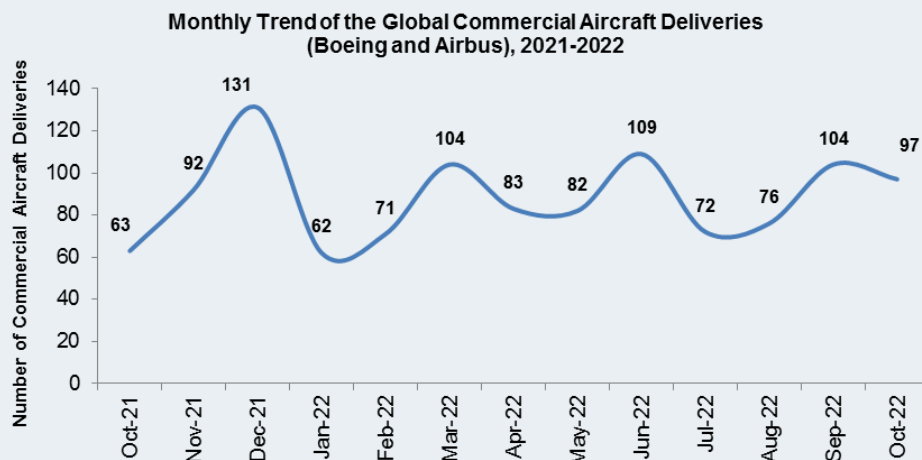


Composites Market Update for October, 2022

The composites market in October was flat to slightly down (1% – 4%) from a year over year standpoint due to various factors. Inventory adjustments at the distribution level softened demand. RV continued to struggle, and both transportation and marine have begun to slow down. Housing related products started to slow down, but infrastructure remained strong. November is projected to be down from 2021, which was uniquely strong. Current demand is more in line with pre-COVID trends, and November should be consistent with October from a daily sales standpoint, but with the added negative impact of the Thanksgiving holiday. Raw material prices continued to show signs of stabilization and even softening. UPR and epoxy prices came down slightly in recent weeks. The supply chain and import markets are still important factors, and freight prices have been climbing in recent weeks. Rail industry unions are negotiating terms, and a strike could negatively impact the entire composites market supply chain. Interest rate increases are likely tied to slowing housing and construction business. Although a cyclical slowdown is expected as the holiday season started, the outlook for composites demand remains fairly robust with no precipitous swings in pricing or demand.

Aerospace

Commercial aircraft (Boeing and Airbus) deliveries decreased from 104 aircraft deliveries in September 2022 to 97 aircraft deliveries in October 2022.



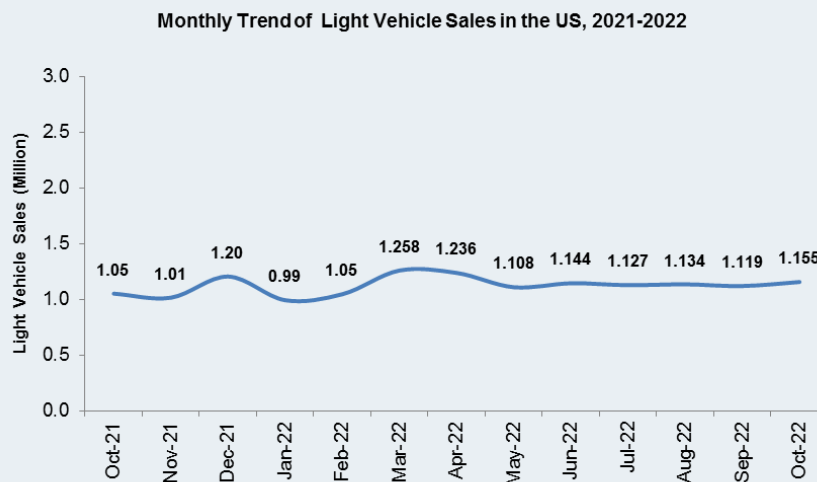
One of the highlights of October 2022 is as follows:

- Strong Partnership between Toray and Specialty Materials for Next Generation Aerospace Application.** The joint collaboration will improve the supply chain by uniting Specialty’s boron fiber with Toray Composite Materials America’s domestically produced high-strength intermediate modulus carbon fibers T1100G and a variety of Toray Advanced Composites’

resin systems including toughened epoxies, cyanate esters, bismaleimides, and polyimides for the Specialty Materials' Gen 2 Hy-Bor product family. The next-generation product family is a high-performance hybrid prepreg tailored to enhance the structural efficiency of composite structures such as spars, longerons, rotors, and control surfaces for aerospace applications by tuning compression and stiffness properties.

