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Self-driving cars and associated technology is moving from science fiction to reality in our lifetime. The acceleration of technology in this area and the ability to apply these scientific and engineering advances to practical applications are creating advances in transportation that will change the way people live their lives and how civilization does business. This article focuses on a fascinating blend of classic product liability and proximate cause issues as they relate to an area populated by new products, components, hardware, software, and related technology.

Self-Driving Technology and Autonomous Vehicles: A Whole New World for Potential Product Liability Discussion

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As remarkable as it seems, the concept of self-driving cars and associated technology is moving from science fiction to reality in our lifetime. The acceleration of technology in this area and the ability to apply these scientific and engineering advances to practical applications are creating advances in transportation that will change the way people live their lives and how civilization does business. It is yet unclear whether these advances will match the giant leaps forward created by airplanes, cars, and computer technology. However, whether it be electric-powered cars or autonomous vehicles, there seems little doubt that how we travel will change in the near future. With these technological advances, legal questions are sure to follow, and so it seems that these advances will keep product liability lawyers busy for as many years as the products took to develop. This article can only scratch the surface, but the discussion is a fascinating blend of classic product liability and proximate cause issues as they relate to an area populated by new products, components, hardware, software, and related technology.

Background

For those of us with undiminished long-term memory, the 1964 World's Fair in Flushing Meadows, New York was a first look at the future for autonomous vehicles. The General Motors Pavilion, called Futurama II, featured automated highways and self-driving cars. Interestingly enough, the exhibits built on concepts depicted at the GM Futurama exhibition at the 1939 World's Fair in New York, which featured self-driving cars and automated highways. Many recall that the Central Power and Light Company launched an advertising campaign in newspapers and magazines in the mid-1950s predicting automated travel with an interesting depiction of a family playing a board game in an electric automated car traveling on a highway. In August 1961, Popular Science Magazine reported on the Aeromobile 35B, an air-cushioned personal self-driving hovering car; for those of us infatuated at the time by the favorite cartoon series, The Jetsons, it was a dream come true. During the 1960s, the United Kingdom's Transport and Road Research Laboratory tested a driverless vehicle that could reliably drive 80 mph over magnetic cables buried under the road. During the 1960s and 1970s, Bendix Corporation developed and tested similar driverless cars that utilized buried cables and computers.[1] This was the stuff of science fiction and super heroes for kids like me, and technology has developed from there.

As we know, technology development has already resulted in advanced cruise control, vehicles with self-parking capability, sensor-initiated braking, all manner of early warnings to a driver for pedestrians and other vehicles in driving and parking situations, but most of

[1] James A. Anderson et al, "Autonomous Vehicle Technology – A Guide for Policymakers," Rand Corporation, 2014. For those with shorter attention spans, but in need of a quick overview and history of the subject matter, *see "History of Autonomous Car", http://en.wikipedia.org/wiki/History_of_autonomous_car.*

this technology is still tied to a human operator. These technologies enhance the driving experience and improve accident and injury avoidance, but, for the most part, these advances do not replace the driver. Current self-driving concept vehicles using the Google technology are being tested continuously on California roads. As of August 28, 2014, it was reported that the latest prototype had not been tested in heavy rain or snow due to safety concerns, and since the cars rely primarily on pre-programmed route data, they do not obey temporary traffic lights and, in some situations, revert to a slower mode in complex unmapped intersections. The vehicle was reported to have difficulty identifying when objects, such as trash and light debris, are harmless, causing the vehicle to veer unnecessarily. Additionally, the Lidar technology cannot spot some potholes or discern when humans, such as a police officer, are signaling the car to stop. Google projects having these issues fixed by 2020.[2] In early 2014, IHS Automotive released a study, entitled "Emerging Technologies: Autonomous Cars – Not If, But When," which projects a global total of "nearly 54 million" self-driving cars by 2035, and predicts that "nearly all of the vehicles in use are likely to be self-driving cars or self-driving commercial vehicles sometime after 2050."[3]

