Opportunities and Economics of Composites in Construction

Lucintel Brief

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Executive Summary

- **Global composites end products (bath tub, door, window, utility pole, rebar, etc.) for construction market was estimated at $11.3 billion in 2019 and is likely to reach $13.2 billion in 2025**
  - Residential is the largest segment followed by commercial segment
- **Composite materials have a low market penetration in most applications and thus significant opportunity for growth. Composites offer good economics and business case in many construction applications**
- **During 2020 global shutdown and lockdown have created threat and halted many construction work creating supply chain bottleneck for key resources of materials and equipment**
- **The material price of FRP pole is higher than the traditional material but the overall total cost of ownership is lower, due to no maintenance cost for composite poles, low installation costs, and many more**
- **To drive growth in the construction market, the industry needs to focus on:**
  - Creating awareness surrounding the benefits of composites for application and product development
  - Cost reduction in composite parts
- **There is innovation requirement in manufacturing of cost efficient composite parts as well as improvement in performance characteristics of fiber and resin.**

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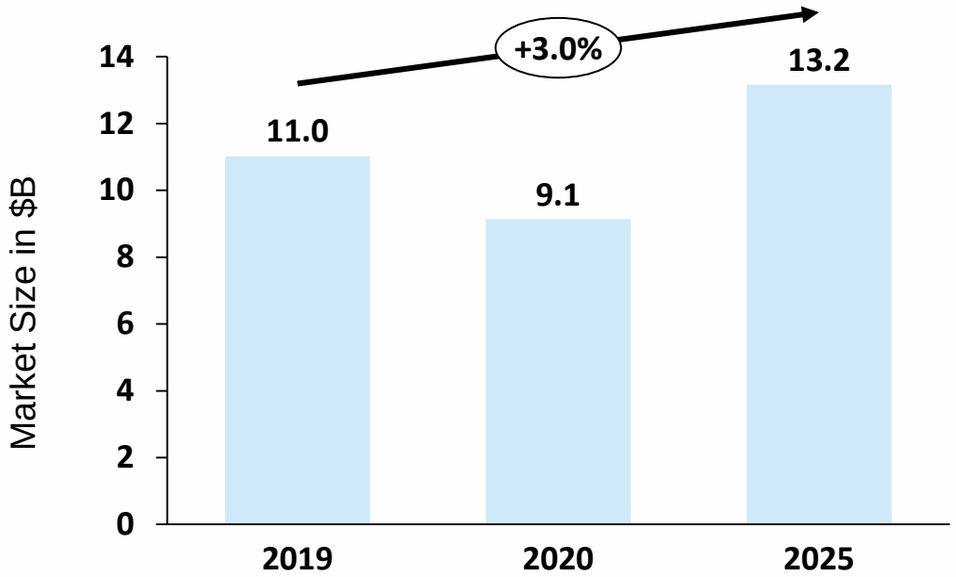
Global Construction Market is Expected to Achieve a CAGR of 3.0% over the Next Six Years

Global Construction Composites Market Forecast ($B)



Key Insights

- In 2020, global shutdown and lockdown have created threat and halted many construction work, industry is witnessing supply chain bottleneck for key resources of materials and equipment
- Composites are used to make bath tub, window profile, utility pole, bridge deck, grating, and many other parts for the construction industry

"We were able to avoid several supply chain issues in this covid situation, as we're a big company and were able to lock in orders with suppliers. But we're struggling with regards to shipping and getting products out to our customers, so there has been an increase in the cost of shipping to our customers. We are seeing a similar challenge in terms of raw material supply. The cost has gone up a little on the front end and the back end for shipping"

Marketing Manager, Strongwell

Composites Applications and Competing Materials in Major Segments

Residential Construction

Major Applications

- Bath tub
- Window profiles
- Ladder rails
- Structural shapes

Major Competing Materials

- Steel
- Aluminum
- Plastics
- Wood
- Composites

Infrastructure / Civil

Major Applications

- Rebar
- Utility pole
- Road markers
- Bridge deck
- Column wrapping

Major Competing Materials

- Steel
- Concrete
- Wood
- Composites

Industrial

Major Applications

- Cooling tower
- Grating
- Structural shapes
- Water treatment

Major Competing Materials

- Steel
- Concrete
- Composites

Higher Costs and Low Penetration of Composites are the Major Challenges in the Construction Industry

Key Drivers

- Growth of construction industry and increasing penetration of composites will drive the demand for composites in the construction industry
- Ease of installation: Composite parts in the construction industry requires lesser labor during installation due to light weight and low maintenance cost are added benefits
- Better mechanical and chemical properties of composites when compared to counterparts