Automotive

The U.S. new vehicle sales of 1,151,744 units in October 2022 represented an increase of 10% as compared to 1,051,015 units in October 2021.



Some of the highlights of October 2022 are as follows:

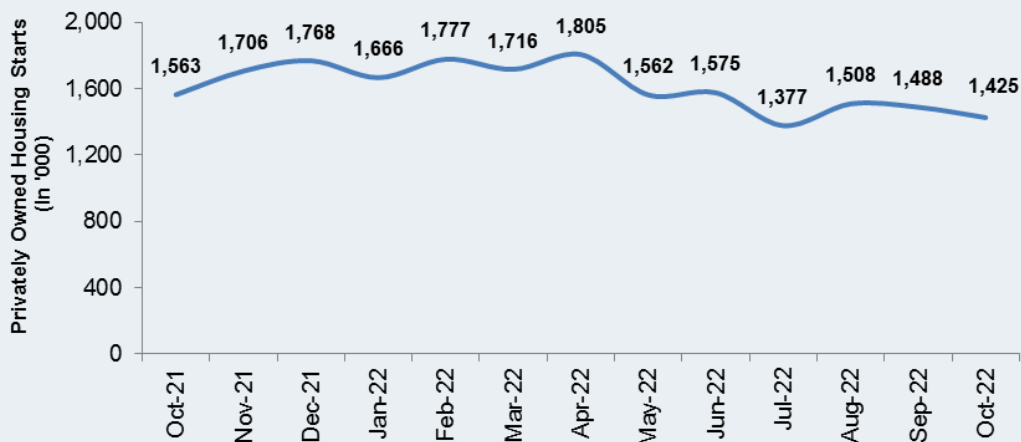
- Alef Aeronautics Launches eVTOL Flying Car.** The Alef Model A flying car comprises a carbon fiber body. It has a driving range of 200 miles and a flight range of 110 miles. It offers a distributed electric propulsion system, no exposed propellers, extensive software flight stabilization and safety system, elevon system and all-wheel driving. The Alef Model is a modern solution for both urban and rural transportation needs in the 21st century because it is the fastest and most convenient transport ever created from the point of origin to the final destination. The Alef flying car has reportedly been developed using the latest hardware and software technology advances, ultra-light and ultra-strong components, software simulators and analysis and rigorous flight testing.
- Cobra Advanced Composites Launches Flax Fiber-based Visual Finish Components.** The automotive business of composite products manufacturer Cobra International, has launched a range of production-ready, flax fiber-based, visual finish components. The new natural fiber composite solutions offer a sustainable option compared to traditional carbon look visual components. The low-density flax fibers, typically cultivated in Western Europe, are reported to be much less energy-intensive to produce than carbon fiber, provide good impact resistance and high vibration damping. This makes them suitable for a wide variety of parts including interior and exterior components.

- Bucci Composites Presents 20-inch Carbon Fiber Rim Dedicated to the Aftermarket.** Bucci Industries Group presented its first 20-inch carbon fiber rim dedicated to the aftermarket, especially for the sport/supercar sectors. The 20-inch composite rim features an elegant and sporty design, combining high performance with a weight saving of more than 20% compared to a forged aluminum wheel, according to Bucci Composites. Its ultralight weight is directly linked to less rotational inertia, which translates into greater acceleration, shorter braking distance and better vehicle handling.

Construction

Privately-owned housing starts in October were at a seasonally adjusted annual rate of 1,425,000. This is 4.2% below the revised September estimate of 1,488,000 and is 8.8% below the October 2021 rate of 1,563,000. Single-family housing starts in October were at a rate of 855,000; this is 6.1% below the revised September figure of 911,000. The October rate for units in buildings with five units or more was 556,000.

