Safety and Liability Issues Related to Repair Defects In Collision Damaged Vehicles

Safety

More than 41,000 people in the United States die in motor vehicle crashes each year, and crash injuries result in about 500,000 hospitalizations and four million emergency departments visits annually. The economic burden of motor vehicle-related deaths and injuries are also enormous, costing the United States more than $150 billion each year.

The National Highway Traffic Safety Administration (NHTSA) began to evaluate its Federal Motor Vehicle Safety Standards (FMVSS) in 1975. By December 2004, NHTSA had evaluated the life-saving benefits as well as the consumer cost for a substantial "core" group of safety technologies for passenger cars and LTVs (light pickup trucks, sport utility vehicles and vans). In 2002, these technologies added an estimated $11,353,000,000 (in 2002 Dollars) to the cost of new cars and (LTVs) of that model year. They saved an estimated 20,851 lives in the cars and LTVs on the road during that calendar year. That amounts to $544,482 per life saved in 2002.

Over model years 1968-2002 these technologies added a total of $189,842,000,000 to the consumer cost of new cars and LTVs. They saved 252,989 lives in model year 1968 and later vehicles during calendar years 1968-2002. That amounts to $750,782 (in 2002 Dollars) per life saved in 1968-2002. Spending $750,782 per life saved shows how serious the Federal government takes vehicle safety.

After an accident it is critical to restore all the vehicle’s safety features to factory tolerances to assure that the current driver and passengers, and any future owners, are afforded the same level of vehicle safety after the repairs as they had before the vehicle was wrecked. These safety features can be divided into two major categories; crashworthiness and crash avoidance.

Crashworthiness: The most important devices, or elements of design, installed on or in a motor vehicle are those that reduce the risk of death or serious injury when a crash occurs. Crashworthiness features, which are designed to prevent ejection from the vehicle, reduce the risk of fire, and minimize occupant injuries, include: seat belts, crush zones and the safety cage, airbags (including side impact protection), and windshields. Windshields (stronger and lighter than steel) are responsible for structural stiffness, ejection prevention, and proper passenger air bag operation.

A vehicle's structural design is the primary feature for protecting passengers in a serious crash, and minimizing any injury that may result. A good structural design should have a strong occupant compartment, or safety cage, and front and rear ends designed to buckle and bend in serious crashes to absorb crash forces (crush zones). It is important for these crush zones to keep damage away from the safety cage because, once this cage begins to collapse, the likelihood of injury increases rapidly. If it is effectively designed, a longer crush zone lowers both the likelihood of damage to the occupant compartment and the crash forces inside it. Since crush zones were first introduced by Volvo in 1966, they have become an

indispensable safety feature in modern cars. By absorbing part of the impact from a car crash, crush zones have been credited with saving thousands of lives each year.

Crush zones are deliberate weak spots that engineers have placed in the structure of a car. While this might appear contrary to passenger safety, there are sound principles behind this approach. By placing the weak spots in strategic locations, the metal work of a car can be made to collapse in a controlled manner. This creates 2 mechanisms by which the energy from an impact can be managed:

1. In deforming the metal work of the car, energy from the impact gets "used up" or converted into heat. This reduces the amount of energy left to damage the passenger area.
2. Since the collapse is controlled, energy from the impact can be directed away from the passenger area. In most designs, force from the impact is channeled to areas such as the cowl, rockers, pillars, floor and roof.

The human body can only withstand deceleration to a certain limit, beyond which severe internal injury or death occurs. A crashworthy vehicle must be designed to deform according to a deceleration-time response, or crash pulse. Ideally, engineers try to design the deformation of the structure to achieve a uniform deceleration, for example 20-25 G's when measured in a fixed barrier, frontal crash at 30 mph (where G is the pull of gravity). During that very short time period (in milliseconds), the kinetic energy must be absorbed primarily by the vehicle's crush zone.

To understand how crush zones affect passengers, consider a car crashing head-on into a stationary concrete wall. Before the crash, the car and its passengers move together at the same speed. If the car has a rigid body, an impact will cause both the car and passengers to come to a stop in a split second. It is this rapid deceleration that causes injuries and fatalities in a car crash.

