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Defensive driving for manufacturers in the autonomous revolution

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In every company developing autonomous vehicles today, someone just hit "Send" on an email. Any one of those emails may one day be turned over to plaintiffs' lawyers seeking millions of dollars for damage caused by the crash of one of those vehicles.

As speculation grows on the law surrounding autonomous vehicles, those facing liability should be equally mindful that the facts underlying future litigation are being written now.

And while the automakers have seen product liability lawsuits before, this new era of autonomous vehicles will include legal theories more commonly seen in other industries. Companies that take lessons from those arenas can positively shape autonomous vehicle litigation for decades to come.

Recent automotive mass torts have primarily stemmed from two legal theories: design defect and misrepresentation. In design defect cases, the plaintiff claims that the manufacturer produced a defective car that has injured people. Often, the manufacturer does not appreciate the existence, scope or severity of the defect during the product's design phase.

Examples of this type of claim include the Takata air bag and General Motors ignition switch litigations.

Takata air bags were included in vehicles produced by 19 automakers around the world. Under certain circumstances, the chemical used to rapidly inflate the air bags could deteriorate when exposed to heat. The faulty inflator housing could then rupture, sending metal fragments at the driver and passengers.

The ensuing lawsuits are based on the notion that the design of these air bags is defective, that consumers suffered physical or economic harm as a result of the air bags, and that manufacturers are therefore liable to consumers.

Takata has since filed for bankruptcy, and the effects of the litigation have rippled down its supply chain. Estimates place the number of affected vehicles at more than 37 million.

The second legal theory that has served as a centerpiece for recent automotive mass torts is misrepresentation. Misrepresentation claims can take many forms (ranging from breach of warranty to negligent misrepresentation and fraud) depending on the degree of fault alleged against the manufacturer.

Common to all of them, though, is the allegation that the manufacturer made some representation about the vehicle that was incorrect.

One recent example is the litigation concerning Volkswagen's emissions controls on their turbocharged direct injection diesel engines. Volkswagen admitted to having installed software that could recognize whether a vehicle was operating in a laboratory setting or under real-world conditions.

> Consider the dilemma presented by an autonomous vehicle forced to choose between hitting a pedestrian or harming its passengers by hitting a tree.

If the vehicle concluded that it was operating in a laboratory, it would alter the operation of the engine to satisfy government emission regulations.

When the car was on the road, however, it would not alter its operation and — as a result — would not comply with the same government regulations.

To date, Volkswagen has paid over $15 billion in settlements related to this litigation.

A key distinction between these litigations and those that companies may face over autonomous vehicles is the role of inherent risk as it applies to crashes. Inherent risk is the danger associated with a useful product that cannot be eliminated without reducing the product's functionality.

Surgery to implant an artificial knee, for example, is an inherently dangerous procedure. It carries with it the potential for infection, rejection of the implant, and even death. At least with current technology, it is impossible to place an implant without exposing the patient to these risks. Yet patients continue to accept these risks in exchange for the chance at a more active lifestyle.

For autonomous vehicles, crashes will be an inherent risk. As long as these vehicles share the roads with human drivers and pedestrians, that human element will introduce a degree of unpredictability that will prevent even the most sophisticated systems from operating absolutely accident free.

One day, technology may progress to the point of eliminating accidents altogether, but until then we should resist the temptation to delay the better in pursuit of the perfect.

Without question, these vehicles carry the potential to be vastly safer and more efficient than vehicles operated by human drivers. Indeed, the National Highway Traffic Safety Administration has found that Tesla's current Autopilot system reduces the vehicle crash rate by almost 40 percent.

Soon, however, vehicles operating exactly as intended will be responsible for deciding when and why crashes happen.

Consider the dilemma presented by an autonomous vehicle forced to choose between hitting a pedestrian and harming its passengers by hitting a tree. Even assuming that the vehicle functioned properly in leading up to and making that decision, several product liability claims could result from the inherent risk of the crash itself.

The first type of product liability claim resulting from the hypothetical attacks the design of the vehicle's programming.

Depending on the state's law, design defect claims are analyzed under one of two frameworks: the risk-utility test or the consumer expectation test.

As implied by the name, the risk-utility test balances the dangers posed by a product against its benefits to society. This test is typically more friendly to defendants.

The factors balanced when employing this test vary by state, but they include such things as the availability and cost of an alternative design and the degree to which the product's risk is obvious or avoidable.

In contrast, the consumer expectation test analyzes whether a product is defective by asking whether it is dangerous to an extent beyond that which would be contemplated by the ordinary consumer.

The subjectivity of this test offers greater flexibility to plaintiffs, but its application can be difficult when the product is particularly complex or specialized.

For companies developing autonomous vehicles, these tests present both challenge and opportunity.

Beyond the obvious challenges created by a rise in the complexity of product liability suits, companies may face difficulties based on the very technology that allows autonomous vehicles to exist in the first place.

Artificial neural networks are vital to the decisions that autonomous vehicles will make every second that they are on the road. But unlike a series of if-then statements — where the programmer's code predetermines the output — neural networks do not operate by such a rigid, algorithmic structure.

Instead, neural networks gather inputs and produce outputs based on their training. Between input and output can exist several hidden layers that adjust themselves based on the training and form the network's decision-making process.