Monthly Trend of Privately Owned Housing Starts in the US, 2021-2022



One of the highlights of October 2022 is as follows:

- Wyoming Bureau of Land Management Goes to Carbon Fiber Tower.** IsoTruss Inc. has installed a lightweight, durable IsoTruss carbon fiber cell tower solution for the Wyoming Bureau of Land Management. The Elk Mountain IsoTruss tower is great examples of helping a client resolve an ongoing repair and maintenance issue at a remote critical infrastructure site with a sustainable, innovative solution. IsoTruss engineered and transported a 40-foot IsoTruss® carbon fiber tower weighing 250 lbs., then bolted and connected it to the existing system shelter. The lighterweight tower was delivered to the remote site with a light-duty truck and installed using manpower in a single day. This towers reduce material usage by twelve times on a weight basis, resulting in 70% reduction in carbon emissions over the life of the tower and are well-suited to high wind, snow and ice environments in mountain settings. This is mostly due to the corrosion-resistance of the composite material.

Wind Energy

According to the latest "Energy Infrastructure Update" report from the Federal Energy Regulatory Commission's Office of Energy Projects, the cumulative installed capacity of 32 units during January – September, 2022 was 6,328 MW as compared to 8,480 MW of 50 units during January –September, 2021. With a total installed generating capacity of 141.11 (GW), wind constituted 11.23% of the total installed generating capacity of 1,256.81 (GW) among all energy sources.

One of the highlights of October 2022 is as follows:

- **Collaboration between Siemens Gamesa and Airborne.** Siemens Gamesa Renewable Energy has contracted Airborne to engineer and supply an automated system for the manufacturing of composite offshore wind turbine blades. By working together, both companies bring years of expertise in the manufacture of wind turbine blades, composite processing and automation to make this project a success. The scale of the operation is impressive and the requirements on layup rate are higher than ever seen. Morten Westeraa, robotics expert of Siemens Gamesa agrees, finding potential and demand in the global wind turbine market.

Marine

The US marine industry is anticipated to experience good growth in 2022.

One of the highlights of October 2022 is as follows:

- **Hexcel HexPly M9.6 Prepregs Receive Type Approval for Marine Use.** Hexcel Corp. has received type approval for its HexPly M9.6GF prepreg products from testing, inspection and certification services company Bureau Veritas. The third-party certification enables Hexcel's carbon fiber-reinforced epoxy prepregs to be used in the production of parts for all BV-approved marine vessels. It also guarantees the quality, performance and consistency of the prepregs for ship and boat builders. BV-approved HexPly M9.6GF prepregs can be reinforced with unidirectional (UD), non-crimp (NCF) and twill-weave fabrics. They are particularly suitable for use in the manufacture of masts and other large structural components for wind-assisted ship propulsion (WASP). To reduce reliance on engines and cut fuel use, WASP vessels harness the power of ocean winds, often using large carbon fiber-reinforced masts flying durable composite solid sails.

Consumer Goods

New orders for manufactured durable goods in October, up seven of the last eight months, increased \$2.8 billion or 1.0% to \$277.4 billion, according to the U.S. Census Bureau. This followed a 0.3% September increase. Excluding transportation, new orders increased 0.5%. Excluding defense, new orders increased 0.8%. Transportation equipment, up six of the last seven months, led the increase by \$2.0 billion or 2.1% to \$97.8 billion.

Some of the highlights of October 2022 are as follows:

- D-Fly Launches Dragonfly Electric Hyper-scooter.** The four-wheel electric Dragonfly scooter is designed with patented full-tilt steering that controls all wheels at once, four-wheel dual-independent damped suspension and a high-class, sleek design to deliver stability and control even while navigating difficult terrain. Key to the scooter's stability and safety is the wide carbon fiber deck. Carbon fiber was chosen for its high strength-to-weight ratio, and because it promotes a natural flex while maintaining optimum rigidity.
- Comfort and Flexibility in New Ankle Prosthesis.** Solico, the composite engineering specialist based in Oosterhout in the Netherlands has recently collaborated with Belgian prosthetics specialist Axiles Bionics on the Lunarix ankle-foot prosthesis which features bespoke composite components. The new Lunarix prosthesis uses advanced composite components to reduce the overall weight and outer dimensions of the unit, enhancing the performance and aesthetics when compared to earlier all-metallic designs. The innovation enables Axiles Bionics to contain the Lunarix' AI sensor package in a compact size 36 foot, as well as deliver the specific non-linear stiffness required for a more natural gait.