The force acting on the passengers is given by Newton's 2nd law:

$$\text{Force (G's)} = \text{Mass} \times \frac{\Delta \text{ Velocity}}{\Delta \text{ Time}}$$

As the stopping time is only a split second, the force on the passengers is very high.

Cars with crush zones, however, do not have a rigid body. One can think of them as springs being compressed against a wall. Although the front bumper of the car immediately becomes stationary, it takes some time for the metal work to collapse. This allows the middle and rear of the car to continue in motion for a short time. Since the stopping time is increased, the force acting on the passengers is greatly reduced.

Proper structural repair when restoring the front crush zone is even more critical with air bags because the stiffness and crushability of the structure is what tells the air bag sensors when to deploy the air bag. Car manufacturers take great care to ensure all the structural components work together. The correct flow of crash energy through the vehicle is imperative. Automakers "tune" the pulse to exactly the right combination of deceleration time

and crush distance for maximum occupant protection. Each sensor is designed to match the crash pulse of that particular car.

The entire crash time is less than 1/10th of a second. The air bag needs to be inflated early in the crash in order to cushion the occupant. As it deflates, it slows the occupant down over a relatively long period of time, which makes air bags so effective in reducing injuries. The other safety components, especially the seatbelts, are also carefully matched for each make and model.

Timing is very important because each vehicle model does have a different crash pulse. If the vehicle is damaged, it is important to restore the sensors and the structural safety elements to their original conditions. Structural repair is risky for the timing sequence. If the technician does not restore the vehicle to pre-accident crushability, the shape of the pulse may change. If the repairs have made the crush zone softer, this can fool the sensor and the air bags may not deploy because too much time has passed before the deploy threshold was reached. Too much time means the driver will hit the steering wheel and other interior surfaces rather than the air bag exploding when the passenger is too close. If the structure is repaired too stiff the air bags will deploy, but this may put excessive G's on the driver and passengers. Remember, all this happens in under 1/10th of a second.

As new vehicles get lighter and lighter it is structural engineering that protects passengers in a collision, not mass. The Insurance Institute for Highway Safety spends a lot of money ($60,000 per car) crash testing new cars to pressure OEMs (original equipment manufactures) to design and build safer cars. However, there is no system used by the insurance companies or their repair dealers to confirm that structural repairs have been completed to factory tolerances. This is why you need to know the vehicle's most important safety feature, the crush zone, was repaired properly so it will perform as it was designed to perform in a serious crash. A professional post repair inspector (PRI) can help and should be consulted if you have a vehicle that is going to need repairing or has repaired structural components. This should also be considered when buying a used vehicle as most insurance claim repairs are not yet reported to information providers like CarFax.

Crash avoidance: These systems are the design features and elements that help prevent an accident. These safety features include driver's visibility, electronic vision, lighting, and handling. Handling elements include: tires, wheels, brakes, suspension, steering, and structural stiffness.

Again, restoring these elements to manufacturer's operating limits assures that in an emergency situation the vehicle will handle as the manufacturer designed the vehicle to handle. Avoiding an accident is always a better alternative than having an accident, and thus knowing these mechanical systems are restored properly (to factory tolerances) is a must.

Liability

Any case arising from a motor vehicle accident should probably be evaluated for a potential claim based on a defect in the vehicle or a vehicle component, especially those cases which involve serious bodily injury or death. It may be found that such injuries were preventable if not for a vehicle defect, or were made worse by such a defect.

The most important concept in vehicle defect liability cases is crashworthiness. During a collision, the vehicle's occupants are subject to a number of forces that can result in injury, including rapid deceleration and rapid acceleration, depending on the direction of impact in the collision. Crashworthiness deals primarily with the 'second collision' that results from these forces, in which the driver and passengers collide against the interior of the vehicle. An effective crashworthy vehicle design will distribute these injurious forces over as great a period of time and distance as possible, including by directing them to parts of the body that are more capable of withstanding them.

One of the first steps in assessing a motor vehicle defect claim is to decide who (or what business entity) can be sued, what defenses may be available to them, and what is expected to be recovered should a claim be successful.