Much has been written on the benefits of self-driving vehicles from the standpoint of better design, improved safety, and increased capacity on highways, and savings and efficiency to infrastructure. According to cost-benefit analyses that were made, the adoption of an automated system on the British motorways was projected to be repaid by end of the century, to increase the road capacity by at least 50%, and to prevent around 40% of the accidents.[4] Self-driving vehicles are being designed and refined and undergoing extensive testing on an ongoing basis. All major vehicle makers are engaged in some form of design, refinement, and testing of self-driving automobiles. Even long haul trucks made by companies like Mercedes are being designed and undergoing testing on roads in various parts of the world.[5] Fuel efficiency, reducing the number of cars on the

[2] Joann Muller, "No Hands, No Feet: My Unnerving Ride In Google's Driverless Car," March 13, 2013; Lee Gomes "Hidden Obstacles for Google's Self-driving Car," August 28, 2014; and "Google Self-Driving Car Chief Wants Tech on the Market Within Five Years," (March 17, 2015).

[3] IHS, Self-Driving Cars Moving into the Industry's Driver's Seat (January 2, 2014), http://press.ihs.com/press-release/automotive/self-driving-cars-moving-industrys-drivers-seat

[4] John Reynolds, "Cruising into the Future," London Telegraph, May 26, 2001; Jacob Kastrenakes, "Self-driving Cars and Ocean Colonies: Revisit Isaac Asimov's Vision of 2014," The Verge, August 28, 2013, reporting Asimov's reflections from the 1964 World's Fair in comparison to what he believed would be the advances at a 2014 World's Fair; and James Anderson et al., Autonomous Vehicle Technology – A Guide for Policymakers," Rand Corporation, 2014.

[5] The Mercedes-Benz Future Truck 2025 study provided a long-distance truck at the 2014 International Commercial Vehicle show (IAA). In ten years' time, they predict that trucks could be driving autonomously on motorways. "Transport efficiency will increase, traffic will be safer for all road users, and fuel consumption and CO2 emissions will be further reduced. To do this Mercedes-Benz connects existing assistance systems with enhanced sensors to the "Highway Pilot" system. Autonomous driving is already possible at realistic speeds and in realistic motorway traffic situations." The Mercedes-Benz Future Truck

road, environmental concerns, safety in the form of reducing car accidents, enabling people who are handicapped, aged, impaired, or otherwise unable to drive themselves are often cited as reasons for implementing self-driving vehicles. Some of these people are capable of driving themselves or monitoring the automated operation of the vehicle, while others would be unable to do so, and the status and ability of the operator or passenger will have some impact on potential tort liability for accidents involving these vehicles.

The Product Liability Environment

The threshold issue is whether legislation will permit the use and operation of self-driving vehicles on highways, roads and local streets, and, if so, under what circumstances. This legislation is an imperative for widespread development and will most likely frame or limit the liability environment for vehicle, equipment, and technology manufacturers.[6] Similar to pharmaceuticals and medical devices, the development of these technologies and applications will have broad application and benefit to society, so manufacturers will require a legislative framework which provides them with limitations on product liability for injuries and property damage. If not, then it would seem that companies will be hesitant to implement the products and technology or will do so in limited form or use. As it currently stands, manufacturers may be hard-pressed to advertise its technology to be used in environments more likely to cause accidents and/or as a substitute to some meaningful driver involvement. Unless we see legislation limiting liability, it seems likely that self-driving technology will receive treatment similar to cruise control and not see the full benefit to society or the individuals who would most benefit from its use.

