Functional and flexible



IT IS NOT SURPRISING THAT DUE TO THE ADVANTAGES OFFERED BY PLASTICS, AFTER PACKAGING, CONSTRUCTION SECTOR IS THE SECOND HIGHEST CONSUMER OF THIS MATERIAL ACROSS THE GLOBE. BY SAMIT JAIN, MANAGING DIRECTOR, PLUSS POLYMERS

lastics are unarguably the most fascinating materials known to mankind. They are present in almost every sphere of our modern lives - from packaged foods to smart automotives, from electronic gadgets to fabricated houses. After packaging, construction sector is the second highest con-

Construction sector majorly includes buildings, housings and real estate projects. However,

the consumption of plastics is not much evident in construction and buildings to the layman. Plastics are used for a wide array of applications including piping, wires & cables, electrical fittings, profiles for doors and windows, roofing, flooring, insulation, railings to list

sumer of plastics across the globe.

a few besides various other interior and exterior applications. This growing range of applications for plastics is because of their unique advantages viz. great versatility, excellent strength to weight ratio, cost effective-

ness, durability, corrosion resistance and low/zero maintenance. Plastics are easily mouldable, do not rot, rust or demand painting, which accounts for their being the potential material of choice throughout this sector.

Plastics pipes is one of the most predominant application of plastics in the construction sector and share the majority of all new pipe installations - well over 50 percent of the annual tonnage and is still growing. PVC is the most preferred choice of plastics for this application across the globe because of its most favourable balance of properties- light in weight, chemical and water resistant, easy to install, low frictional loss and low on maintenance cost. Polyvinyl Chloride (PVC) and Polyethylene are used in making flooring which are less prone to wear and tear and can be cleaned easily.

For green or low energy buildings, Polyurethane is considered to be the best plastics material for insulation due to its closed cell nature. High thermal resistance which promotes temperature consistency is a critical advantage of using rigid polyurethane foam besides its lightweight, chemical resistant, and flame retardant properties. Polyurethane insulation performs as an air barrier, thus resulting in substantial energy savings.



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Samit Jain, Managing Director, PLUSS Polymers

Of late, there has been a significant rise in the use of engineering plastics in the construction sector. It ranges from speciality applications of electrical fittings and housings using plastics like PC, PBT etc. to non-speciality applications of PC based window frames. Polycarbonate is an engineering plastic and is frequently used to manufacture building windows because of its strong, clear and very light in weight mechanical characteristics. Windows made of polycarbonate materials are considered more burglarproof than regular glass windows. There is also a growing use of scrap polycarbonate for these applications which is not only a cost effective development but also a environmentally sustainable innovation. The upgradation of scrap PC is done by using speciality additives which enhance mechanical properties at par with virgin polymers and thus do necessary value addition. Apart from polycarbonate, acrylates and vinyl are used for producing window frames.

Acrylates are extremely strong while vinyl is quite durable and inexpensive.

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Wood plastic composites (WPC) are one of the recent developments in the field of plastics used for construction sector. WPC are composite materials made of wood flour or agricultural



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waste and recycled thermoplastics along with speciality additives. These materials feel just like wood combining advantages of both wood and plastics and are resistant to rot, termite, moisture, warping and crack. As they are made using recycled materials, they are environment friendly products contributing to the LEED points. In buildings and construction industry, they have various applications like decking, railing, fencing, louvers, garden benches, wall cladding, doors and windows etc. Available in different colour and finishes, these gives the homes a superior aesthetic look.

WPC mainly serve the high end residential homes and the premium hotel segment. According to a recent report, there are approximately 400,000 high end homes coming up in the top 8 cities of India at a compounded annual growth rate of 2.8 percent. The division of single family housing and multi-family housing is 3:7. A conservative estimate of the area of WPC in a

single family and multi-family housing is approximately 1,000 and 7,000 square feet respectively. The potential market size for the next 5 years is 23-25 million square feet per year. Likewise, the number of luxury and upper scale hotels coming up in the next 5 years in India is approximately 400 with a growth rate of 10



percent. An estimate of the possible WPC area in a hotel is approximately 5000 square feet. The overall market size is in the range of 350,000-500,000/year.

Also, India has the potential to be a global leader in green buildings by 2020 with over 1 billion square feet of green building foot print. HDPE, PP and PVC are three most commonly used plastics by the WPC industry. Use of PVC has started decreasing in European countries because of its toxic nature and the trend will follow everywhere soon. It is still being used because of its cost effectiveness over HDPE and PP but the demand of PP based WPC's is increasing in the country. WPC is not just a product but a concept of minimizing use of renewable natural resources like wood and using waste plastic waste to generate utility that are crucial to a sustainable future.

Nowadays aluminium composite panels (ACP) are used in constructing modern office

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buildings. ACP's are nothing but a sandwich panel having a structure made of three layers: low density polyethylene core inserted in between two relatively thin skin layers of metal, preferably aluminium. The binding of such a system is done by using speciality additives called tie-layer adhesive resins. The positive signs of change in the Indian economy are reflecting significant growth of the office space market across the country and this in turn creating demand for innovative materials like ACPs and WPCs.

Continuous innovation in plastics will further encourage use of innovative materials in construction sector. New materials and a range of polymeric composites and glass reinforced plastic materials are continuously being developed to explore their implications for structures. Wood plastic composites with up to 95 percent recycled material in weight and including construction and demolition waste are already being manufactured for applications like pathways,

benches, terraces, sound barrier partitions for railways and highways etc.

Construction sector has, however, a strong tendency towards usage of traditional materials and tried and tested methodologies; but plastics offer immense opportunities for innovation in this sector. The future will see the growth of smart buildings and methods such as prefabrication which will move work away from construction sites and into factories.

It is true that the future of construction industry in India is a lot dependent on economic condition. The new Government seems dedicated towards development in the infrastructure sector and is doing every effort to accelerate growth in the industry. Increase in demand for housing coupled with new regulations which are intended to make the industry more energy efficient, manage waste, recycle and take life cycle analysis is into consideration as per Govt. commitment to have housing for all by 2022.

PLUSS Polymers, an advanced materials technology company, is working in the area of speciality additives that are helping traditional PVC wires and cables manufacturers to move to environment friendly halogen free wire compounds that produce low or zero smoke in cases of fires. OPTIM additive from PLUSS is the key towards enabling making of such compounds. PLUSS also pioneered the additive to blend wood waste with plastics waste to create wood plastics composites in India. India today has about 5 to 7 PP based WPC manufacturers and the number is likely to grow. WPC will be a game changing technology in the Indian construction industry - to meet the wood replacement demand in millions of low cost and high end homes likely to come up in the near future. (2)



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