Key Challenges

- Cost: Initial cost of composite products is relatively higher than cost of competing materials, Difficulty in manufacturing of complex shapes structures
- Supply chain issues have been raised due to COVID-19 outbreak and players are witnessing lower sales, low operational activities leading to higher cost
- Education: Lack of awareness about the benefits of pultruded products as these products have lower penetration when compared to conventional counterparts

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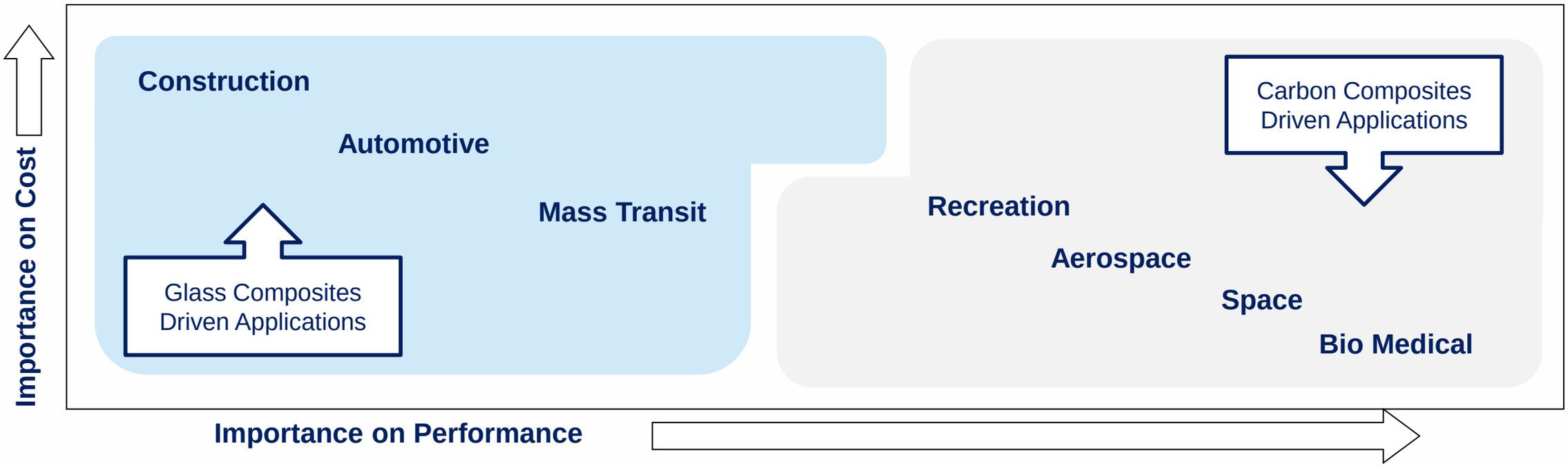
Economics of Composites

- Construction applications are cost sensitive and composites compete with steel, concrete and wood in construction applications
- Market penetration of composites is less than 1% in most applications (rebar, utility pole, window profile, etc.) compared to competing materials



Cost Benefit Analysis of FRP Poles as Compared to Competing Materials

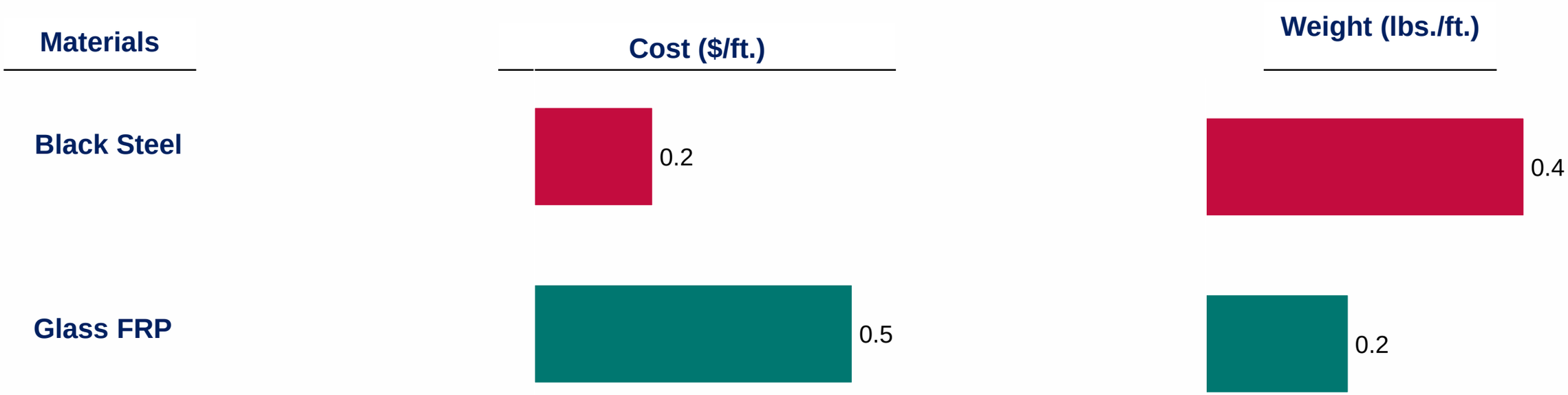
Materials	Initial Cost ($)	Average Life (Years)	Maintenance Cost ($)	Cost/Year ($)
Wood	$250	30	$210	$15
Steel	$260	35	$245	$14
Concrete	$350	35		$17
Composite	$900	80		$11

