BEYOND Lightweight

Patrick Siboni, sales and marketing aerospace account manager at L&L Products explains how the company helps reduce weight and process complexity at the same time.

✈ L&L Reinforce L-9060 helps manufacturers achieve lightweighting goals while unlocking an extensive list of other production benefits (above)

Lightweighting is a vital aspect of aerospace engineering and manufacturing. From commercial planes to spacecraft, the cumulative effect of cutting an ounce here and a pound there can have a significant impact on fuel efficiency, cargo capacity, and emissions reduction.

Of course, lightweighting cannot happen in a manufacturing vacuum. Every manufacturer is looking for solutions that won't just reduce weight but potentially streamline their production processes at the same time.

Ultimately, lightweighting gains cannot come at the expense of compromises elsewhere in your manufacturing workflow. Your full production process must be considered when evaluating opportunities for lightweighting.

At L&L Products, we help aerospace manufacturers tackle the complex goal of reducing aircraft weight while increasing production efficiency. It takes a thoughtful combination of innovative materials and efficient processes – as well as a comprehensive understanding of the factors that can help you succeed.

If you're assessing your own opportunities to reduce manufacturing complexity, costs, and cycle times while simultaneously reducing weight and improving worker safety in your facilities, this article is designed to help you get started.

Lighter, cleaner, simpler, safer

In the aerospace industry, certain material qualities are non-negotiable. All the materials you use for cabin applications must be FST-compliant, and weight can't be reduced at the expense of strength, structural integrity, and the safety of the crew and passengers.

Likewise, there are certain material qualities that directly influence process optimisation. In general, examining your manufacturing through the lens of process optimisation means looking for ways to make your entire production workflow cleaner, easier, faster, safer for operators, and more cost-effective. Potential improvements can exist at every level of your workflow, from the materials you use to the machinery and manual labour required.

The ideal lightweighting solutions will meet all necessary certifications and standards for aerospace, plus additional production benefits that will improve your overall production efficiency. When assessing innovative materials and processes for lightweighting, these are the key traits to look for:

No manual mixing necessary: Materials that must be mixed manually prior to using them often introduce time-consuming, complex, and potentially wasteful processes during the pre-production phase. Potential optimisation benefits: Time and labour costs, eliminating waste.

Fast and easy dispensing: Efficient dispensing isn't just convenient. It can also open the door to automation. Potential optimisation benefits: Time and labour costs, automated processes.

Enhancing worker safety: Opportunities to enhance worker safety extend to the properties of materials themselves. Look for lightweight materials that do not contain isocyanates, carcinogens, mutagens, and strong odours. Potential optimisation benefits: Worker safety and environmental benefits.

Compatibility with existing

processes: Are there aspects of your production workflow that are already optimised? This may include industry-standard lightweighting solutions such as honeycomb-core composite structures. The ideal lightweight adhesives and reinforcements should work with the production elements you want to keep. Potential optimisation benefits: Production cycle times and operating costs.

Flexibility with curing processes: Heat-cured and ambient-cured materials are both viable solutions, depending on your workflow and the required applications. Heat can help accelerate the curing process, but ambient-cure materials have benefits in terms of ease of use and reducing production steps. Potential optimisation benefits: Cycle times and operating costs.

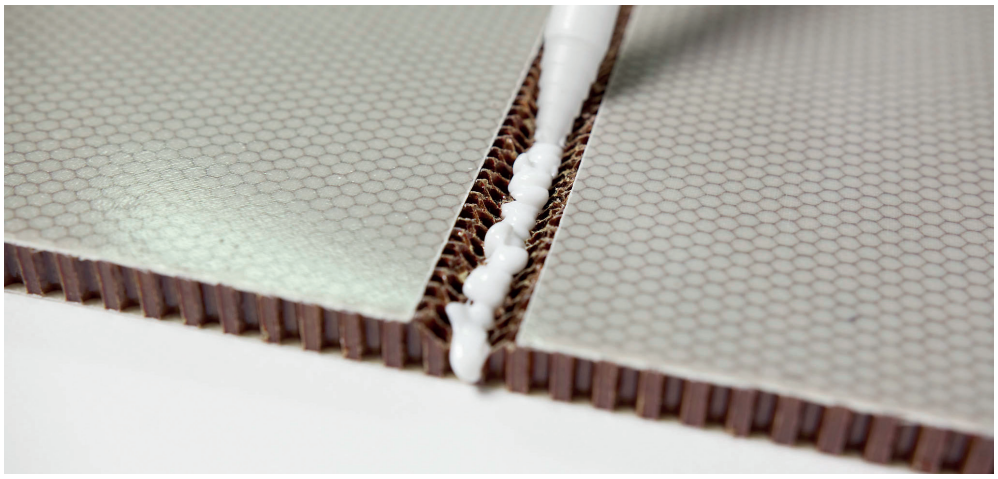
Long shelf life: When materials can be stored at room temperature for long periods of time, it can benefit many stages of your production workflow. Materials with a long shelf life often reduce waste, place fewer constraints on your supply chain, and lead to more stable materials at room temperature. Reduced storage and transportation costs, reduced waste, and energy savings.