Recent Development in Material

- PRF Composite Materials Launches New RP570 FR Fire-Retardant eXpress Cure Prepreg System.** PRF Composite Materials introduces its new RP570 FR eXpress cure prepreg system. Formulated for structural components requiring FST properties, RP570 FR is a fire-retardant ultra-fast prepreg system which is cured and demoldable after 5 minutes at 160°C. This express resin system is principally designed for snap cure press molding, however it can equally be used in conventional autoclave molding and significantly reduces time in the autoclave up to 50% less thereby increasing productivity and lowering energy consumption per part. RP570 FR is tested to Federal Aviation Requirements 25.853 Appendix F Part 1, AITM 2.0007 and 3.0005, UL94 V1 and FMVS Standard No.302. The PRF team will be discussing RP570 FR further with visitors at Advanced Engineering 2022, stand V150, alongside their innovative range of prepreg systems.

Recent Product Launches in the Composites Market

The following table represents new product launched in the composites market in October, 2022.

Product	Company Name	Description
Phosphorus Flame Retardant	Lanxess	The phosphorus-based additive is designed primarily for use in glass fiber-reinforced plastics used to manufacture products for the electrical and electronics (E&E) industry. The new polymer additive from LANXESS exhibits very good flame retardant properties in combination with other additives and easily meets the relevant fire safety tests.

<p>Sustainable Flax Fibre Visual Finish Components</p>	<p>Cobra Advanced Composites</p>	<p>The new natural fibre composite solutions offer a sustainable option compared to traditional carbon look visual components. CAC has used flax fiber prepregs with autoclave processing to create the new components. The low density flax fibers provides good impact resistance and excellent vibration damping making them suitable for a wide variety of parts including interior as well as exterior parts.</p>
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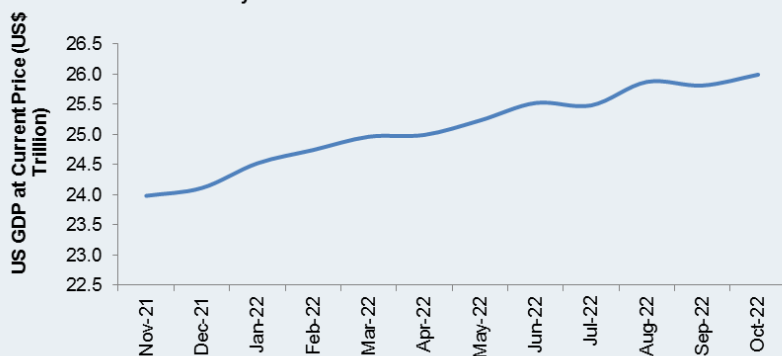
The US Economic Overview – October 2022

The US Consumer Confidence Index increased to 59.9 in October 2022 as compared to 58.6 in September 2022. The GDP at current price of the US increased from US \$25.81 trillion in September 2022 to US \$25.99 trillion in October 2022.

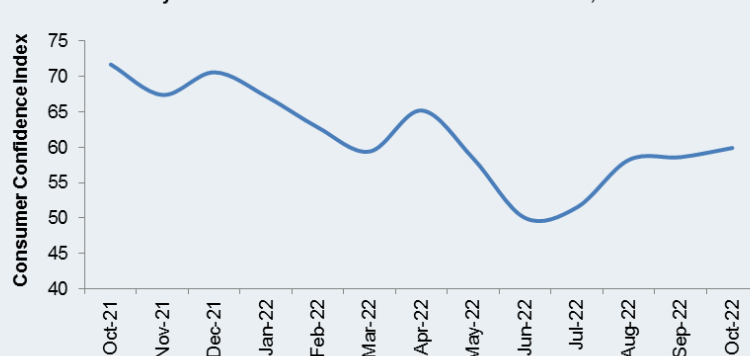
Real gross domestic product (GDP) increased at an annual rate of 2.9% in the third quarter of 2022, according to the "second" estimate. The increase in real GDP reflected increases in exports, consumer spending, non-residential fixed investment, federal government spending, and state and local government spending that were partly offset by decreases in residential fixed investment and private inventory investment. Imports decreased.

The price index for gross domestic purchases increased 4.7% in the third quarter, an upward revision of 0.1 percentage point from the previous estimate. The personal consumption expenditures (PCE) price index increased 4.3%, an upward revision of 0.1% point. Excluding food and energy prices, the PCE price index increased 4.6%, also revised up 0.1% point.

Monthly Trend of the US Current GDP in 2021-2022



Monthly Trend of Consumer Confidence Index in the US, 2021-2022



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