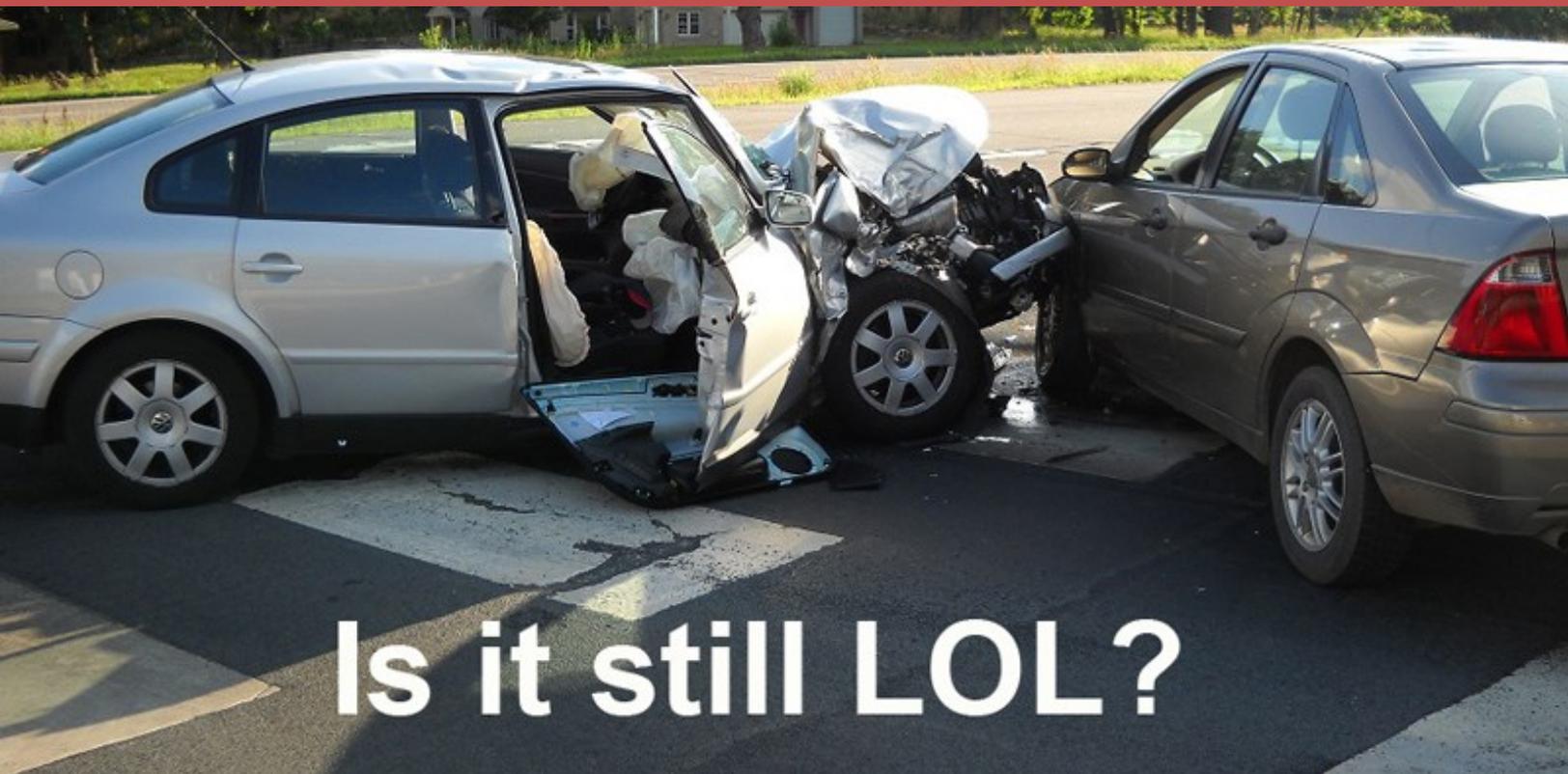


# CALIFORNIA ASSOCIATION OF ACCIDENT RECONSTRUCTION SPECIALISTS

## SKIDEMARKS

SEPTEMBER 2013 – VOLUME 15, NUMBER 3



# Is it still LOL?

## Distracted driving and walking in the news

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## Letter from the editor

Dear CAARS members,

Third-quarter training covered side under-ride collisions with big-rig trailers. It is covered in this newsletter.

There is also a lot of news. A case involving unintended acceleration in Toyota vehicles is heating up in L.A. Actually, this is not a case of surprise acceleration involving an electronic throttle. Rather the victim's foot apparently became jammed on the accelerator pedal in a crash. The plaintiff's attorney contends that Toyota should have installed a brake override system in these vehicles, because other automakers had already done so. I would like, at some time, to have a long article on this whole sad history. That's on my list.

