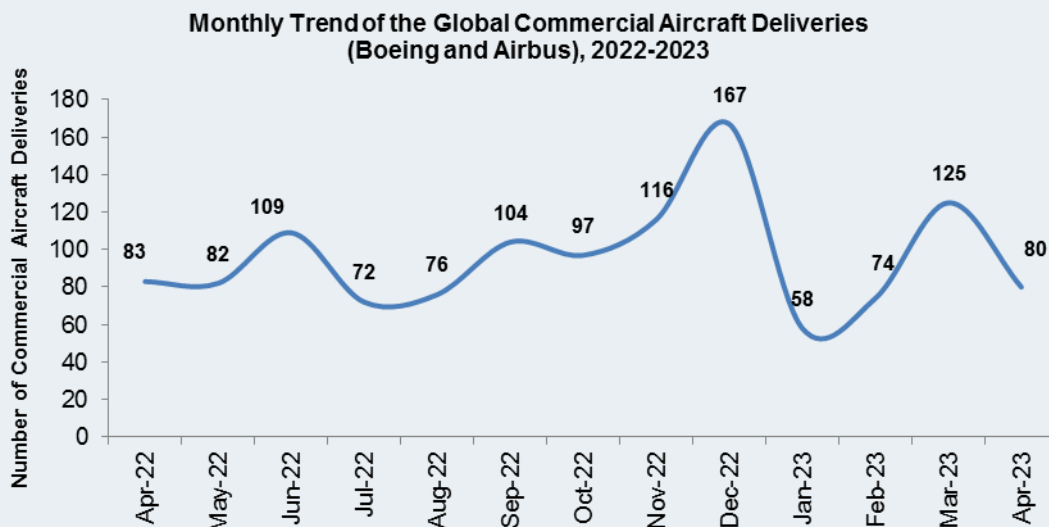


Composites Market Update for April 2023

The composites market in April dipped about 12% as compared to April 2022, and moderately edged down around 6% from March 2023. Sectors experiencing some weakness in April included Construction, Transportation (especially RVs), and Distribution. The marine sector witnessed softening in demand. The decline in the RV market is attributed to an accumulation of inventory, following growth during the pandemic. A key bright spot in April was Infrastructure, buoyed by opportunities in the expanding electrical grid. The second half of 2023 is anticipated to show positive signs, assuming positive economic conditions. The Infrastructure Investment and Jobs Act, where funding is being deployed, will drive growth in the infrastructure sector, including upgrading the electrical grid infrastructure. As inflation becomes further tamed, interest rate hikes are anticipated to decline or perhaps cease. This would be a key driver for the composites industry, which is negatively impacted by increased interest rates. The resulting increase in the housing market and in consumer spending on durable goods and luxury items would further boost composite industry prospects. The US Infrastructure Law will ultimately drive growth chance for rebound in housing. As inflation decelerates and gets under control, interest rate increases will cease. Indeed, there are some positive signs in the housing market. The US Census Bureau reported that privately-owned housing starts in April 2023 were 2.2% above the seasonally-adjusted March estimate, although 22.3% below the rate of April 2022.

Aerospace

Commercial aircraft (Boeing and Airbus) deliveries decreased from 125 aircraft deliveries in March 2023 to 80 aircraft deliveries in April 2023.

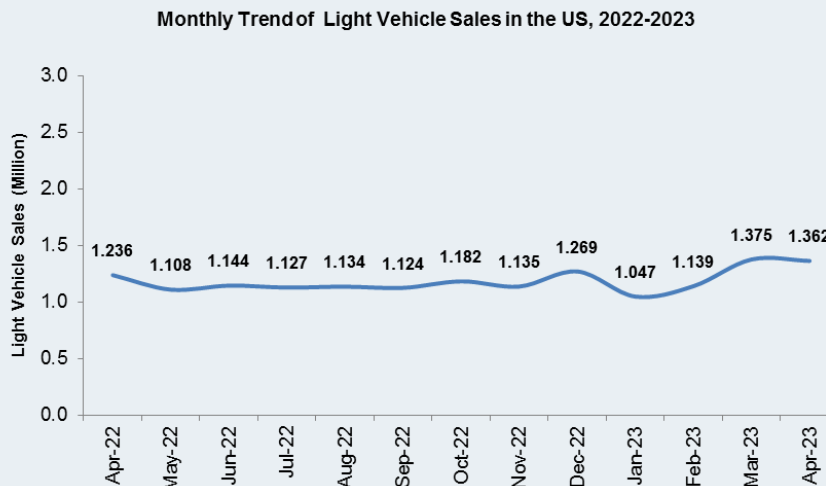


Some of the highlights of April 2023 are as follows:

- LifePort Acquires Aeromatrix Composites.** LifePort completed the acquisition of the advanced materials line of business from Aeromatrix Composites reflecting its commitment to vertically integrated aircraft solutions. This strategic acquisition expands LifePort’s product offering to now include: composite flat and formed panels, adhesives, all ATR panel pins and inserts, as well as payload component product lines. The strategic acquisition continues LifePort’s vertical integration initiative, while solidifying its capability to provide next-generation advanced materials solutions to aerospace and defense customers. The expanded portfolio will offer lighter-weight, and higher-performance products that can be rapidly manufactured. This combination not only expands LifePort's product offering, but also reduces supply chain risk by diversifying the supply base, and generating efficiencies that bring added value to customers.
- Hartzell Develops Five-Blade Composite Propeller for New, Pre-Owned Daher Kodiak 100s.** Under a recently approved STC, Hartzell Propeller’s five-blade composite propeller for Daher Kodiak 100 aircraft will be available as a factory option and for retrofit under Hartzell’s Top Prop program. The propeller can replace the four-blade aluminum Hartzell prop, now standard equipment on Kodiak 100s. The aerodynamic design of the new propeller’s carbon fiber blades allow RPM to be reduced from 2,200 to 2,000 RPM, reducing noise while producing smoother operations with no loss in climb and cruise performance. The new Hartzell prop for the Kodiak 100 also provides a significant noise reduction as compared to the current standard prop. The new 96-inch diameter prop saves 13 pounds of rotating weight by utilizing Hartzell’s Raptor propeller system and carbon fiber blades.

Automotive

The U.S. new vehicle sales of 1,361,803 units in April 2023 represented an increase of 10% as compared to 1,236,432 units in April 2022.



Some of the highlights of April 2023 are as follows:

- Teijin Automotive Technologies Supplies Exterior Body Panels to Lotus Emira.** The exterior styling of the all-new mid-engine premium sports car Lotus Emira is made possible, in part, by the advanced composite exterior panels provided by Teijin Automotive Technologies. Specifically, Teijin Automotive Technologies announces that it is providing the right- and left-hand doors; right- and left-side rear quarter panels, and the inner, outer and lower shells of the tailgate. The inner panels for the tailgate are made from a structural grade, low-density SMC, featuring a glass fiber content optimized for strength. All outer panels are provided to Lotus with a conductive primer, and the interior tailgate panel is provided with a black textured coating.
- Automotive Chassis Components Lighten up with Composites.** All of the easy automotive applications were converted from glass and metal to plastics and composites long ago. What are left are primarily structural applications on the chassis with considerably higher performance requirements than interior trim and exterior body panels and various trim components. On the other hand, kept in incumbent metallic materials, chassis components contribute significantly to conventional and electric vehicle (EV) mass and carbon footprint, and as a result, have become key targets for the conversion to composites and hybrid systems that combine multiple materials often metal and composites or several types of composites as the five applications that follow will demonstrate.

Construction

Privately-owned housing starts in April were at a seasonally adjusted annual rate of 1,401,000. This is 2.2% above the revised March estimate of 1,371,000 but is 22.3% below the April 2022 rate of 1,803,000. Single-family housing starts in April were at a rate of 846,000; this is 1.6% above the revised March figure of 833,000. The April rate for units in buildings with five units or more was 542,000.

Monthly Trend of Privately Owned Housing Starts in the US, 2022-2023



Some of the highlights of April 2023 are as follows:

- **EuCIA Provides Update on Future Eurocode for Composites.** The European Composites Industry Association has issued a fact sheet outlining progress towards the new Eurocode for composites, which is set to put composite materials on the same level as conventional construction materials. The publication of CEN Technical Standard (CEN/TS) 19101: Design of Fibre-Polymer Composite Structures, the future Eurocode for composites, starts a trial phase during which designers and engineers are encouraged to apply the guidelines in real cases.
- **Gatorbar, NEG, ExxonMobil Join Forces for Composite Rebar.** ExxonMobil subsidiary Materia, NEG-US, and GatorBar have formed a strategic alliance committed to increasing the market share of composite rebar within the concrete reinforcement sector. ExxonMobil's Materia Proxima polyolefin thermoset resin systems, and glass fiber from NEG-US, are used to produce GatorBar, an industry-leading, glass fiber-reinforced composite rebar (GFRP). GatorBar is also 4-7 times lighter than steel, resulting in significantly improved handling and ease of use characteristics. This creates opportunities for total project savings through reduced labor and decreased shipping costs.