To briefly set forth the duties of some potential defendants:

- A car repair dealer owes a duty to the public to use ordinary care in making repairs, and to proceed beyond a routine inspection of a car for defects.
- A used car dealer has a duty to discover and repair any obvious defects in the vehicle, or defects, which are reasonably discoverable (should have known).
- A new car dealer with repair facilities may be held to an even higher duty to discover and correct defects reported by purchasers.
- The manufacturer of a defective automobile is liable to the purchaser or user of the vehicle, and to bystanders. The manufacturer's duty is to make the vehicle reasonably safe for all people when it is used in a reasonably anticipated manner, which courts have even found includes the striking of a pedestrian.

In some cases, a written warranty covering the vehicle may affect a claim of a defect. It is important to note that this warranty may be binding only on the vehicle dealer, and in some circumstances a manufacturer may or may not be bound by it.

Effective June of 2006 the State of California has a new law that will affect all used car dealers. AB 68, Montanez; Motor vehicle sale contracts: Car Buyer's Bill of Rights. SEC. 8. Section 11713.18 is added to the Vehicle Code, to read:

> (a) It is a violation of this code for the holder of any dealer's license issued under this article to advertise for sale or sell a used vehicle as "certified" or use any similar descriptive term in the advertisement or the sale of a used vehicle that implies the vehicle has been certified to meet the terms of a used vehicle certification program if any of the following apply:
>
> (5) The dealer knows or should have known that the vehicle has sustained frame damage.

It is important to note that “should have known” means the dealer is expected to have the expertise to evaluate a vehicle and determine if the vehicle has sustained frame damage.

Crashworthiness can be used to hold a defendant liable for injuries sustained in a car accident because of a defect that was not necessarily the cause of the accident, but that

caused or made worse the injuries suffered in the accident. In order to be successful in making such an argument, they will most likely need to prove that a design feature that was reasonably avoidable, or improperly repaired, either caused or increased an injury.

As the law of automobile products liability does not differ theoretically or conceptually from the general law of strict products liability, an overview of the concept of strict liability is useful in understanding what to do if one is faced with a possible claim based on a motor vehicle defect.

Ordinarily, to hold someone liable for injuries, one must show that they were careless -- that is, negligent -- and that their carelessness led to the accident or injury. With products such as motor vehicles sold to the general public, however, it would be extremely difficult and prohibitively expensive for one individual to have to show how and when a manufacturer was careless in producing the vehicle or a dealer in repairing the vehicle. For these reasons, the law has developed a set of rules known as "strict liability" that allows a person injured by a defective or unexpectedly dangerous product to recover compensation from the maker or seller of the product without showing that the manufacturer or seller was actually negligent.

Here's how strict liability works in the motor vehicle context: If someone has been injured by a motor vehicle or a component on that vehicle, they are entitled to compensation from the manufacturer or from the business that sold, repaired, or rented the vehicle directly to them. Strict liability operates against a non-manufacturer who sold, rented, or repaired a vehicle only if it is in the business of regularly doing so. In other words, if someone bought a car from a source that sells all kinds of things, but not any one type of item on a regular basis, strict liability may not apply. There are three types of defects that can cause injury and result in liability of the manufacturer or vehicle dealer:

- Manufacturing defects - The injury results from a flaw in the manufacturing process, such as a manufacturer's failure to include a safety device, although the design of the vehicle calls for such a device. An auto rebuilder may leave off air bags to reduce repair costs.
- Design defects - An injury results from a manufacturer's design that makes the vehicle somehow unsafe in the first place, such as placement of a fuel tank in a location that may result in explosion during a collision. For a repair dealer it is important to restore the air bag sensors and the structural safety elements to their original conditions so that the air bags will deploy properly and passengers will not be subjected to forces greater than what should be expected in a serious accident. In newer vehicles the “black box” records the actual deceleration-time response during an accident making it possible to calculate the G’s the occupants were subject to during the accident.
- Failure to warn - Injury occurs when the manufacturer or dealer is aware of a dangerous aspect of a vehicle but fails to warn or provide adequate warning to consumers.

Due to the complexity of the issues involved in a potential motor vehicle defect claim, discussing the case with an attorney who is experienced in the area of motor vehicle and product liability is the best way to ensure a thorough evaluation of the likelihood of success if a claim is made for injuries and/or damages, and of the potential value of the claim. Also, there are deadlines for filing motor vehicle and product liability claims.