

Composites Market Update for February 2024

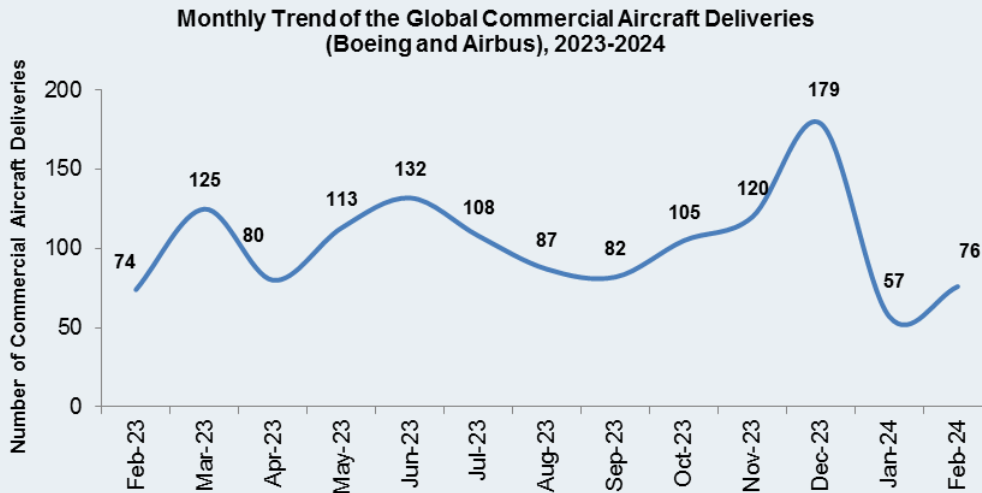
The composites industry, as gleaned from recent insights, reflects a resilient yet cautiously optimistic outlook amidst challenging market conditions. For February 2024, the sector witnessed a near-even performance year-over-year with a minor downturn. The construction segment showed promise with approximately 5% growth, offering a glimmer of hope against the otherwise flat or declining segments, such as marine. Overall transportation saw a 5% dip, with RVs experiencing a 7% decrease, passenger vehicles performing worse than heavy trucks, which actually were up. Notably, the additional business days from the leap year failed to stimulate excitement or notable gains, underscoring a period of missed opportunities for growth.

The narrative was slightly more positive on a month-over-month basis, where a modest overall uptick of around 3.5% from January to February was observed. The infrastructure sector, in particular, bounced back with a significant 10% increase, signaling a sector-specific revival. This upturn continued into March, with projections indicating a 10% surge compared to February, hinting at a much-needed rebound. However, the marine sector persisted in its downward trajectory both year-over-year and month-over-month, reinforcing the sector-specific struggles within the broader composite industry landscape.

Complicating the industry's path forward are the raw material cost pressures, with noticeable surges in key ingredients, such as styrene, and a 5-6 cents per pound increase in resin prices. The industry has responded with market price increases, with one already implemented and another poised for the start of April. These price adjustments, while necessary, may influence the second half of the year, which holds more positive expectations given the ease of year-over-year comparisons. The composite industry, thus, stands at a crossroads with sector-specific performances varying widely, and overall industry health dependent on navigating raw material price volatility and capitalizing on the areas of growth within the challenging economic landscape.

Aerospace

Commercial aircraft (Boeing and Airbus) deliveries increased from 57 aircraft deliveries in January 2024 to 76 aircraft deliveries in February 2024.

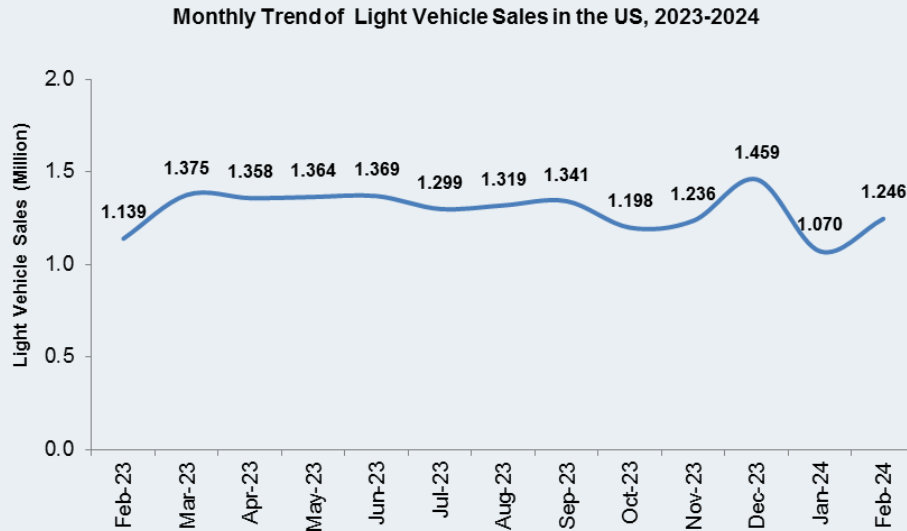


Some of the highlights of February 2024 are as follows:

- **Airbus Helicopters Selects Airborne to Supply Fully Digital Kit for Cutting & Kitting of Composites Plies.** Airborne is selected by Airbus Helicopters to renew the cutting room in Donauwörth, Germany, with state-of-the-art digital Kit by Light systems. The main objective is to improve operation and material efficiency by making composite plies kitting faster, easier and without mistakes. The new Cutting & Kitting lines will include full digital control of the total kitting process to guarantee flexibility, 100% quality control (zero mistakes), allow dynamic nesting combining multiple parts in a nest and provide more output per cutter and per worker. The full workflow will be digital and seamlessly integrated, from work preparation to execution on the shop floor.
- **Hexcel Receives Grant for Research and Development of New Aerospace Prepreg for High-Rate Production.** Hexcel has received a grant from the Spanish Centre for the Development of Industrial Technology (CDTI) for its Research and Development project titled EFIPreg (Efficient Prepreg). The grant, co-financed by the European Union through the European Regional Development Fund (ERDF), is for 1.2 million euros and will be used for the validation of a new prepreg material for aerospace manufacturing. The new prepreg composite material will significantly improve the competitiveness of composite materials within the aerospace sector. Improvements in lay-up time and waste reduction, coupled with process time savings, will simplify the manufacturing process and streamline production for high cadence programs.

Automotive

The U.S. new vehicle sales of 1,246,178 units in February 2024 represented an increase of 9% as compared to 1,138,756 units in February 2023.



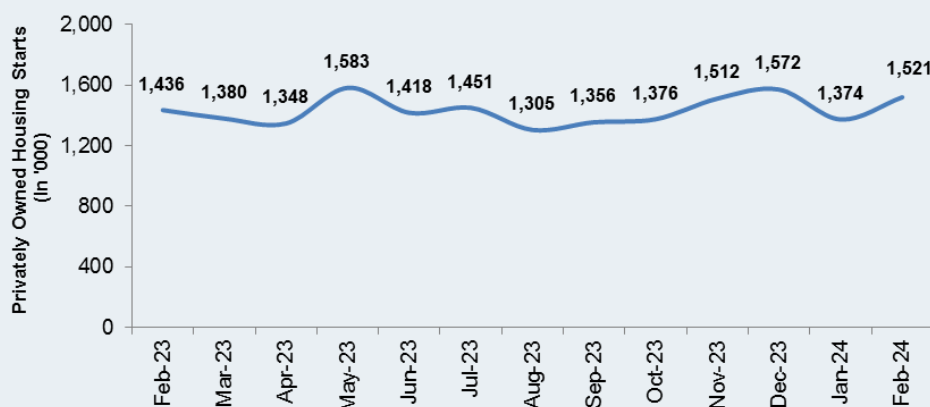
Some of the highlights of February 2024 are as follows:

- Hyundai Ioniq 5 N NPX1 Vehicle Debuts Carbon Fiber Hybrid Wheel.** After making an announcement about the collaboration in July 2023, Dymag and Hankuk Carbon together with Hyundai (Seoul), have debuted their concept carbon fiber hybrid wheel for the Hyundai Ioniq 5 N NPX1 vehicle. The NPX1 is a real-world technology demonstrator, previewing a range of Hyundai's advanced N Performance parts, including Dymag's state-of-the-art carbon fiber hybrid wheels. The 21-inch-high wheel combines a composite outer rim, made from carbon fiber, with a precision-machined, five-spoke, forged metallic centerpiece painted in Satin Black. In addition to reduced unsprung mass, the composite wheel also reduces rolling inertia, offers improved stiffness and strength and lowers noise, vibration and harshness (NVH).
- Envalior, Koki Deliver Lightweight, Efficient Automotive Shift Fork Design.** Envalior is partnering with transmission shifting systems company Koki Technik Transmission Systems GmbH (Niederwürschnitz, Germany), to deliver a shift fork used within an E-Powertrains Decoupling Unit. Koki chose Envalior's ForTii ACE PPA, which is enforced with 50% glass fiber, for its shift fork application because the material offers extreme high stiffness up to 160°C, design freedom and maximum wear resistance without the need for additional bushings. Koki's main objective for the shift fork application was to make it lightweight with high stiffness and maximum wear resistance. The company also wanted to reduce cost of the application when compared to a heavily machined aluminum part.

Construction

Privately-owned housing starts in February were at a seasonally adjusted annual rate of 1,521,000. This is 10.7% above the revised January estimate of 1,374,000 and is 5.9% above the February, 2023 rate of 1,436,000. Single-family housing starts in February were at a rate of 1,129,000; this is 11.6% above the revised January figure of 1,012,000. The February rate for units in buildings with five units or more was 377,000.

Monthly Trend of Privately Owned Housing Starts in the US, 2023-2024



Wind Energy

As per the most recent "Energy Infrastructure Update" released by the Office of Energy Projects within the Federal Energy Regulatory Commission, wind energy with the combined installed capacity of 2 units in January 2024 amounted to 320 MW. This is in contrast to the 350 MW generated by 2 units during the same period in 2023. Wind energy, with an aggregated generating capacity of 151.28 GW that contributes 11.73% to the total energy sources, amounted to 1,289.93 GW.

