



McClarin Plastics, Inc.
SOLUTIONS IN PLASTICS

The Plastics Advantage

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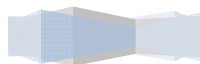
2009



The world of plastic and composite materials has seen numerous technological advances over the past few years which have prompted the replacement of traditional metal products in innovative applications. In fact, the most recent issue of Modern Plastics (July/August 2009) highlights advancements in discussions of a new class of elastomers coming to market that claims to offer “higher performance for longer durations at more temperature extremes.” As new plastic base chemistries continue to be discovered and integrated into everyday life – from household gadgets to cars and trucks to space shuttles – we will continue to reap the many advantages they have to offer.

One of the largest sectors benefiting from the conversion over to plastic components is the transportation/trucking world. Plastics are now taking the place of metal which was the material of choice for many years. As the result of careful material selection and integrated design, many advantages can be gained. Some of the most notable are:

- The elimination of corrosion – plastic can’t rust! Plastic components maintain the ‘like new’ appearance of a vehicle much longer than metals and contribute to a positive opinion of the product over an extended period of time.
- Weight reduction = fuel economy. As fuel cost fluctuations persist, fuel expense has become a main concern to end users.
- Softer appearance. Aerodynamics has become a large factor in truck design for added fuel economy. Greater design flexibility can create an individual and distinctive appearance while allowing manufacturers the added freedoms to emphasize brand characteristics.
- Color is integrated into the component, not applied later. This advantage becomes obvious over time where a small scratch can evolve into an embarrassing eyesore with corrosion giving the appearance of a much larger flaw. With plastic, the operator has a vehicle that looks good, year after year, and the coating need not double as a protective barrier to the base metal.
- Better impact resistance. This benefit leads to a direct reduction in maintenance costs.





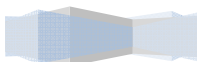
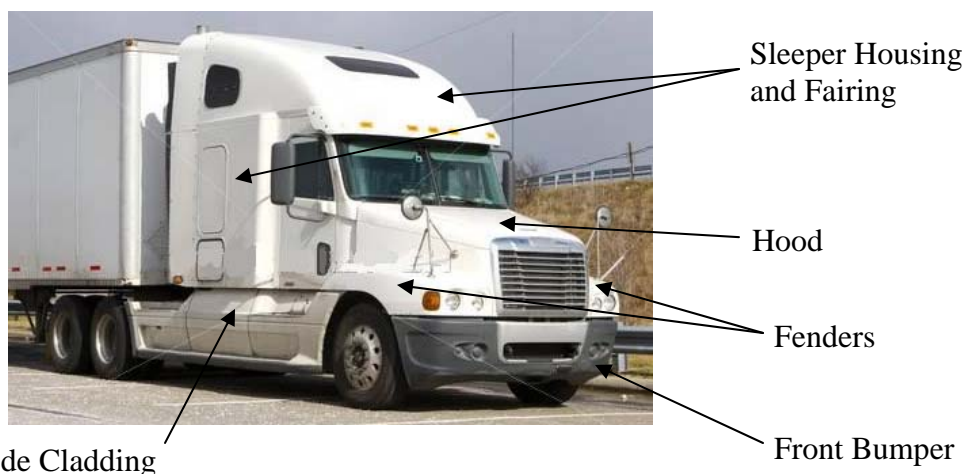
Several examples follow:

Thanks to plastic, the front bumper fascias of many newer rigs are much more aerodynamic, with smoother shapes, as seen in the photo below.



An end result of using plastics is parts reduction. This can be significant in many cases, because parts integration plays a vital role. To simply replace a steel component with an identical plastic part is not cost-effective, however if designed and integrated effectively parts reduction can be dramatic. For example, you can see from the image that running lights have been incorporated. This integrated part design can also absorb much greater impacts than its steel counterpart.

Other examples of effective design and parts integration include side cladding and air foils. These numerous shapes are not economically possible in metal, thus providing a reduction in parts assembly in an aesthetically pleasing, aerodynamic vehicle. Please refer to the image below for specific uses:





Another example includes side panel components in heavy-duty tow rigs.



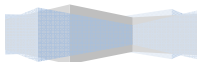
Composite Side Panels

A relatively new material designed for the most rugged and abusive field environments is a plastic product called TPO (Thermoplastic Olefin). TPO is a blend of Polypropylene with various fillers, including multiple grades of rubber. This material is very durable, can operate at low temperature, withstand impact, produce weight reduction and dimensional stability, maintain its attractiveness in color and gloss, and perform under some of the most severe weather scenarios.

TPO is finding widespread use in many automotive applications such as bumper cladding, front fender protection, and air deflectors. For instance, the Chevrolet HHR retro car utilizes TPO on the rear fender to protect the leading edge from gravel coming from the front tires.



Rear Fender Protection made from TPO



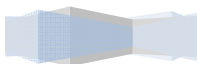


Typical physical properties for TPO are noted below:

Property	Test Method	Units	Result
Gardner Impact	Gardner	In-lbs	85
Specific Gravity	D-792		1.08 – 1.13
Tensile Strength	D-638	(psi)	3100
Flexural Modulus	D-790	(psi)	270,000
Flexural Strength	D-790	(psi)	9,600
Izod Impact	D-256	(ft-lbs/in) @ 73°	6.5
Deflection Temperature Under Load (DTUL)	D-648	°F	240

As can be seen, the high flexural properties and impact strength make this material ideal for many automotive and truck applications.

Another example of the material use is in a wind fairing for a medium-duty cargo truck. A McClarin customer was introducing a new product line, and wanted to include a wind fairing on the front of the cargo box above the cab. Additionally, this customer required a high-gloss finish to match the finish of the truck cab. We were able to custom design the fairing to include a shaped design detail for the marker lights, and an added profile to match the truck cabs being used.





This photo provides an excellent example of the application:



Wind Fairing

By being involved in the design process from the beginning, McClarin was able to add value to the final product making the fairing more durable and appealing. Additionally, the customer's warranty requirements were easily met.

To learn more about plastics/composites and the benefits they can contribute to your design, please visit www.mcclarinplastics.com.

