

Edge drops in excess of 2 inches are likely to cause an errant vehicle to lose control.

DOTs and failure of DOT maintenance personnel to appreciate the need to remediate these conditions. Additionally, due to lack of training by law enforcement, it is very common for reporting officers to even consider a drop-off of 3"-4" or less as being a substantial factor in causing a crash. In fact, in depositions a year after the fatal San Diego edge drop-off crash, the responding officers scoffed at the notion that they failed to consider the drop-off as a factor in causing the crash. (Mind you, a San Diego jury later disagreed finding the edge drop was a substantial factor in causing the crash and awarded significant damages against Caltrans.)

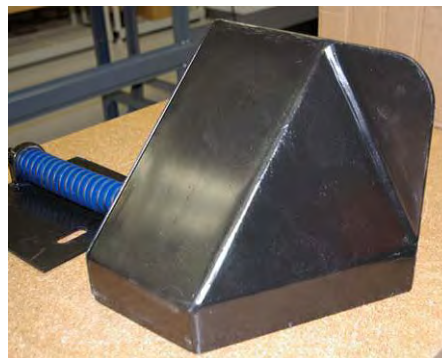
Despite the motoring public being largely unaware of this danger, and law enforcement failing to appreciate it when investigating fatal crashes, state Departments of Transportation (DOTs) have known about this danger for decades. Many DOTs have a 2" standard requiring shoulders to be backfilled or otherwise repaired when drop-offs are in excess of 2". In California, these standards have been in place for over 40 years — similar to many other jurisdictions — and yet these types of crashes continue to represent an inexcusable majority of roadway departure fatalities. Add to that the modern trend towards lighter, more agile vehicles, with lower profile tires, and one might ask whether even the 2" standard should be reconsidered, especially when

these vehicles are often traveling at freeway speeds.

Is all hope lost?

Thankfully, not all hope is lost. Solutions exist to manage these dangerous conditions; however, states need to be proactive in adopting such standards in new construction and ensuring that current roadway infrastructure is properly maintained per existing standards.

One recent development is the implementation of a "safety edge" which is accomplished by placing a simple, inexpensive, and effective "shoe" to the back of the existing paving machine that results in a gentle, recoverable roadway edge. Slowly, certain western states, in collaboration with the Federal Highway Administration, are beginning to implement the "safety edge" in new highway construction and repavement projects. Not only is the safety edge safer for the motoring public, but it also has added benefit to the state DOT. For



instance, compaction of the asphalt at the roadway edge is improved (requiring less maintenance in the future); the roadway edge is more durable (as testing has shown that heavy truck traffic on the edge, which often causes degradation of the edge and greater drop-offs, is virtually eliminated); and there is a reduction of tort liability for serious injuries and deaths.

Additionally, the cost for installing a safety edge is negligible. For approximately \$3,000 (a one-time cost), the "shoe" can be added to any existing paver and there is no cost for additional paving materials (e.g. asphalt). In fact, there's likely a savings in actual asphalt because much of it sloughs off and is lost at the roadway edge in traditional paving operations. The safety edge shoe utilizes that material, keeps the costs down and makes the roadway safer. In sum, it is a reasonable, cost-effective and safer design feature that will substantially reduce needless deaths throughout our country's two lane highway system.

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OFF THE EDGE

Key Steps for Litigating a Highway Shoulder Defect Case

By Adam Graves

The declining physical condition of our nation's roadways poses significant risk to the traveling public. The relative safety — or lack thereof — of our nation's highways is well documented. Every four years the American Society of Civil Engineers issues a report card to depict the condition and performance of America's infrastructure, assigning letter grades in the form of a school report card. The most recent report card scored America's highway infrastructure a D+, citing a backlog of overdue maintenance and a pressing need for modernization and long-term funding.

Defective highway shoulders have been cited as a major cause of severe accidents involving injuries and fatalities on roadways nationwide. A common cause of highway shoulder accidents is pavement edge drop-offs, which occur when there are uneven height differences between the travel lane and shoulder. This article examines a few issues that routinely come up in highway shoulder defect cases and offers practical tips for litigating these types of cases.

