

WORLD MARKETS FOR FRP: EUROPE

By A. Brent Strong, Brigham Young University and John E Green, GSG, Inc.

Overview

As anyone who attends composite shows in the United States and in Europe can confirm, the composites markets in the United States and Europe are not dramatically different. Most of the product areas, manufacturing methods, and raw materials are similar, if not identical. In fact, some parts, especially in aerospace, are made interchangeably in Europe, Asia, and the US. However, some areas of emphasis and some trends vary significantly between the US and Europe. Those variations are important because they reveal characteristics of the two markets that can be critical in marketing and product development.

One overriding difference between the major market areas arises from legislative pressures and public opinion which have long focused on environmental issues to a much greater extent in Europe than in the United States. These environmental concerns in Europe have a major influence on the strength of some market segments, such as wind turbines. The same pressures also influence the choice of materials causing thermoplastic composites to be much more important and growing faster in Europe than in the US. Recent proposed legislation by the European Union would require that extensive health and safety data be made available on all components of all materials used. The phrase that seems to be associated with this legislation is "no data, no market". While the legislation would not be implemented until at least 2012, many resin manufacturers have already begun the costly process of obtaining the data that will be required. Inevitably, this will affect both pricing and availability of some products.

In this article we will focus on the differences of emphasis between the US and Europe in application areas (industries) and manufacturing methods/materials, and on the trends seen in Europe which might signal future differences.

Application areas (industries)

Wind turbines – Over the past ten years there has been a 24% per year growth in the wind turbine market throughout the world with the majority of that growth occurring in Europe. Europe now possesses over 75% of the world's total wind turbine systems. A relative lack of oil and other natural energy sources has led some countries to develop wind turbines quickly and massively so that wind energy now represents over ten percent of the total energy source for both Denmark and Spain, with several other countries not far behind. (Up to now the favored energy method in European countries with little natural energy resources has been nuclear. Both France and Belgium depend upon nuclear sources for over 50% of their energy needs, but that trend is changing in favor of wind power.)

The European focus seems to be on large-scale wind energy farms, especially where wind forces are high. Along with the large number of wind turbines in these locations, the development of very large units seems to be a trend. Recently the world's largest wind turbine, a 3.6 megawatt unit, was installed in Ireland.

Previously the majority of wind turbine blades were made by hand layup, but many manufacturers are now moving to filament winding. Units as large as 180 feet long have been installed and this size has dictated that carbon fiber be used extensively (sometimes mixed with fiberglass in the same blade). Composite towers and covers (shrouds) are also increasingly made of composites (usually fiberglass polyester).

Aircraft/Aerospace – Airbus continued its growth in both total volume and market share. This growth occurred in both the civilian aircraft market and in the less-well-known military market. Of particular note was the announcement of a massive new program for military transports valued at 20 billion Euros over the 20-year life of the program. This program will supply military transports to seven European nations (in initial orders).

In addition to the large (over 100-passenger) aircraft such as the high-composite content A-380, some European manufacturers are working on full-composite fuselages for aircraft seating 4-8 passengers. Such aircraft are also being developed in the US. This could be a major growth area for composites in the future, especially as advanced manufacturing methods demonstrate the overall efficiency of composite manufacturing versus metal fabrication.

Automotive – The automotive market is up in Europe. Not only is it growing within Europe itself, but the foreign market, especially as European manufacturers penetrate the Chinese market, is rapidly becoming a major market. European auto manufacturers have chiefly used composites in high priced cars but the successes of those high-end models has led to inclusion of composites in models throughout the price range. Advantages of composites cited are weight reduction, greater energy absorption, lower investment costs, and easier repair.

Components that are typically made of composites include: chassis, hoods, front end frames, rear bumpers, doors, seats, engine components, and oil sumps. Some auto manufacturers (Mercedes Benz, BMW, Porsche) have some models with over 50 percent of the weight from composites. One auto company (Invicta Car Company, UK) has begun to make a sport coupe with a total composite exterior.

Mass transit – Composite rail coaches, bus bodies and compressed natural gas (CNG) tanks are the main focus in this market in Europe. Rail coaches and mass transit vehicles use composite products mainly for body components and bed and bathroom compartments. Growth in this area has been steady over the last 5 years.

CNG tank production is growing rapidly and will continue to expand. While largely used for fleets at present, the expansion of CNG filling stations and the continued development of manufacturing methods for high volume production will spur continued and accelerating growth. This growth will also be encouraged by legislation.

Manufacturing methods/materials

Thermoplastics composites – Environmental concerns over solvent-based resin systems has led composite manufacturers in Europe to develop thermoplastic composites to a much greater extent than has been done in the US. For instance, a Danish company, Twinrov, has worked with Euro Projects, a UK company, to develop thermoplastic composite lamp-posts. These posts avoid the manufacturing difficulties posed by solvent-containing resin systems and also have excellent mechanical properties. A unique break-away design promises to absorb more impact energy and therefore save lives when struck by autos.

General raw materials suppliers – A change in ownership occurred during 2003 in one of the major composite companies headquartered in Europe. Vantico was sold to HMP Equity Holdings, a partnership between MatlinPatterson and Huntsman LLC. Vantico is a supplier of coatings, structural composites, adhesives, tooling resins, and electrical insulation materials. Vantico was previously owned by Ciba-Geigy.

Another change in raw material supplies in Europe was the expansion of capacity by SOFICAR SA, a carbon fiber manufacturer in France. SOFICAR is a joint venture of Toray and Atofina. The expansion will raise SOFICAR capacity by 70% and reflects a belief by the company that carbon fiber demand will grow 6 percent per year over the next decade.

Traditional manufacturing methods – Filament winding is still one of the most efficient production methods for composite parts. There is still continued growth in this field in Europe with sales expanding for both US machine and European manufacturers. A Macedonian manufacturer announced the introduction of multi-axis filament winding machines thus signaling continued expansion of this manufacturing method into relatively new market areas. Another indication of creative innovation in filament winding is the continued expansion of turn-key winding factories.

Parts that have been traditionally made with SMC are now being made with hot pressing, especially in the automotive market. This is a cost effective manufacturing method, especially in light of total manufacturing costs. The hot press method seems to capture some of the best features of composite injection molding and thermoset compression molding.

As is also true in the US, resin infusion processes continue to expand into all market segments. These processes are being helped by the development of resins specifically tailored for this process and by new and innovative methods of making preforms. Increasingly, preforms are being made by traditional or modified textile processing, thus taking advantage of the many years of expertise that has been built-up in the development of textile equipment and manufacturing methods.

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John Green can be reached at GSG, Inc., www.thegreensalesguy.com

The following websites and newsletters were useful in gathering information for this articles:

www.netcomposites.com

editor@e-composites.com

www.compositesnews.com