Understanding potential product liability for self-driving vehicle equipment by applying existing statutes and case law is clearly a work in progress, as the products and technology is developing and not easily applied in comparison to other products. The application of self-driving technology and vehicles to various state statutes and case law will present real challenges for anticipated claims based on manufacturing defects, design defects, or warning deficiencies. More detailed articles on this subject have already been written and worth using as reference material.[7] The implications are substantial and will continue to develop as we more fully understand the breadth of the potential liability. For example, when self-driving vehicles become operational and prevalent, we can expect broader and more general global issues, including concerns over terrorism and cyberattacks on the technology, whether it be the algorithms or the GPS data or whatever else comes into play. And once

2025 provides a glimpse of the future shape of trucks. https://www.youtube.com/watch?v=7bFc0rBoFY8

[6] John Villasenor, "Products Liability and Driverless Cars: Issues and Guiding Principles for Legislation," Brookings Institution Press (April 24, 2014). http://www.brookings.edu/research/papers/2014/04/products-liability-driverless-cars-villasenor

[7] Jeffrey Gurney, "Sue My Car Not Me: Products Liability and Accidents Involving Autonomous Vehicles," 2 Journal of Law, Technology & Policy 247 (2013).

we enter this area, then the available of insurance and insurance coverage disputes are sure to develop.[8] A 2014 Lloyd's risk assessment report noted that the increase in autonomous cars will mean more data connectivity between cars and personal items such as smartphones and tablets, which could create the potential for unwanted parties to access personal data, such as typical journeys or a person's physical location. The report also warns of cyber terrorism, such as a large-scale immobilization of cars on public roads.[9]

Within this broader framework, we can examine the current state of product liability law on the assumption that there will be no legislative protections as a baseline, and address each general category separately. By definition and context here, the analyses must be abbreviated but should be enough to relate the issues and identify the areas of concern and caution for defense lawyers and clients alike. From a product liability standpoint, where necessary, distinctions are drawn between the vehicles themselves and the components or technology that will self-drive the vehicles, but the point is worth making generally here in that some jurisdictions may permit vehicle manufacturers to pass this liability on to the producer of the self-driving hardware or software.

First, claims involving manufacturing defects generally must follow certain lines of proof – failure to meet the manufacturers specifications or standards, and so the issues will likely turn on the reason for the accident and the alleged or proven malfunction in the self-driving system. Here, understanding the technology and how it interfaces with other components or systems is essential to determining whether certain theories can be pursued. For example, if the technology relies on radar sensors, laser rangefinders, video cameras, global positioning, or digital mapping, then it might be possible to make out a manufacturing defect claim if one can prove a product or component malfunctioned in comparison to specifications. However, these location and context components only do part of the job; developers then refine the algorithms this technology utilizes to track location and interface with other vehicles and obstacles.[10] However, if the alleged defect is really a software error in these algorithms, then classic product liability law most often cannot be utilized to prove a manufacturing defect involving software error in that it is not a manufactured product.[11]

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[8] Natalie Baughman, "With Self-Driving Vehicles on the Forefront, Companies Should Consider Cyber Insurance Coverage Options," The National law Review (April 22, 2015).

[9] Gillian Yeomans, "Autonomous Vehicles Handing Over Control: Opportunities and Risks for Insurance," Lloyd's Exposure Management (2014) can be found electronically at https://www.google.com/#q=2014+Lloyd%E2%80%99s+report+titled+%E2%80%9CAutonomous+Vehicles+Handing+Over+Control:+Opportunities+and+Risks+for+Insurance%E2%80%9D+

[10] Ryan Whitwam, How Google's self-driving cars detect and avoid obstacles," Extreme Tech, September 8, 2014. http://www.extremetech.com/extreme/189486-how-googles-self-driving-cars-detect-and-avoid-obstacles.

[11] Gurney, "Sue My Car Not Me: Products Liability and Accidents Involving Autonomous Vehicles," 2 Journal of Law, Technology & Policy at 259.

If the product can be proven to have malfunctioned, then the plaintiff may be able to show through circumstantial evidence that the there was a manufacturing defect without specifically proving how it was defective, but only if they can show that the product malfunctioned, the malfunction occurred during proper use, and the product was not altered or misused in a manner that likely caused the malfunction. With self-driving vehicles, the argument is that the accident itself proves the initial two elements; while the third element requires proof that the vehicle was in its original condition, which is essentially proofs that sound like res ipsa loquitur case. Given the fact that some jurisdictions do not allow for recovery under a malfunction theory, then the traditional manufacturing defect avenue may well be insurmountable for product liability claims involving self-driving vehicles.