Some of the highlights of February 2024 are as follows

- China's Sany Renewable rolls out 131-meter Wind Blade.** Chinese wind blade manufacturer Sany Renewable Energy apprised of the rollout of a 131-meter wind blade, claiming that it has implemented several key blade design advancements focusing on both strength and reliability to enable a more robust structure. Sany reports in a LinkedIn post that SY1310A retains an "optimized airfoil design with greater thickness and a blunt trailing edge." Moreover, the new manufacturing process technologies aided in its successful development, including self-designed fiberglass pre-quilting technology, long-distance automatic infusion technology for large composite blades and 3D design for trailing edge blind bonding inserts.

- **Teijin Aramid and FibreMax Drive Floating Wind Innovation.** Teijin Aramid and FibreMax have secured a EUR 4 million subsidy from the Just Transition Fund Groningen-Emmen (JTF) for their groundbreaking Floating Wind project. This initiative marks a significant advancement in renewable energy. Floating Wind technology is at the forefront of wind energy innovation. The challenge in floating wind technology lies not just in buoyancy but in ensuring stability in depths surpassing 60 meters, making the role of advanced tendons critical. This collaboration with FibreMax has been pivotal in achieving this. Teijin Aramid and FibreMax are co-developing robust tendons made from recycled synthetic fibers – a promising alternative to conventional steel cables.

Consumer Goods

New orders for manufactured durable goods in February, up following two consecutive monthly decreases, increased \$3.7 billion or 1.4% to \$277.9 billion. This followed a 6.9% January decrease. Excluding transportation, new orders increased 0.5%. Excluding defense, new orders increased 2.2%. Transportation equipment, also up following two consecutive monthly decreases, led the increase, \$2.9 billion or 3.3% to \$90.4 billion.

One of the highlights of February 2024 is as follows:

- **REIN4CED and DIEFFENBACHER Form Strategic Partnership.** A shared vision for using thermoplastic manufacturing to produce more durable and sustainable carbon bicycle frames has led DIEFFENBACHER, the Germany-based manufacturer of turnkey composite systems, and REIN4CED, the Belgian developer of a new, patented impact-resistant composite material, to get into a strategic partnership. Traditional carbon used in high-end bicycle frames is light, strong and stiff, but highly impact-sensitive. REIN4CED resolved brittle fracture issues by adding small amounts of steel fibers to specific locations inside the carbon material.

Recent Development in Materials

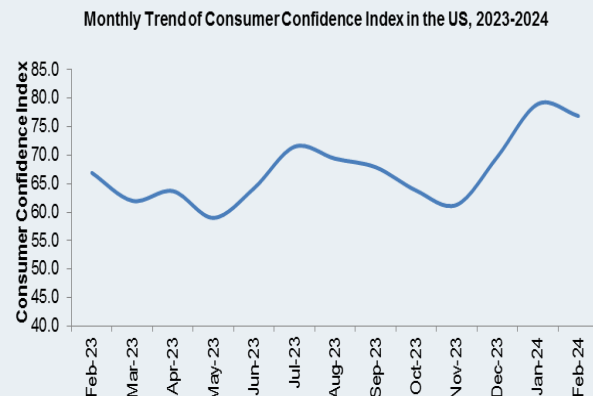
- **OPTIPLAN and AOC Develop New Composite Materials.** OPTIPLAN and AOC have collaborated to develop OPTIPLAN's ultralight, high strength, sustainable POLYDET rPET cover sheets, incorporating AOC's formulations derived from post-consumer recycled PET waste. These new composite materials are revolutionizing the truck and lightweight vehicle manufacturing industry. OPTIPLAN has developed an innovative ultralight range of composite cover sheets under the POLYDET brand, with increased strength and stiffness, incorporating AOC's Synolite 8421-N-1 formulation. Beyond using POLYDET r-PET for lightweight truck construction, OPTIPLAN is confident its new product will find its way in motorhomes, caravans, and last-mile delivery vehicles. Additionally, the eco-friendly features of these composite sheets position them for increased usage in building and construction applications, with the most obvious end markets being modular housing, wet and cold storage rooms, building façades and surface cladding.

The US Economic Overview – February 2024

The US Consumer Confidence Index decreased to 76.9 in February 2024 as compared to 79.0 in January 2024. The GDP at current price of the US decreased from US \$28.19 trillion in December 2023 to US \$28.11 trillion in January 2024.

Real gross domestic product (GDP) increased at an annual rate of 3.4% in the fourth quarter of 2023, according to the "third" estimate. The increase in real GDP primarily reflected increases in consumer spending, state and local government spending, exports, nonresidential fixed investment, federal government spending, and residential fixed investment that were partly offset by a decrease in private inventory investment. Imports, which are a subtraction in the calculation of GDP, increased.

The price index for gross domestic purchases increased 1.9% in the fourth quarter of 2023, the same as in the previous estimate. The personal consumption expenditures (PCE) price index increased 1.8%, the same as the previous estimate, and the PCE index excluding food and energy prices increased 2.0%, a downward revision of 0.1%.



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