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Rethinking Rail Interiors Through Harmonised Material Design

Designing rail interiors has always required a balance of safety, performance and passenger experience. That balance is becoming more nuanced. Designers are being asked to create environments that feel considered and cohesive, while engineering teams must continue to meet the demands of high-traffic, regulated spaces.

As a result, material selection is no longer viewed only through the lens of part performance. Surface quality, colour consistency, tactile character, manufacturability, lifecycle impact and long-term durability all contribute to the experience of a rail cabin. Increasingly, the opportunity lies in treating materials as part of an integrated design system rather than as separate component decisions.

Thermoplastics are playing an important role in this shift. Their lightweight construction, durability, cleanability and ability to meet flame, smoke and toxicity requirements make them well-suited for passenger-facing applications. Compatible thermoplastic materials can be used across forming processes, enabling a consistent visual language to extend throughout the interior.

Achieving Visual Consistency

One of the most visible challenges in rail interior design is maintaining harmony across components produced through different manufacturing methods. A single cabin may include injection-molded parts, thermoformed panels and extruded profiles.

When materials or finishes vary between processes, even subtle differences in colour, gloss or texture can become noticeable. Those transitions matter to rail designers working to create a calm, intentional passenger environment.

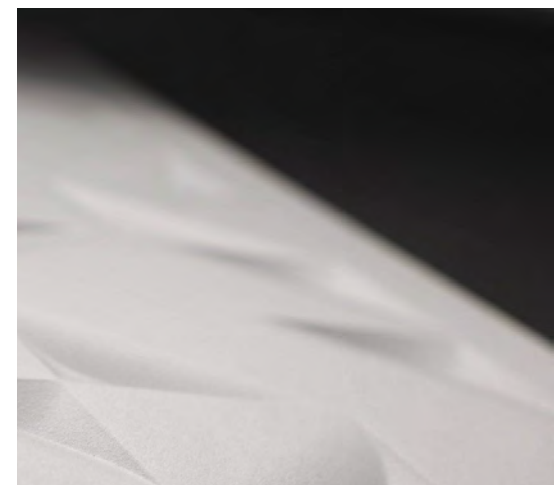
In areas such as window casings, seat shells and sidewalls, designers are placing greater emphasis on material systems that can be translated across manufacturing methods

without sacrificing reliability. When a single material is used, it becomes easier to align visual characteristics and reduces reliance on secondary processes such as painting or coating.

Extending Material Consistency

Maintaining continuity depends on how well materials can move between processes. Historically, this has led to compromises, with material selection based on process constraints. As interiors become more integrated, that fragmented approach becomes harder to sustain.

Materials such as KYDEX® P2200 offer a more aligned path by enabling extruded profiles that can match KYDEX® 2200 IM (injection-molded) resins and KYDEX® 2200LT



thermoformed parts. This allows trims, edge details and structural elements to align visually. For designers and engineers, this reduces the need to manage materials across adjacent parts.

Pressure Forming and the Role of Precision

As material consistency becomes more important, manufacturing processes play a central role. Pressure forming enables the thermoplastic sheet to conform more closely to mold surfaces, improving surface definition and consistency. This becomes especially valuable when pressure-formed parts are alongside injection-molded components within the same visual field.

The pressure forming technique supports:

- Sharp lines, intricate detailing, gloss control and uniform appearance
- Functional undercuts for mechanical interlock
- In-mold textures for tactile variation and brand differentiation
- Tighter tolerances compared to standard vacuum forming
- An injection-molded look and feel with a more flexible tooling investment

When compatible materials are used across these processes, transitions become less noticeable, and the cabin reads as a more complete environment. The result is not only improved part integration but a stronger sense of harmony.

Integrating Surface Design Without Secondary Layers

Surface design is another important part of a harmonised material strategy. As passenger expectations continue to rise, designers are looking for ways to introduce pattern, wayfinding, branding and visual depth without adding layers that may age, wear or perform differently over time.

One solution gaining traction is Infused Imaging™ technology. Rather than relying on secondary processes like applied films or coatings, the visual element becomes part of the material itself. For high-contact environments, this can help maintain durability while giving designers greater freedom to develop bespoke finishes.

Infused Imaging™ allows for rich, high-resolution patterns to be embedded directly into KYDEX® Thermoplastics without compromising recyclability or performance. This enables visual depth, material cohesion and complete customisation across applications.

Supporting Sustainability Through Material Strategy

For rail interiors, sustainability is increasingly tied to material strategy. KYDEX® Thermoplastics offer a future-forward solution for sustainable CMF design. Fully recyclable, KYDEX® materials

are manufactured without plasticisers and are designed to meet the demands of modern transit interiors.

Thermoplastics can provide a lighter alternative to legacy materials while preserving design freedom and long-term performance. Their durability helps reduce the need for frequent replacement, while resistance to chipping, discoloration and cracking supports longevity in high-touch, passenger-facing environments.

By reducing the number of materials used across rail interiors, design and engineering teams can streamline sourcing, reduce variability and more effectively support environmental responsibility.

A More Integrated Approach to Rail Interior Design

As rail interiors continue to evolve towards more cohesive, personalised and sustainable solutions, material strategy plays a pivotal role. Harmonised thermoplastics, produced through compatible processes, give designers a way to connect creative intent with operational requirements.

For the next generation of rail interiors, material harmonisation is more than a visual preference. It is a design principle that can help create intentionally composed passenger spaces.

*KYDEX®
thermoplastics
and injection
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