Characteristics of a Shoulder Defect Accident

A highway shoulder is defective if there is an unsafe drop-off between the edge of the roadway pavement and the shoulder. A pavement edge drop-off is a “vertical elevation difference between two adjacent roadway surfaces.”ⁱ

According to the Federal Highway Administration (FHWA), approximately 11,000 people are injured and about 160 die annually in crashes related to unsafe pavement edges, resulting in a cost of \$1.2 billion.ⁱⁱ One of the most common tort liability suits filed against state agencies and construction contractors involves cases in which pavement edge drop-off was a major contributing factor to a crash.ⁱⁱⁱ

Pavement edge drop-offs are especially unsafe because the uneven height differences between surfaces can decrease vehicle stability and hinder a driver’s ability to handle a vehicle. Common causes of pavement edge drop-offs include erosion and excessive wear, which can cause the shoulder material to migrate away from the pavement edge. Other causes include pavement edge-breaking and resurfacing a roadway without providing a proper transition to the shoulder.^{iv}

Accidents involving defective highway shoulders typically exhibit similar characteristics. In most cases, a vehicle leaves the travel lane and the right tire slips off the pavement and gets “wedged” or “restricted” by the pavement edge.^v When this happens, drivers are often surprised and tend to overcorrect as they attempt to return to the travel lane, causing the vehicle tires to “scrub” against the pavement edge and prevent the vehicle from climbing back onto the

pavement.^{vi}The steering angle required to return the front wheels to the pavement and overcome the change in elevation is greater than what would typically be required to make the same turn on an aligned pavement.^{vii} As a result, drivers tend to lose control of the vehicles, cross the centerline and, in some cases, collide with oncoming traffic.

Crashes caused by pavement edge drop-offs are “two to three times more likely to be fatal, primarily because the vehicle often leaves the roadway, rolls over, hits a roadside object or is involved in a head-on collision.”^{viii}

For more than 30 years, numerous studies have analyzed the various factors that lead to crashes involving pavement edge drop-offs. Consistent findings across all the studies suggest that whether a driver regains control of the vehicle or crashes depends on a variety of circumstances and conditions, including vehicle speed, steer angle, vehicle’s departure and return angle, vehicle size, drop-off severity, driver skills, roadside obstacles and oncoming traffic.^{ix}

Government Liabilities of Roadway Maintenance

There are no national standards in place that indicate the level at which pavement edge drop-offs should be maintained; however, several federal agencies provide guidance and recommendations, including the FHWA, American Association of State Highway and Transportation Officials, National Cooperative Highway Research Program and other entities.^x

The FHWA has implemented its Safety EdgeSM program, a treatment that is implemented in conjunction with pavement resurfacing to mitigate pavement edge-related crashes. With this

treatment, the pavement edge is shaped to 30 degrees to allow a more controlled reentry onto the roadway.

Research performed by the Texas Transportation Institute in the 1980s found that drivers rated a 45-degree wedge as a much safer pavement edge to remount the roadway than vertical or rounded edges; however, the findings were criticized because the drivers were instructed to go off the pavement edge and therefore did not represent unknowing drivers.^{xi} While multiple studies suggest a threshold drop-off height that should prompt action by highway departments, none of the national guidance agrees on drop-off shape or a specific level of drop-off that constitutes a potential hazard.^{xii}

Still, state and local governments are responsible for providing safe and well-maintained roadways to motorists. The following set of established principles pertain to the duty owed by states and “subordinate units” to the motoring public:^{xiii}

Duty is limited to that of maintaining the roadway systems in a condition reasonably safe for public travel by motorists who are themselves exercising ordinary care.

In an action against the State, or other governmental entities, to recover for death, injury or property damage caused by a defect lying in, along, above or adjacent to the paved surface or the shoulder or berm of the roadway, it is necessary to establish that the defect was the proximate cause of the accident, and as a necessary corollary, that the sequential chain of events leading to the accident was not broken by an efficient, intervening, or independent

cause.