Second, plaintiffs also will allege a design defect theory of liability, and provide proofs in an attempt to satisfy either the consumer expectations test or the risk-utility test. However, both tests will present their proof challenges, and a few of these issues are worth review here. Under the consumer expectations test, which the Restatement (Third) rejected for design defects, a court will look to assess what a reasonable consumer would expect from a self-driving vehicle under the same or similar circumstances. The initial argument is simple – self-driving vehicles should drive themselves without mishap, although such an expectation may be unrealistic based on new and developing technology. On the one hand, self-driving technology is incredibly complex and so there is an argument that the test cannot be utilized because reasonable consumers might not expect perfection. However, if allowed and the facts can be proven, then this test may well be a potential avenue for recovery. Under the risk-utility test, the burden is on the plaintiff to proffer evidence of a reasonable alternative design that would have prevented the accident, but before doing so, the plaintiff must determine the design cause of the accident, whether it be an actual product or component or the software involved in the process. Showing that a safer design would have prevented the accident could create an incredibly high burden of proof, make it difficult to find qualified experts with legitimate experience, and simply make it too expensive to pursue claims based on a design defect theory.

Finally, a warnings-based theory of liability might allege either a failure-to-warn or an adequacy of the warning. While many think warnings are likely the easiest theory for plaintiffs to pursue, self-driving vehicles present new and interesting challenges. To those of us thinking about these things before there are even lawsuits or a real product on the road on which claims can be based, it seems that the success or failure of this kind of claim will depend on the product or technology description and marketing/sales materials, the reason(s) people are buying and using the technology, and the nature and extent of the instructions and warnings provided. No doubt, even though self-driving contemplates just that, manufacturers will be

very careful about the extent of the technology in the context of safe operation and the potential risk of harm. Most anticipate that the warnings theory will be the most likely and least complicated avenue for potential recovery if plaintiffs can find and afford the multiple experts necessary to deal with computer hardware and software technology, cost analysis, and what is appropriate or inappropriate in terms of instructions or warnings with regard to these types of vehicles.[12]

Finally, if plaintiffs are successful enough to prove one of these liability theories, then there remains the same liability and causation issues we deal with in other product liability cases. These include the potential plaintiff's comparative fault under the circumstances, issues of misuse of the technology, state of the art and assumption of the risk where relevant, and then the potential for additional parties or causes. Manufacturers cannot anticipate all misuses, no more than anticipating all potential changes or modifications to the vehicle that may impact on self-driving operation. The state-of-the-art defense will come into play in these kinds of cases because technology is developing in real time with modifications likely being made over the next ten years. The challenge will be utilizing those changes as evidence where the changes are implemented as subsequent remedial measures and where self-driving technology relies on complementary engineering, computer science, and latest in vehicle interface design. Lastly, factors like changes in road conditions that have nothing to do with the technology or could have been anticipated or detected will as a potential defense under appropriate circumstances.

Conclusion

Self-driving vehicles will be part of the future of personal and commercial vehicle travel in the foreseeable future. Given the advantages of the technology and advances to vehicle travel, predictions indicate that there will be some state or federal legislation that will impact on or limit potential product liability for vehicle manufacturers or the companies designing or implementing technologies that will make autonomous vehicles a reality. Even with these statutory protections, there will be potential liabilities or claims made by plaintiffs injured as a result of accidents involving these vehicles. Much will also depend on the warnings and instructions provided with self-driving cars and factual details leading up to the accident. Product liability law will develop over time involving self-driving cars, and what we can be sure of in the process is that the journey will be interesting and present plenty of opportunity to make new law.

[12] This article does not address state law claims based on negligence principles, breach of express or implied warranty claims, misrepresentation, fraudulent and otherwise, but where permitted, these causes of action will come into play.

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