Note: Costs are based on a 40ft, class 4 pole
Maintenance costs apportioned at US $35 per pole per 5 year maintenance cycle

Key Insights

- **Despite of high initial cost of FRP poles than conventional materials, the overall total cost of ownership is lower, due to**
  - Virtually no maintenance cost for composite poles
  - Low installation costs because installation is quicker, and usually only light-duty equipment is required

Cost Benefit Analysis of FRP Poles as Compared to Competing Materials



Note: Size: 9.5 mm diameter

Key Insights

- Glass FRP rebar cost is more than 2 times higher than black steel
- Glass fiber based rebar are 50% lighter than black steel counterparts and provide easier handling

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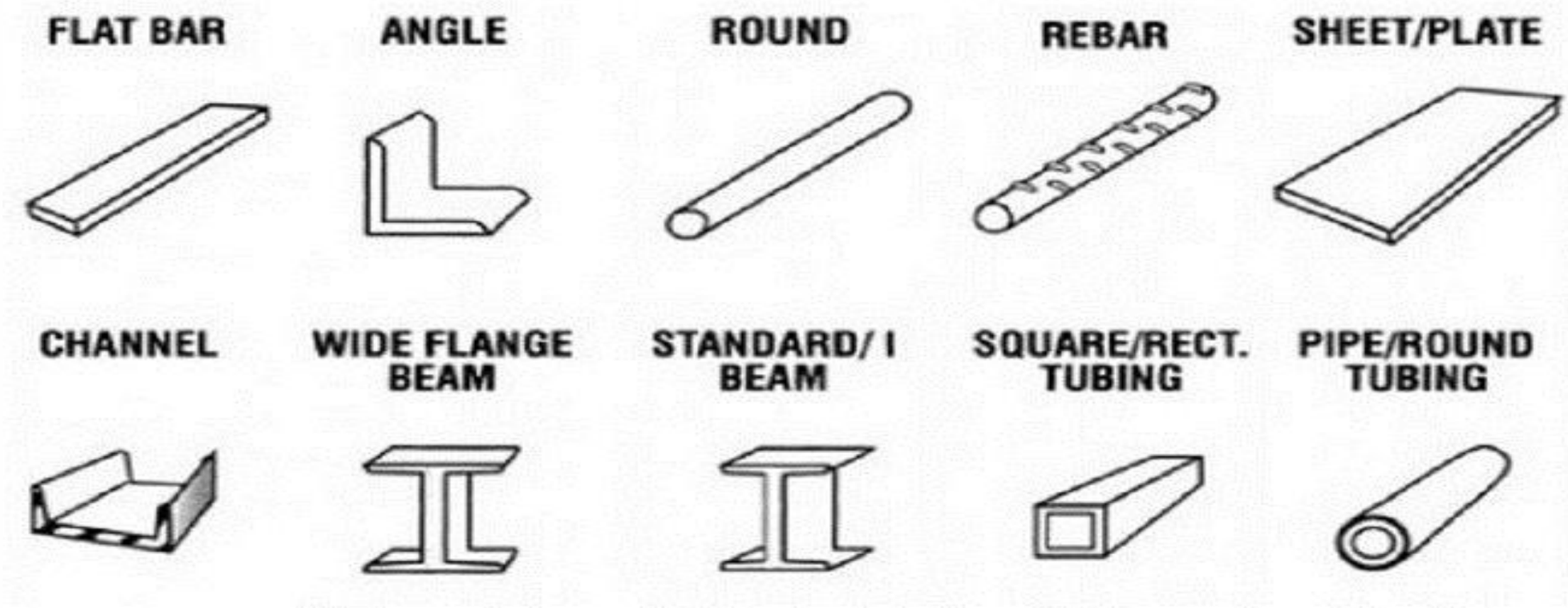
Significant Opportunity for Composites in Construction