As a further condition precedent to recovery, it is necessary to establish that the State or subordinate governmental agency had either actual or constructive notice of the defect and at the same time was accorded a reasonable opportunity to take remedial action with respect thereto.

The limitations of these principles further reinforce that highway cases can be difficult to win. Therefore, thorough case evaluation is critical to determining whether time and resources should be devoted to cases involving defective highway shoulders. When evaluating a case, key considerations include:^{xiv}

- Would the condition of the road (captured in photos) look dangerous to an average person, regardless of whether the shoulder meets proper design or maintenance standards?
- Can prior accidents or witnesses be used to show notice of a dangerous condition?
- What forced the driver to go on the shoulder and was it for good reason?

If the answer is yes to most or all of these questions, then the claim may be worthy of further investigation.

Discovering the Defect

To successfully prosecute a claim arising from a defective highway shoulder, an attorney must establish a design, construction or maintenance defect existed and that the nature and location of the accident was a result of the defect.

Key steps include:

1. Investigate the scene of the accident with qualified experts, including a qualified highway engineer and accident reconstructionist as soon after the accident as possible.
2. Evaluate the shape and height of the drop-off.
 - Safe return to the lane has been found to be significantly more successful if a tire has to overcome a drop-off with a slope of 45 degrees or less. Further, “lane recovery” with a sloped or filleted drop-off is significantly better than a straight vertical or curved drop-off.^{xv}
 - Guidelines suggest that drop-off heights should be no more than 2 to 3 inches, depending on width of the lane and the speed at which vehicles are travelling (see chart below).^{xvi} The American Association for State and Highway Transportation Officials, Transportation Research Board and

state departments of transportation issue reports, guidelines and recommendations concerning the height and configuration at which shoulder drop-offs become dangerous.

3. Photograph and document roadway characteristics, such as the lane width, shoulder width, type of surface and shoulder materials, grade and presence of a horizontal curve. Be sure to photograph everything from the driver’s perspective and include:^{xvii}

- All signs.
- Pavement/edge markings.
- Speed limits.
- Skid marks or other marks on the pavement.
- Vehicle resting points.
- Anything that was struck in the accident.

4. Obtain all documents from the police investigation (reports, photos, reconstruction), keeping in mind this data is only a starting point.^{xviii}

5. Obtain photographic records and maintenance records from the local or state department of transportation.

Practice Tip: Photo records and maintenance records can help to establish a design defect or the failure to maintain the shoulder as

Speed (mph)	Drop-Off Height (Inches) for a Lane Width of			
	12 ft.	11 ft.	10 ft.	9 ft.
30	3	3	3	2
35	3	3	2	1
40	3	2	1	1
45	2	1	1	1
≥50	1	1	1	1



originally designed. Also seek highway department budget requests to determine whether the section of roadway where the accident occurred had been previously identified as needing repair.^{xix}

Identifying Additional Sources of Recovery

When identifying additional sources of

recovery, it is important to know the state laws. Most state DOTs or highway entities are subject to being sued, but the amount of damages that can be recovered are regulated or subject to being capped under the waiver of sovereign immunity. Recovery amounts are typically limited to \$500,000 or less; therefore, a suit solely against the owner of the highway likely

will not provide full compensation to a client.

It is important to look beyond the state department of transportation to identify whether additional entities, such as a construction company, created the dangerous circumstances. These types of defendants will not have the types of protections like sovereign immunity and will not be subject to the same damages caps as municipalities or state governments, thus allowing for a full recovery.

On the other hand, defendants, such as construction companies, will have defenses that the highway owner won't, such as following the DOT's directions and the acceptance doctrine. In certain circumstances, the state's acceptance of a project can extinguish the liability of a contractor despite its negligence, which is why it is critical to know the state's laws regarding these types of claims.

