

# Growing use of composites likely to boost outsourcing



**MICHAEL QUARREY,**  
VICE PRESIDENT OPERATIONS

**VIC POTTER,**  
GENERAL MANAGER  
AEROSPACE  
WEB INDUSTRIES

The demand for advanced composite materials, including thermoplastics, in aerospace applications is predicted to double by 2025. Aerospace OEMs are likely to respond by ramping up their outsourcing activities and seeking greater technical support from their composite material suppliers.

According to a recent presentation by the consulting firm Carb-Consult, the global demand for composite materials in aerospace applications is expected to double by the year 2025. Part of the growth is due to increased activity involving aerospace-grade thermoplastics, including PEEK (polyetheretherketone) and PEKK (polyetherketoneketone).

These materials offer lightweight, high-temperature performance and exhibit superior toughness and impact resistance. PEEK and PEKK can be moulded into complex contours and shapes, giving aerospace designers greater flexibility. Once found almost exclusively in clips and brackets, they are now under trial and consideration for primary structural components such as fuselages and wing boxes. To meet the growing demand for advanced thermoplastics and other composites, aerospace OEMs face two

choices: ramping up their in-house production activities or relying more heavily on their supply partners. Those who view the latter option as more efficient and cost-effective are likely to strengthen their outsource relationships with their composite technology providers, including prepreg producers, precision formatters, fabrication equipment developers and parts fabricators.

### Technology collaboration

Fashioning composite materials into finished aerospace parts is a complex process that requires multiple manufacturing steps. Although some aerospace OEMs perform the bulk of these steps in house, there are clear advantages associated with greater technology collaboration and outsourcing. By teaming closely with composite formatting experts, OEMs can tap into fresh ideas and perspectives and benefit from the latest composite solutions. They can focus on the high-value core competencies of making and assembling advanced aerostructures, rather than

on important yet ancillary operations such as the production and formatting of composite materials. Reducing costs is an added advantage. Consider the yield rate, the percentage of composite raw materials that winds up in finished parts. Because they often lack the most advanced equipment and technical expertise, con-

ventional in-house formatting operations may waste material, resulting in low yields. Precision formatters, in contrast, can significantly boost yield rates, often by as much as 5% or more. Given the relatively high cost of composite materials, achieving higher yields means increased productivity and lower costs.



Fig. 1: Precision formatting equipment and processes can significantly boost yield rates, often by as much as 5% or more

In addition, supply partners typically offer material management, warehousing and inventory-related services, simplifying the production process for aerospace OEMs. Advanced composite materials often have demanding storage and shelf-life requirements.

Prepreg formatters are well versed in the storage requirements, shelf life and handling considerations for various composite materials. Outsourcing the storage and handling of composite materials to these suppliers prevents spoilage and enables OEMs to make a more productive use of their facilities and floor space.

Suppliers can also track and control inventories and manage the flow of materials from one stage of production to the next.

Formatters, for example, not only ensure that composite materials are converted correctly, but are packaged and shipped just-in-time to the part fabricator

**An outsourcing success**

The advantages of outsourcing were highlighted in a recent case involving a major aircraft engine manufacturer. One of the OEM's facilities hosted a composite cutting and formatting operation on site.

But it required considerable space to store the composite materials properly and to house multiple cutting tables, each measuring about 12 metres long.

The facility also incurred costs associated with material spoilage and with managing and tracking its inventory



Fig. 2: Outsourcing make-ready work like ply cutting and kitting can free up valuable physical and personnel resources for aerospace fabricators

of composite materials.

To focus more on its core business of producing engine casings, the OEM decided to outsource the composite prepreg and ply cutting operation to its supply partner, a precision formatter.

Under the new arrangement, the formatter stored the composite materials at its location, cut the materials according to specifications, arranged them into kits and delivered the kits to the OEM's facility on a just-in-time basis.

*Bottom line:* The OEM succeeded in reducing the costs related to inventory management, equipment maintenance and material spoilage by nearly USD4 million annually.

It was able to redirect its energies to more productive activities and to pursue new business opportunities.

**Key supplier traits**

Aerospace OEMs can be best served by supply partners that have substantial research and development capabilities and are actively engaged in finding innovative composite formatting solutions. Other attributes to look for include:

- *A willingness to collaborate:* Suppliers should be willing to be in close collaboration from beginning to end, starting at the initial design stage. This allows problems to be identified early and solutions found before full production is under way.
- *Partnering across the supply chain:* Suppliers should also be willing and prepared to partner across the entire supply chain. Each supplier is likely to take a different view of what is optimal in terms of material format, dimensions, cost and other variables. For example, what is optimal for the com-

posite prepreg maker might be suboptimal for the formatter or part fabricator. The supply partners must communicate to determine what is optimal across the entire supply chain.

- *Focus on continuous improvement:* An attitude of continuous improvement is key. Outsource suppliers should agree to participate in cross-functional teams to drive improvements in quality, cost, delivery and service.
- *Redundancy:* Redundant capabilities, preferably at different locations, are a plus. This allows production to continue in case of unforeseen events affecting a single production line or facility. Production can then be shifted to a backup assembly line or from one facility to another. □

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