Reduce steps in the production workflow: The ability to eliminate manual mixing and heat curing also speaks to a bigger goal in your production cycle: Reducing steps and simplifying processes. Are there pre-production, production, and post-production stages that add time and labour costs to your manufacturing cycle? If so, those steps should be the first places you examine for optimisation opportunities. Potential optimisation benefits: Production cycle times, worker safety, reduced waste, and operating costs.

The right partner: Finding the optimal solution for your needs goes well beyond the materials and processes you use. The ideal partner won't just supply the materials; they'll help you navigate your entire process optimisation journey. A true partner will also help you custom-engineer materials that meet your precise needs, further enhancing your optimisation opportunities. Potential optimisation benefits: Production cycle times, worker safety, reduced waste, and operating costs.

A real-world example

What does this combination of traits look like in the real world? L&L Products offers a complete line of FST-compliant adhesives and reinforcement materials. Within that lineup, L&L Reinforce L-9060 is an example of a product that helps aerospace manufacturers achieve lightweighting goals while unlocking an extensive list of other production benefits.



Lightweighting is a vital aspect of aerospace engineering and manufacturing (above)

L&L Reinforce L-9060 is an ultralightweight interior edge and core filler compound that reinforces honeycomb structures in areas where brackets and fixtures are inserted and closes out edges of panels. Those properties make it an innovative lightweighting solution for many aircraft interior applications, but when you factor in the additional benefits it can provide to production workflows, the value increases exponentially.

That makes it a great example of a lightweighting solution that can also optimise production so, let's take a deeper look at how L&L Reinforce L-9060 aligns with the traits we identified as optimisation enhancers: No manual mixing: L-9060 is dispensed from a convenient cartridge, eliminating the need for hand-mixing or manual mixing; Fast and easy dispensing: L-9060 can be applied using a standard 400ml manual or pneumatic dispenser, making it a good fit for metered dispensing and pumping; Enhancing worker safety: L-9060 provides safety benefits for manual application as well: It's free of isocyanates, carcinogens, mutagens, reprotoxins, and strong odours; Compatibility with existing processes: L-9060 is designed to be used with the honeycomb core materials that are common in aerospace applications; Flexibility with curing processes: Depending on the application and the materials it must bond to, L-9060 is compatible with both heat curing and ambient curing. Heat-curing accelerates its curing process, but the flexibility to use ambient curing can reduce time, post-processing steps, and machine needs in some applications; Long shelf life: L-9060 can be stored at room temperature, and it has a shelf life of 18 months when stored at or below an ambient temperature of 23°C (73°F). That translates to energy-efficient storage, waste reduction, reduced transportation costs, and more flexibility with your supply chain; Reduces steps in the production workflow: When you add up the processing benefits outlined above, you start to see the multiple effects a single material can have on process optimisation; The right partner: L&L Products is a partner that goes above and beyond the traditional definition of 'supplier'. Alongside our materials science expertise, we work closely with clients in the aerospace industry to deliver unique custom-engineered solutions - from testing to validation to custom-engineering to collaborating on your process optimisation efforts.

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Streamlining your journey

Identifying opportunities for process optimisation across the entirety of your workflow means expanding your focus a bit. The materials you choose can have a holistic effect on your overall efficiency and ROI.

For honeycomb panel bonding and reinforcing, edge close-out, bracket and insert bonding, and panel assembly, L&L does much more than develop innovative materials for aerospace applications. Not only do we custom-engineer materials that meet our customers' complex needs, but we also help them identify solutions that will improve performance and processes at the same time.

Are you ready to adopt innovative solutions that make your products lighter and your processes safer, easier, and more efficient? We are here to help your goals take flight.

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