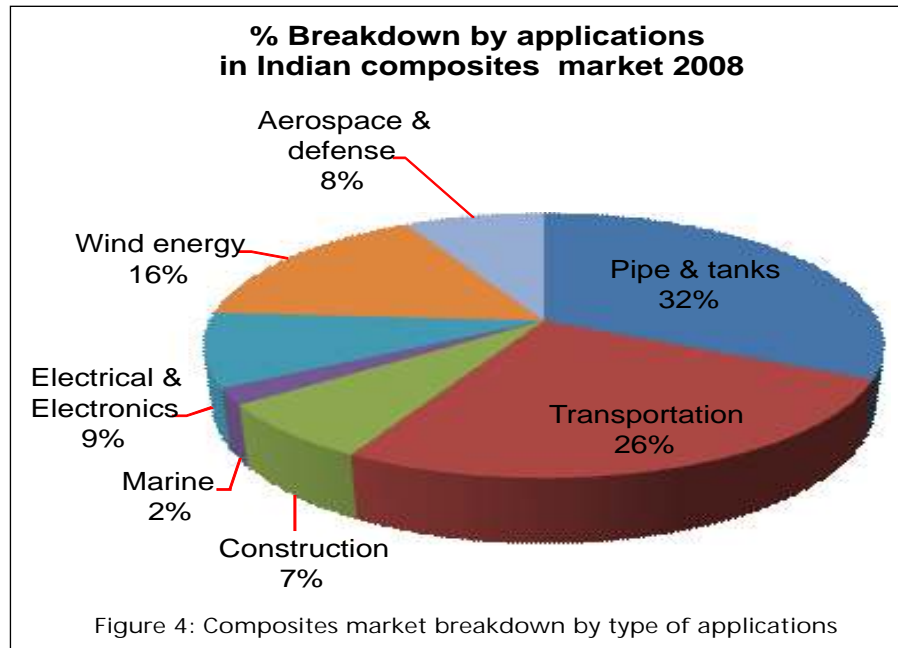


Figure 4: Composites Shipment (Mill lbs) by manufacturing process for Indian composites industry



is predicted that composite materials can capture 50% of this market in the oil and gas sector in the next 5-6 years.

Aircraft market

The huge potential is in aircraft market consisting of aerospace and defense sector. In 2008, it was 8% of the total Indian composites shipment and by value \$ 88 million.

Boeing, the world's second largest commercial aircraft maker is working on some key technologies in India for improving the aircraft's efficiency and bringing down its operating costs.

In India, Boeing has collaborations with several institutions for the development of aerospace technology. It has a tie-up with Indian Institute of Science (IISc) for research in aerospace material, structures and manufacturing technologies. It collaborates with IIT-Kanpur for integration of passive and active radio frequency identification (RFID) technology, and with National Aeronautical Laboratory (NAL) for development of computational fluid dynamics (CFD) tools and testing aircraft landing gear. Boeing has a partnership with Hindustan Aeronautics Limited (HAL) for developing advanced low-cost

manufacturing processes for polymer matrix composite structures. Boeing is part of the Aerospace Network Research Consortium (ANRC) comprising IISc, Wipro and HCL, which is developing innovative solutions for aerospace networks.

Boeing has also tied up with Tata Motors Tal Manufacturing Solutions (TALMSL), which will build floor beams using titanium and composite materials for Boeing 787.

The US based Sikorsky Aircraft is looking at making India the hub to cater to the requirements of the South Asian market after forming a joint venture with the Tata Group to manufacture helicopter cabins in India.

The European aircraft manufacturer Airbus Industry has plans to establish manufacturing base in India in the next three or four years following a strong presence in areas such as engineering, research, design and training. Airbus expects an expenditure of about \$ 1 billion in India over the next 10 years provided it gets right partners and projects. As part of its globalisation plan, the company plans to build upto 20% of aero-structures and 30% of engineering sub-contracting offshore by 2020.

Tata Advanced System Limited (TAS), a unit of the Tata group is expected to invest \$ 200 million for helicopter manufacturing unit at the Aerospace Special Economic Zone (SEZ) in Adibatla village near the Hyderabad international airport. The TAS had collaboration with Israel Aerospace Industries to set up a surveillance system facility also at the SEZ, and would be the focal point for a large number of high-tech activities.

The government of India has also taken good initiative to establish composites hub for aerospace and defense sector, and also government's Offset and PPP policies are helping private and public sector to invest in the Indian aerospace sector. An investment of \$ 600 million will be made by industries in the Special Economic Zone of Aerospace and Precision Engineering Special Economic Zone at Adibatla of Ranga Reddy district in Andhra Pradesh.