In many ways, eliminating the rigid and predictable algorithmic structure is good and necessary. Neural networks are adaptable to less predictable situations that cannot be captured through a coded algorithm.

Moreover, they are capable of learning based on experience and improving function over time.

Without knowing how the vehicles will behave in every situation, it will be difficult to warn how they will react in a given situation.

Neural networks can also make real-time decisions with the speed needed to replace human drivers. But when hidden layers exist in the reasoning process, neural networks may obfuscate why autonomous vehicles make the choices they do.

Conversely, autonomous technology can also result in new opportunities for defendants facing design defect claims.

To begin with, defendants will have far greater control over the facts underlying accidents because it will be their decision-making that operates the vehicles. Defendants will also have access to cameras, radar and light detection and ranging (known as "LiDAR") to better record all of the moments leading up to a crash.

Moreover, since these products are still being developed, companies who are mindful of the design defect tests can work those tests into their decision-making processes.

For instance, it is unlikely that autonomous vehicles will be mass produced until regulators are convinced that the benefits outweigh the risks.

Similarly, it is unlikely that the vehicles will be mass used until consumers are satisfied that their expectations of safety have been met. Companies that reflect defense theories in their documents today will set themselves up for success in litigation tomorrow.

The second type of product liability claim that may result from the hypothetical examples attacks the warnings that accompany the vehicle.

For example, if the vehicle chooses to risk injury to its passengers rather than the pedestrian, the passengers may allege that the manufacturer improperly failed to warn them that the programming would make that decision.

Failure-to-warn claims are also dependent on state law and exist in a number of forms, including strict liability and negligent failure to warn. Common to all of them, however, is the allegation that the manufacturer failed to provide an adequate warning and that the failure caused injury to the plaintiff.

When dealing with unsophisticated users, the adequacy of the warning becomes particularly important. A warning that is buried in a dense manual accompanying a vehicle will have a more difficult time holding up than one that is more specifically called to the user's attention.

In the medical device and pharmaceutical context, this has led to the use of "black box" warnings that specifically call to the user's attention certain serious or life-threatening risks. Just as medical device and pharmaceutical manufacturers have attempted to do for years, automakers will have to balance the thoroughness and adequacy of warnings.

The more that warnings are imprecise and overly general, the more their adequacy will be attacked due to a lack of specificity.

Conversely, the more a warning is detailed but begins to resemble a small town's phone book, the more its adequacy will be attacked because it would be unreasonable to expect an average user to understand it.

It may be tempting to dismiss failure-to-warn claims because it is impossible to warn how an autonomous vehicle's programming will react in every scenario.

Indeed, the use of neural networks will again have fascinating ramifications because it will be impossible to know how the vehicles will react to every scenario until they actually encounter them.

Imagine a system that learns to answer the question of whether an image contains a dog by showing it pictures that contain dogs and pictures that do not contain dogs. As the system gains more information, it will make better decisions. Yet even after the system has reviewed millions of pictures, there is no guarantee that its next answer will be correct.

Although it is extremely oversimplified example, this is not unlike the case of an autonomous vehicle approaching an intersection and processing variables about pedestrians, stoplights and crossing traffic.

The vehicle will be equipped with reasoning that helps it make the right decision — reasoning that will only become more advanced as millions of these vehicles hit the roads and log billions of hours each year.

But the potential for variation — especially because unpredictable human drivers and pedestrians share the road with these vehicles — will continue to frustrate efforts to guarantee how these vehicles will behave.

Without knowing how the vehicles will behave in every situation, it will be difficult to issue appropriate warnings in a given situation.

In addition to providing warnings about the decisions that an autonomous vehicle may make, companies may also need to provide continuous warnings about driving conditions.

For example, when drivers today enter a thunderstorm, they can choose if and when conditions become so dangerous that they must pull over and wait. Currently, vehicles with partial autonomy avoid this dilemma by giving control to the human driver when road conditions deteriorate.

But when cars are so autonomous that they no longer require a driver or even have a steering wheel, they may make these choices for their passengers or give passengers an option to pull over when conditions deteriorate past a certain point.

The latter scenario could present opportunities for defendants to argue that the causal chain has thus been broken, but driving may eventually be so foreign to humans that it no longer makes sense — or is safe — to ask them to make this decision.

In any event, there may still be situations in which the passengers need to override the reasoning of the vehicle, no matter how sound the vehicle's reasoning is.

Perhaps the thunderstorm previously mentioned was actually a Category 5 hurricane that the passengers were desperately trying to outrun. Perhaps one of the passengers was suffering from a medical emergency that outweighs the need for safe driving. These scenarios are certainly outliers, but they must be addressed if full autonomy is to be embraced.

As decisions concerning the development of autonomous vehicles are being made, companies should remember the legal theories underlying these product liability claims so they can best prepare to support their decisions.

Perhaps even more important, companies should be mindful of the optics surrounding those decisions — and not just the final decisions themselves. The best intentions can still result in high-dollar verdicts when the plaintiff's counsel has a poorly worded email to wave in front of a jury.

As companies create the technology that will one day drive this new industry, they should act as though someone is looking over their shoulder with access to every communication and document they create. That is exactly the scenario they may find themselves in one day.

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