- **Global market for metal structural shapes including rebar is over $300 Bil / year. Composites represent less than 0.3% of structural shapes market. Thus there is huge potential for growth in structural shapes. Choose your battle carefully**



Future Growth Areas in Construction

Residential Construction

Window Profile

Bath tub

Structural shapes

Infrastructure

Bridge

Trellis

Utility Pole

Rebar

Industrial

Antenna

Cooling Tower

Drivers

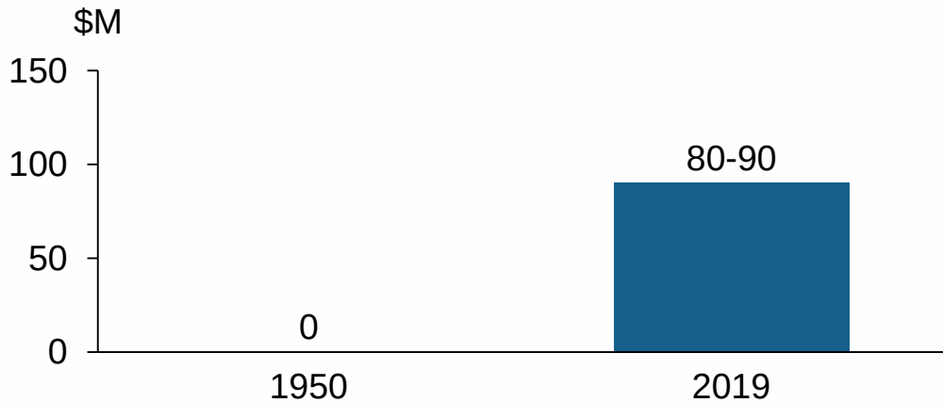
- **Increasing urbanization**
- **Increasing number of old bridges creating demand for refurbishment composites**

- **Increasing demand for telecom services**
- **Excellent electromagnetic properties of composites will drive higher penetration in Infrastructure segment**

- **Growth of small wind turbine**
- **Rising industrial activities**

Strongwell Making Significant In-roads with Pultrusion Technology in the Composites Industry

Revenue



Total Company Revenue

Products Profile

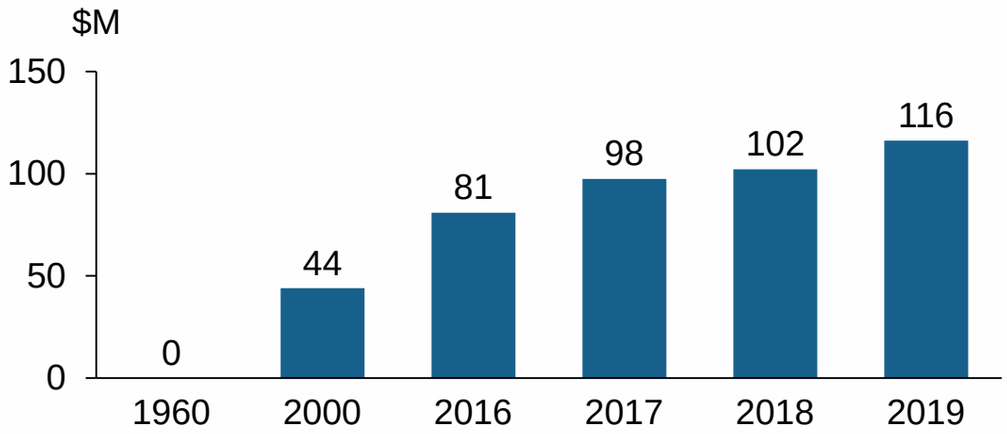
- Ladder rail
- Grating
- Handrail and fencing systems
- Structural building panels
- Power poles
- Baffle panels
- Decking
- Structural shapes
- Ladders & cage
- Bridge components
- More

Company's History

- **1924:** Started operations and specialized in aircraft, TV cabinets and carbon parts for weaponry
- **1956**: First production utilizing the pultrusion process
- **2006-2008:** Introduced SAFSTRIP® strip, DURASHIELD HC® panel, DURAGRID® R-8300 grating, STRONGRAIL® architectural handrail, and DURAGRID® 1" R-7300 grating
- **2013:** Agreement with Redwood Plastics for authorized distributor in western Canada
- **2015:** Signed licensing & technology agreement with Fibratore S.A
- **2016:** Introduced SAFPLANK HD™ planks
- **2017:** Opened a new pultrusion plant in Mexico

Exel Composites has Grown its Share in the Construction Industry through Acquisitions in Last Few Decades