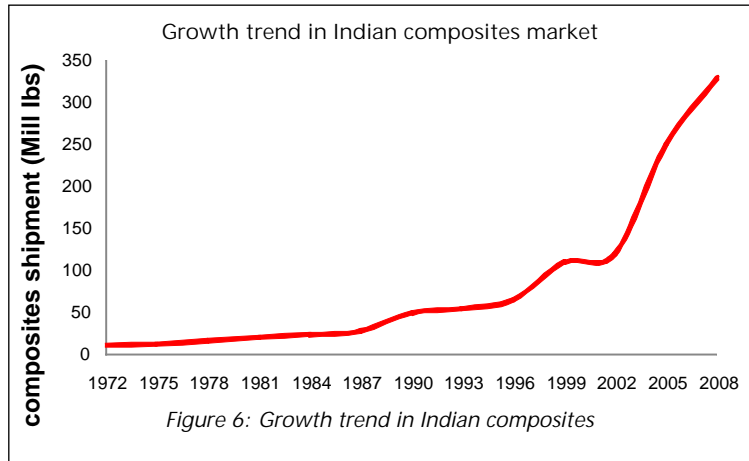
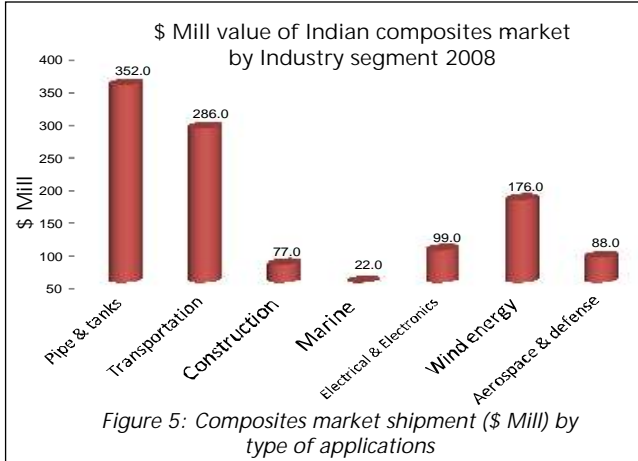
The European Aeronautic Defence and Space Company (EADS), the parent of Airbus is exploring possibilities to set up a helicopter assembly unit in India. A high-level delegation recently visited India to assess the possibility of setting up a manufacturing facility in the country.

The main concern is the availability of raw materials for aerospace and defense sector, wherein the supply side is weak. For the fulfilment of these gaps some major MNC raw material manufacturers started operation in India.

Rallis India has set up the facility in Ankleshwar to produce advanced composites poly ether ketone (PEKK), a high-end application polymer used in the aerospace industry for US-based Cytac Engineered Material.

Reliance Industries Limited plans to manufacture carbon fibres and outsource locally developed technology from state-owned National Aerospace Laboratories. Bayer Material Science is to invest Euro 20 million in an aromatic and aliphatic polyisocyanate plant in India as part of its strategy to grow its business and become the leading polyurethane

Feature



Key Drivers

- + Gradual economic growth
- + Potential investments in infrastructure, gas & power sector, water sanitation, wind energy, waste water treatment
- + Helicopter, aircraft & space production programmes
- + Offset policy for aerospace & defense
- + Demand reduction in North American and European composites market, interested to invest in the Indian composites market
- + Burgeoning foreign direct investment in Indian composites industry is likely to cross \$ 200 million in the next 4-5 years, current FDI is \$140 million
- + Government support for the development of new composites technology & design application, Technology Information, Forecasting and Assessment Council (TIFAC) and IIT, Kharagpur has set up an industry-oriented composites application wing

Key Challenges

- + Acceptance of composites system
- + Few raw material suppliers
- + Scarcity of "Indian made" process machinery
- + Gaps in demand & supply side

raw material supplier in India. The new plant is set to be based in Ankleshwar (Gujarat) and scheduled for 2011 start-up. The DIAB and Evonik Degussa has started manufacturing unit in India for the production of foams which are used as a structural core material for sandwich constructions in aerospace and wind energy sectors. In India composites material is having potential application in the railways sector such as window sills and frames, trays for battery boxes, ceilings, driver cabins, laboratories and floors.

Marine

The marine industry has lower consumption of composites materials in Indian composites industry and the

applications include leisure boats, houseboats, and speedboats. In fiscal year 2008, it accounted for only 2% and by value it was \$ 22 million. The future growth rate will be same for the coming years. In 2009, Mahindra Group forayed into marine market through 51:49 ratio joint venture with Ocean Blue, in which the \$ 146 million valued Mahindra & Mahindra (M&M) will hold majority stake and make 20-40 ft long custom-designed fibreglass power boats for social and recreational purposes. The Japanese auto major, Honda, through its Indian subsidiary Honda SIEL India (HSIL) is planning to foray into the Indian boat manufacturing market and is conducting feasibility studies for the purpose.

Growth trend in Indian composites Industry

The Indian composites industry is consistently growing. The growth rate was slow till 1990 but picked up from 1995 onwards.

In the fiscal year 2008, the total Indian composites market had grown with the rate of 20% and it is predicted that growth rate would be 25% in the next 5-6 years. Figure 6 is representing growth trend in Indian composites market. India has the most potential growth of composites than any other country in the world right now.

The rising affluence of the Indian people, growing middle class and leisure activities are important factors to accelerate the above said growth.



Vivek Patel

(Contact : vivepatel@gmail.com)