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 8 units during January - March 2023 was 1,475 MW as compared to 4,617 MW of 20 units during January - March 2022. With a total installed generating capacity of 146.28 (GW), wind constituted 11.51% of the total installed generating capacity of 1,271.07 (GW) among all energy sources.

One of the highlights of April 2023 is as follows:

- **U.S. DOE Strategy to Accelerate, Expand Domestic Offshore Wind.** The U.S. Department of Energy (DOE, Washington, D.C., U.S.) announced the release of its Offshore Wind Energy Strategy, said to be a first-of-its-kind, comprehensive summary of the Department's efforts to meet the current U.S. administration's goal to deploy 30 gigawatts (GW) of offshore wind energy by 2030 and set the nation on a pathway to 110 GW or more by 2050. Offshore wind is rapidly growing around the world, becoming a central part of international decarbonization and a vital part of coastal economies, and the domestic potential to harness offshore wind is now emerging.

Marine

The US marine industry is anticipated to experience good growth in 2023.

One of the highlights of April 2023 is as follows:

- **Janicki Supports Saildrone Voyager Program.** Janicki, an engineering and manufacturing company, is supporting the Saildrone Voyager program with composite parts, machining and assemblies, leveraging its extensive experience manufacturing tools and parts for the marine and autonomous vehicle industries. Saildrone designs, manufactures and operates a fleet of capable, proven and trusted uncrewed surface vehicles (USVs). The newest addition to the Saildrone fleet, the 33-foot Voyager, is designed for near-shore Ocean mapping at depths of up to 300 meters and providing maritime domain awareness.

Consumer Goods

New orders for manufactured durable goods in April, up two consecutive months, increased \$3.1 billion or 1.1% to \$283.0 billion, according to the U.S. Census Bureau. This followed a 3.3% March increase. Excluding transportation, new orders decreased 0.2%. Excluding defense, new orders decreased 0.6%. Transportation equipment, also up two consecutive months, drove the increase, \$3.5 billion or 3.7% to \$97.6 billion.

Some of the highlights of April 2023 are as follows:

- **Aluula Composites, Black Diamond Develop Climbing Helmet.** Aluula Composites, an advanced materials technology firm, reports that it has collaborated with mountain sports brand Black Diamond to develop ultralight and strong composite materials for use in the next generation of Black Diamond's pinnacle climbing helmet, the 2023 Vapor. Aluula developed a custom penetration shield. The crown of the Black Diamond helmet uses Aluula Gold composite material. Aluula composites combine thin polymer films with ultrahigh molecular weight polyethylene (UHMWPE) fibers woven in various configurations (e.g., 0/90° and bias fabrics) to meet the technical requirements of different applications.
- **World's First Colored Carbon Fiber Bike Wheels Launched At The Cycle Show.** Hypetex is debuting with the world's first set of colored carbon fiber composite bike wheels at The Cycle Show 2023 at Alexandra Palace in London. Developed in partnership with leading wheel brand Parcour, the Chrono carbon fiber wheels feature a spectacular gold finish made of Hypetex's Zlatan uni-directional material and offer a stunning, lighter and higher-performance product than the traditional painted alternative. Hypetex is sustainable coloring technology for advanced materials, such as carbon fiber. Born out of Formula 1 racing, its patented paint-replacing process is a key step in advancing the lightweight revolution.
- **Exel Composites Pultruded Rods Enhance Umbrosa Parasol Durability.** Belgium company Umbrosa manufactures a range of outdoor umbrella and parasol systems that are used on terraces and in yards globally, in environments including seashores and jungles. Its systems must endure long-term exposure to high wind speeds, saltwater, rain and UV, meaning they must be designed with durability in mind to remain in place for long periods of time without experiencing damage.

