

New Vehicle Structural Designs

Impact Collision Repair

By John Leddy

Today, there are a number of major forces driving change in the automotive manufacturing industry. Government regulations that call for increased passenger safety, the lowering of vehicle emissions, and the demand for better fuel efficiency are all significant regulations driving the change. Fuel efficient drive trains and chassis structures of most vehicles, will continue to undergo significant new design changes because of these forces. Fit and finish capabilities, with our modern materials, are driving consumers to become more demanding. Integrated electronics are providing functions, features and performance as never before.

Forces

During the 1970's the National Highway Safety Administration (NHTSA) established the *New Car Assessment Program*. They began to test vehicles for frontal impact safety. In the 1990's, they started to test vehicles for side impact and rollover type collisions. These safety ratings led to the "Five Star" Safety Rating System still used today.

When a new vehicle is sold, the *Star* rating is posted on the Monroney sticker of the vehicle. (This is the price sticker that comes on all new vehicles.) To understand the implications of these ratings, websites like Safecar.gov, help consumers review and understand the safety ratings of vehicles.

In 2009, the NHTSA reported that there were 33,808 people killed in motor vehicle crashes. It was the lowest number of vehicle related deaths since 1950. It is a major statistic that illustrates that better and safer vehicle designs are helping save lives.

Energy Fuel

The Corporate Average Fuel Economy (CAFE) was first enacted by Congress in 1975. The purpose of CAFE is to reduce energy consumption by increasing fuel economy of cars and light trucks. In addition, new laws to reduce green house gases, and reduce the carbon foot print have been introduced and they are here to stay. On a global level, industrialized countries around the world are working hard to produce vehicles that will exhaust low to zero emissions. These initiatives have created global competition to build vehicles that can meet the new, more rigid, standards. New energy requirements will drive automakers to continue increasing their use of aluminum and carbon fiber to reduce vehicle weights.

These forces have combined to pressure the worldwide automotive industry into using new materials in body and chassis. These materials -- advanced and ultra high strength steels as well as aluminum and carbon fiber -- are the new fundamental raw materials that automobile manufactures are now using. Today, the majority of these materials continue to be steel, however many auto manufacturers have increased the use of aluminum and will continue to advance the use of light weight structural materials. The introduction of electric vehicles is causing aluminum to be more desirable, in an attempt to offset the weight of the batteries. Today, batteries increase the vehicles gross weight significantly.

continued on reverse

The Down Stream Problem

With the increased use of these materials, autobody collision repair technology must drastically alter its methods. New advanced steels are much stronger and also far more brittle. The most used tools of heating and hammering, are no longer acceptable means of aligning bent frames. The heating or hammering of the metal can and will damage it, and render it useless. Therefore, more sections such as frame rails, will be need to be replaced rather than straightened.

At a large cost to the manufacturers, the development of procedures and training has been expensive and now is figured into the cost of building a vehicle. Original Equipment Manufacturers have developed detailed replacement procedures required to cut and replace certain structural components such as frame rail sections. The collision repair centers will need to follow these OEM replacement procedures, in order to safely and correctly repair a damaged vehicle. Production of these manuals and diagrams will come from the manufacturers themselves, or a third party company, who contract with the manufacturer for the necessary data.

The manufacturers and their suppliers understand the words “product liability”. If the vehicle is not repaired using the recommended procedures, it will increase both the shop and the manufacturer’s liability exposure.

Advanced training of autobody technicians will be required to meet the rapidly changing standards. The number of training facilities for collision repair centers will increase. Manufacturers will offer more training to repair centers either through their own facilities or administered through organizations such as I-CAR, trade schools and repair equipment vendors. The technicians will need to be trained on proper welding methods for aluminum and steel using Metal Inert Gas (MIG) Welding, Squeeze Type Resistant Welding (STRSW), riveting and bonding materials and more.

With more section replacement required, manufacturers will require certified technicians and approved equipment to make repairs for their vehicles. Very accurate measuring systems utilizing manufacturers approved data will need to be employed. Displays and print out capability as well as designating areas of structural damage and estimates for remediation costs, are a necessity. Fixturing Systems capable of holding a vehicle from front to rear, will be a requirement for proper repair. New spot welding equipment that replicates the manufacturers’ welds, and riveting tools to extract and replace factory rivets, will become a necessity.

Metal testers will become a familiar tool because not all metals are the same even if they look similar. It will be akin to the “mark before you dig” rules in the construction industry. Test before you bang!

Repair centers will become more diversified and efficient.

With these changes there will be more opportunities to become more efficient and profitable. More collision repair facilities will have advanced measuring services to work at maximum productivity: to certify a vehicle is factory compliant, mechanical services to remove and replace drive train components and equipment to perform wheel service alignments, wheel safety and brake checks. Computer and electronic circuit capability will be in high demand.

The days of heat, bang, bend and putty are near over. Our new vehicles demand new methods.
