



Composites State of the Market

Using Composites as a Competitive Advantage



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*This summary is an abbreviated version of the report and does not contain the full content. A link to download the full report is available on the Tech-Clarity website, www.tech-clarity.com.

If you have difficulty obtaining a copy of the report, please contact the author at michelle.boucher@tech-clarity.com.



Executive Overview

Today's products are growing in complexity and new materials are a significant source of that complexity. Composites, in particular, are getting a lot of attention. In fact, the use of composites is growing and is expected to increase over the next 15 years. With this growth, the number of engineers working with composites should also increase by 15% over the next five years. Complicating this, even engineers currently working with composites rate their knowledge of composites as average. The combination of complexity, growth in composite use, and increase in the number of engineers using composites means companies will need better ways to supplement their engineering knowledge of composites.

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Composites have been key for helping many companies differentiate their products by reducing weight, improving performance, and lowering the cost of ownership. However, with the expense of composite material, companies must find ways to make better decisions to optimize the amount of composite material used to achieve performance requirements, without over-engineering and maintaining profitability.

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To understand best approaches, Tech-Clarity surveyed 244 companies to identify their goals for composites, best practices, and top selection criteria for technology. Further analysis identified how Top Performing companies address the top challenges of designing and producing composite parts. Top Performing companies are those who are more successful than their competitors. Compared to competitors, they are more efficient, faster, produce higher quality products, and do a better job meeting cost targets. When compared to peers, some of the things Top Performers do to achieve this success includes:

- 2.2 times more likely to optimize the part design to improve consistency during production
- 59% more likely to use tools that automatically link design and analysis data
- 2.5 times more likely to use tools that automatically update the composite definition as changes are implemented



This report examines the state of the market for composite design and production and provides guidance on best practices. These practices will help companies leverage the benefits of composites to improve the competitiveness of their products, while managing cost, quality, and efficiency.

Conclusion

Composites offer great opportunities to reduce weight and improve product competitiveness. This is driving an increase in the amount of composites used. However, composites add complexity to both design and manufacturing. To make their use of composites more successful, Top Performers, those who are beating their peers, optimize the part design for production. They have also implemented several design best practices and enabled those practices with the right technology. By implementing best practices followed by Top Performers, companies can expect to see improvements such as faster cycles times, lower material costs, and reduced scrap.

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Recommendations

Based on industry experience and research for this report, Tech-Clarity offers the following recommendations:

- Understand sources of complexity and invest in ways to manage it
- Assess the growth of composites and identify how adopting more composite material will impact your products and your market as competitors adopt composites
- Focus on design optimization to improve production consistency of composite parts
- Empower your growing engineering staff by supplementing their composite knowledge and giving them access to tools that will enable them to make better decisions
- Understand the challenges associated with designing composite parts
- Enable better collaboration between design engineers and analysts working with composites
- Ensure your composite design tools support the CAD data you work with
- Select a solution that integrates with both CAE tools and your manufacturing environment



About the Research

Tech-Clarity gathered and analyzed 244 responses to a web-based survey on material trends. Survey responses were gathered by direct e-mail, social media, and online postings by Tech-Clarity, Siemens PLM, and Composite World.

The responding companies were a good representation of the manufacturing industries, including Automotive (34%), Aerospace and Defense (30%), Industrial Equipment and Machinery (20%), Consumer Products including Sporting Goods (17%), Building Products and Fabrication (14%), Energy and Wind (14%), Electronics and High-tech (9%), and others including Life Sciences, Marine, and more. Note that these numbers add up to greater than 100% because some companies indicated that they are active in more than one industry.

The respondents represented a mix of company sizes, including 30% from smaller companies (less than \$100 million), 19% between \$100 million and \$1 billion, 16% between \$1 billion and \$5 billion, and 14% greater than \$5 billion. 21% chose not to disclose their company size or did not know. All company sizes were reported in US dollar equivalent.

The respondents were comprised of various roles. A little less than one-half (45%) were individual contributors. Another one-third (36%) were manager or director level, and 20% were VP or C-level executives.

The respondents reported doing business globally, with most companies doing business in North America (66%), a little over one-third doing business in Western Europe (37%), about one-third doing business in the Asia-Pacific regions (33%), Eastern Europe (15%), Latin America (12%), and Africa (6%).

Respondents included manufacturers as well as service providers and software companies, but responses from those determined not to be directly involved in designing or producing products were not included in the analysis. The majority of companies were considered to have direct involvement in designing and producing products and the report reflects their experience.

About the Author

Michelle Boucher is the Vice President of Research for Engineering Software for research firm Tech-Clarity. Michelle has spent over 20 years in various roles in engineering, marketing, management, and as an analyst. She has broad experience with topics such as product design, simulation, systems engineering, mechatronics, embedded systems, PCB design, improving product performance, process improvement, and mass customization. She graduated magna cum laude with an MBA from Babson



College and earned a BS in Mechanical Engineering, with distinction, from Worcester Polytechnic Institute.

Michelle began her career holding various roles as a mechanical engineer at Pratt & Whitney and KONA (now Synventive Molding Solutions). She then spent over 10 years at PTC, a leading MCAD and PLM solution provider. While at PTC, she developed a deep understanding of end user needs through roles in technical support, management, and product marketing. She worked in technical marketing at Moldflow Corporation (acquired by Autodesk), the market leader in injection molding simulation. Here she was instrumental in developing product positioning and go-to-market messages. Michelle then joined Aberdeen Group and covered product innovation, product development, and engineering processes, eventually running the Product Innovation and Engineering practice.

Michelle is an experienced researcher and author. She has benchmarked over 7000 product development professionals and published over 90 reports on product development best practices. She focuses on helping companies manage the complexity of today's products, markets, design environments, and value chains to achieve higher profitability.