Company Revenue Growth



Products Profile

- Structural shapes
- Laminates
- Windows & Doors
- Airport Infrastructure Products
- Machine Components

Company's History

- **1960:** Started operations in 1960 and specialized in electronic detonator caps
- **1970**: Start of composite
- **2000:** Acquisition of Fiberspar Performance Products
- **2001:** Acquisition of Menzolit-Fibron GmbH's pultrusion business
- **2004:** Acquisition of Bekaert's pultrusion business
- **2005:** Acquisition of Faserprofil GmbH's pultrusion business
- **2016:** Acquired a Chinese composites manufacturing company to strengthen its position in APAC region
- **2018:** Acquired Diversified Structural Composites to expand its footprint to USA

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Conclusions and Strategic Recommendations

- The construction market is second largest market for composites with $13.2 Bil opportunity in 2025
- Most of the composites applications have low market penetration (less than 1%) against competing materials and thus provide good growth opportunity
- Construction market has high levels of fragmentation and competition
- Since revenue of most players in this market are small, it becomes challenging for them to invest in new application development, innovation and geographic expansion
- Yet, in spite of the current difficult environment for companies, the long term prospects for this market segment are attractive
- The potential market is large, but companies in this market need to leverage the inherent economics of composites and develop innovative technologies to compete with steel and concrete
- This market provides opportunity for consolidation. Do you want to be a consolidator or to be consolidated or drive organic growth

Conclusions and Strategic Recommendations

- **In order to become one of the future market leaders in construction, companies need to consider and develop clear strategies and objectives in the following areas:**
  - Application development
  - Creating awareness on benefits of composites
  - Cost reduction in composite parts
  - Geographic expansion
  - JV / Acquisition
  - Access to capital
- **Lucintel can help you define and implement a strategy designed to grow your business, more specifically to:**
  - **Identify and evaluate attractive opportunities for growth:** Develop dynamic understanding of the relevant market segments you target where you should compete, broken down by segment, application, region, etc. What gaps exist to realize full potential?

Lucintel - At a Glance

- **Premier management consulting and market research firm. Founded in 1998.**
- **Deep global insights into major industries. Team of over 120 analysts / consultants across globe**
- **Management comprised of PhDs, MBAs, and subject matter experts. Head quarter in Dallas, USA.**

Conducted 500+ consulting projects across industries for 3M, Audi, Dupont, Carlyle, GE, etc.

Consulting Services

Why Lucintel

Trusted insights: Reliable insights. Widely cited in Wall Street Journal, Financial Times, Forbes, etc.

Clients we serve: Over 1000 clients from 70 countries – Fortune 500 companies

Strategic advice: Over 20 years of proven global strategic management consulting experience

Industries Served

1000+ Clients in 70 Countries Value Our Service

Case Study 1: Growth Opportunity for a Leading Pipe Manufacturer in Composite Pipes

Challenge

- A leading FRP pipe manufacturer in the US wanted to know about the opportunity existing for them in composite pipes applications in the US and Canada

Objectives

- To identify total opportunity for FRP pipe and steel pipes
- Identify the addressable market (new/replacement) for FRP pipes for the client based on their core competencies (Diameter, pressure rating, etc.)
- Conduct market share analysis, price vs performance analysis with competing materials, customer identification, and customer requirement analysis in various diameter ranges

Solutions

- Lucintel identified addressable market opportunity based on client core competencies and looked into competing materials performance over the last 10 years
- Lucintel provided Go To Customer List with **$50 million dollar sales opportunity in next 10 years**
- Lucintel developed short, medium and long term strategy with detail actionable plan

Results

- The **company's sales** grew by 3**5%** over **2 years**

Case Study 2: Growth Opportunity for a Leading Prepreg Manufacturer

Challenge

- A leading prepreg supplier wanted to know about the opportunity for glass and carbon fiber prepreg in Europe and North America across various sectors

Objectives

- To estimate growth opportunities for glass and carbon fiber prepreg across sectors including rail, marine, construction, automotive, defense, infrastructure, and sporting goods in NA and Europe
- Find out prepreg consumption by molders in each sector by application and prepreg type
- Conduct ***Voice of Market analysis*** and ***Go To Customer List*** in North America and Europe

Solutions

- Lucintel identified the most attractive target applications in each region for the client based on the client's core competency
- Lucintel conducted interviews with **>700 companies** to find out their prepreg consumption patterns and provided Go To Customer List of **>250 molders**
- Lucintel developed short, medium & long term strategy in the most attractive markets with action plan

Results

- The **company's sales** for the relative growth segments grew by **25%** over **2 years**

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