

HISTORY OF AUTOMOTIVE COMPOSITES

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Abstract

A view of the evolution of automotive composites gives a good perspective on how composite materials in general have evolved from an art to a science over the last 30 years. Automotive composite materials/technology started as an art form with formulations that were virtually “a pinch of this and a dash of that” and usually based upon a chemist or formulator's feel for what was right. Today science and analysis actually play a major role in how composites are developed and applied.

For those of us who have watched the technology grow and change through the years, it is clear that there is much more sophistication and less of the “Let's try this and see” approach. Flow modeling predicts the fiber distribution and residual stresses in the composites part while structural analysis determines the failure mechanisms and crash energy management of composite structures. Manufacturability improved from slow and long cycle times to fast processes with higher first-time-quality parts and limited to no need for secondary operations.

Greater design freedom with composites and lower part weight for fuel savings continues to be the winning combination for increased use of composites in automotive applications. This tremendous change in automotive composites reflects the focus for the discussion while concurrently representing the trends in progress across the many other major industries with significant composite materials usage.