Making the Case

In most any case, precedential case law will define the legal standard to impose liability; however, the circumstances surrounding the accident inevitably will be unique to that particular case. Therefore, one key to successfully litigating the case will be to highlight those unique circumstances.^{xx}

Key points to make during trial include:

1. What is the purpose of a highway shoulder?
 - Accommodate stopped vehicles.
 - Emergency use.
 - Recovery area for drivers who leave the travel lane.
 - Lateral support of the sub-base, base and surface courses.^{xxi}

2. What are the requirements of a safe shoulder?

3. What specific safety hazard is associated with each of the factors that make a safe shoulder?

4. What is the standard required to construct and maintain a safe shoulder?

From start to finish, the defense will blame the driver; to counter this strategy, the plaintiff's attorney will have to prove the defect was the proximate cause of the accident, not driver error. But highway shoulders are intended to serve as safety devices that protect the traveling public, and the entities that own, construct and maintain our nation's highways have a responsibility to ensure the shoulders can perform as intended.

Conclusion

Pavement edge drop-off cases are one of the most common tort liability suits filed against state departments of transportation and construction contractors. State highway agencies and contractors responsible for designing, constructing and maintaining roadways can face significant liability in claims resulting from unsafe pavement edge drop-offs. While they have the potential to be good cases, thorough case evaluation and assessment of a highway shoulder defect is a critical first step in the litigation process.

ⁱHallmark, Veneziano, McDonald, et al. "Safety Impacts of Pavement Edge Drop-offs." Prepared for the Foundation for Traffic Safety in cooperation with the U.S. Department of Transportation Federal Highway Administration. September 2006.

ⁱⁱFHWA Resource Center Safety & Design Team. http://www.fhwa.dot.gov/resourcecenter/teams/safety/safe_12tse.cfm (accessed on Oct. 6, 2014).

ⁱⁱⁱHallmark, Veneziano, McDonald, et al. "Safety Impacts of Pavement Edge Drop-offs." Prepared for the Foundation for Traffic Safety in cooperation with the U.S. Department of Transportation Federal Highway Administration. September 2006.

^{iv}*Ibid.*

^vKessler, Michael W. "Trial of a Highway Shoulder Defect Case." First presented at AAJ's Annual Convention, Toronto, Canada. July 2005.

^{vi}Moler, Steve. "The Low-Cost Dropoff Solution." *Public Roads*. Sept/Oct 2007, Vol. 71, No. 2.

^{vii}TranSafety, Inc. "Legal Problems: The Liabilities of Roadside Maintenance." *Road Management & Engineering Journal*. 1997.

^{viii}*Ibid.*

^{ix}Moler, Steve. "The Low-Cost Dropoff Solution." *Public Roads*. Sept/Oct 2007, Vol. 71, No. 2.

^xHallmark, Veneziano, McDonald, et al. "Safety Impacts of Pavement Edge Drop-offs." Prepared for the Foundation for Traffic Safety in cooperation with the U.S. Department of Transportation Federal Highway Administration. September 2006.

^{xi}Federal Highway Administration. "Safety Evaluation of the Safety Edge Treatment." Publication No. FHWA-HRT-11-024. April 2011.

^{xii}*Ibid.*

^{xiii}TranSafety, Inc. "Legal Problems: The Liabilities of Roadside Maintenance." *Road Management & Engineering Journal*. 1997.

^{xiv}Kessler, Michael W. "Trial of a Highway Shoulder Defect Case." First presented at AAJ's Annual Convention, Toronto, Canada. July 2005.

^{xv}Campbell, J.L., Richard, C.M., Brown,

J.L., et al. "National Cooperative Highway Research Program Report 600 C. Human Factors Guidelines for Road Systems." Transportation Research Board, Washington, D.C., 2010.

^{xvi}Brewer, Marcus. "NCHRP Synthesis 432. Recent Roadway Geometric Design Research for Improved Safety and Operations." Transportation Research Board, Washington, D.C., 2012.

^{xvii}Kessler, Michael W. "Trial of a Highway Shoulder Defect Case." First presented at AAJ's Annual Convention, Toronto, Canada. July 2005.

^{xviii}*Ibid.*

^{xix}*Ibid.*

^{xx}*Ibid.*

^{xxi}Campbell, J.L., Richard, C.M., Brown, J.L., et al. National Cooperative Highway Research Program Report 600 C. "Human Factors Guidelines for Road Systems." Transportation Research Board, Washington, D.C., 2010.

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