Recent Development in Materials

- SGL Carbon Introduces SIGRAFIL C T50-4.9/235 Carbon Fiber for High-Strength Pressure Vessels.** SGL Carbon presented a new 50k carbon fiber at JEC World 2023. The new SIGRAFIL C T50-4.9/235 carbon fiber will match the high strength requirements for common pressure vessel designs and exhibits a high elongation capacity. It also enables further applications in market segments that require high strength and elongation. The SIGRAFIL C T50-4.9/235 carbon fiber was developed based on the 50k fiber portfolio already in large-scale production, which is successfully used in the wind and automotive industries, among others. The new SIGRAFIL C T50-4.9/235 achieves high levels of strength (4.9 GPa) and elongation (2.0%), now available in the 50k arena. The new carbon fiber SIGRAFIL C T50-4.9/235 is ideally suited for winding pressure vessels which are needed for storing hydrogen in fuel cell vehicles.
- TFP Unveils ECOVEIL Sustainable Nonwovens at JEC World 2023.** TFP's new ECOVEIL range includes nonwovens manufactured from jute, recycled carbon and bio-derived polyamide fibers, as well as a modified cellulose acetate (MCA) fiber which is readily biodegradable. The innovative new ECOVEIL nonwovens are specially designed to deliver the performance and quality synonymous with TFP's traditional OPTIVEIL range for composites, whilst also enabling the user to demonstrate environmental responsibility. The lightweight ECOVEIL polyamide 11 veil is an ideal choice for use as an effective support or carrier for adhesive films and fragile materials. All ECOVEIL variants also offer a sustainable alternative to traditional surfacing veils due to their even fiber distribution and consistent basis weight.
- DuPont Introduces Next-Generation Aramid Fiber, Kevlar EXO.** DuPont unveiled Kevlar EXO aramid fiber, the most significant aramid fiber innovation in over 50 years and an entirely new technology platform developed to serve endless applications where performance and protection is required in the midst of intense and demanding conditions. Life protection will be the first of many Kevlar EXO use cases that will offer an unprecedented combination of lightness, flexibility and protection from an aramid fiber. First-of-its-kind Kevlar EXO aramid fiber is incomparably better and more durable than even the highest-performing soft body armor materials available.

Recent Product Launches in the Composites Market

The following table represents new product launches in the composites market in April, 2023.

Product	Company Name	Description
Follow Focus F60	SmallRig	The Follow Focus F60 combines lightweight structural materials, ergonomic design, outstanding craftsmanship, and beautiful, durable Sapele mahogany wood for an impressive manual focusing experience. The core components of the F60 are brass and composite materials, which enhance self-lubrication and fatigue resistance, achieving precise focus tracking with zero backlash.

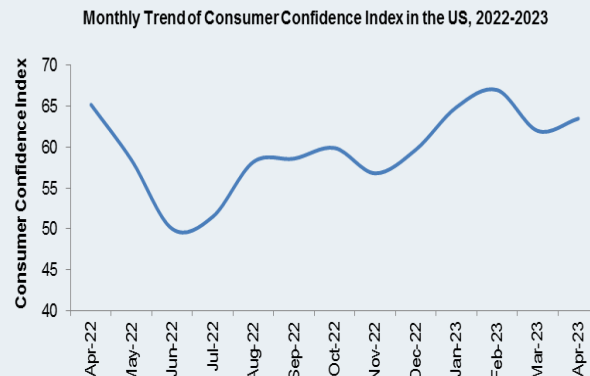
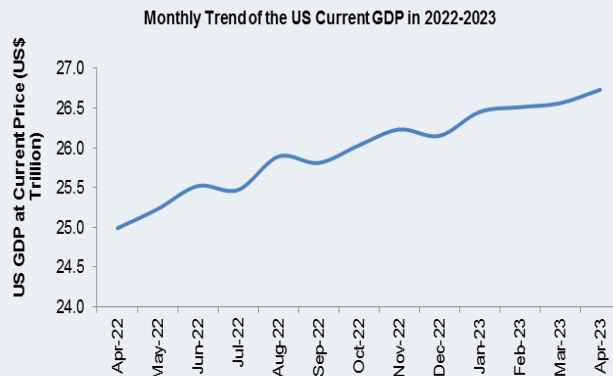
<p>FreeBlazer Heavy-Duty Carbon Fiber Tripod</p>	<p>SmallRig</p>	<p>The pro-level FreeBlazer Heavy-Duty Carbon Fiber Tripod (10kg/22lb max load capacity and 197cm/77.6in max. height), with SmallRig's innovative "FreeSpeed" patented technology, provides a one-button leg lock system to quickly extend or lower the leg sections for smooth, low-noise height adjustment. In addition, the carbon fiber legs connect to a center spreader that offers maximum stability and vibration reduction.</p>
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The US Economic Overview – April 2023

The US Consumer Confidence Index decreased to 63.5 in April 2023 as compared to 62.0 in March 2023. The GDP at current price of the US increased from US \$26.56 trillion in March 2023 to US \$26.73 trillion in April 2023.

Real gross domestic product (GDP) increased at an annual rate of 1.3% in the first quarter of 2023, according to the "second" estimate. The increase in real GDP reflected increases in consumer spending, exports, federal government spending, state and local government spending, and non-residential fixed investment that were partly offset by decrease in private inventory investment and residential fixed investment. Imports, which are a subtraction in the calculation of GDP, increased.

The price index for gross domestic purchases increased 3.8% in the first quarter of 2023. The personal consumption expenditures (PCE) price index increased 4.2%. Excluding food and energy prices, the PCE price index increased 5.0%, an upward revision of 0.1% point.



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