Technology continues to impact driving both in good ways and bad. There's a lot of distraction going on—for drivers, for pedestrians, for law-enforcement officers. These are some of the stories covered in this issue.

Also I have written a short explanation of anti-lock braking systems.

Then there's my first letter to the editor in response to comments I made about taking the ACTAR exam. Reader response is good. Please keep those ideas coming. They benefit the membership as a whole.



Best wishes,

Frank Owen

[editor@ca2rs.com](mailto:editor@ca2rs.com)

### CAARS annual conference

**Topic: Collision Investigation and Commercial Vehicles**

The 2013 CAARS annual conference will be held 24-26 October (Thursday-Saturday) at the Hyatt Regency - Long Beach (200 South Pine Avenue, Long Beach, CA 90802). Registration for the conference can be completed at [www.ca2rs.com](http://www.ca2rs.com). You must be a current CAARS member to get the membership price. Note also that the ACTAR exam will be offered Wednesday, 23 October.

### CAARS first-quarter training

**Topic: The Application and Analysis of Video in Collision Reconstruction with Case Studies**

Presented by Kurt Weiss and Mark Hunt in Southern California at the Santa Ana Police Department Community Room, 60 Civic Center Plaza, Santa Ana, California.

### Upcoming ACTAR Examination Dates and Locations

#### October 2013

**23 October** – Long Beach, CA, sponsor: CAARS. New applications must be received by 23 August. Exam registration cut-off date is 23 September. Held at the Hyatt Regency Long Beach before annual CAARS conference.

#### January 2014

**10 January** – Seattle, WA, sponsor: WATAI. New applications must be received by 10 November. Exam registration cut-off date is 10 December. Held at Seattle PD, Airport Way Center.

There are other tests offered in other parts of the country and Canada. Please go to ACTAR test website listed below for these dates.

All test dates above subject to new testing regulations, which prohibit the use of electronic devices for testing.

Go to [www.actar.org/test.html](http://www.actar.org/test.html) for additional information.

**CAARS THIRD-QUARTER TRAINING**

## René Castañeda discusses big-rig under-run collisions

A big group of CAARS members (about 40) met 16 September at the public library in Glendora to take part in “Trailer side under-ride collisions: relating collisions damage to impact speed”. This was presented by René Castañeda, president of Castañeda Engineering Inc. in Fresno.

Though this type of collision is not common in general, it is a big problem in the Central Valley, with its agricultural industry and the prevalent Tule Fog there in the winter. Often visibility is reduced to 200 feet. Often the collisions occur at daybreak. Usually there are no witnesses. Because of the low visibility, it is very easy to imagine a vehicle moving at highway speeds encountering out of the gloom a slow-moving big-rig turning onto the highway from a farm or a food-processing facility. René began his presentation with three real, sad cases of under-run collisions that he has been involved in. Though these collisions are rare, they are often fatal.

The collisions discussed by René are side impacts where the bullet vehicle collides with a big-rig trailer in the open area between the trailer’s landing gear and its rear wheels. What distinguishes these accidents from normal collisions is that the normal crush zone of the bullet vehicle is not engaged. Only the vehicle’s “greenhouse”, the top part of the vehicle—consisting of the A/B/C/D pillars, the roof, and the glass—is engaged. Thus no crush protection is afforded the passengers, and they are usually severely injured or killed.



**Tule Fog in the Central Valley**



Some work was done back in the 80s and 90s on these types of accidents. But this was before the popularity of high-profile vehicles like SUVs. So much of the work was done on the low-profile vehicles of the day and deals with only collisions involving only the vehicle’s greenhouse. With SUVs, pickups, and vans, often more than the greenhouse collides with the trailer. Often the hood of the bullet vehicle encounters the trailer. But the main crush zone of the vehicle still under-rides the trailer. The first case involved a Honda Civic. It was a hit-and-run accident where five Salvadoran farm workers were on their way to work. Four of them were killed when they encountered a trailer. In determining the collision speed, often there is no pre-impact braking, and since the driver is killed and there is little damage to the lower part of the car, there is no post-impact braking. So in accounting for the energy dissipation in the crash, one can look at the post-crash glide-down to a stop. But the energy dissipated in the crash is very hard to

account far.

The second case occurred in Tulare County and involved a young woman with her child in the rear of the car (a Suzuki) in a booster seat. The woman was killed on impact, but the child survived. The hood of the low-profile Suzuki actually encountered a pump unit mounted underneath a milk delivery trailer. Tulare, Fresno, and King Counties have large dairy centers, and trucks of this type collect milk from dairy farms and transport it to these centers.

Collision three involved a Jeep Grand Cherokee that encountered a big-rig making a three-point turn on Yosemite Highway 120. The top of the Jeep was completely torn off in the collision.

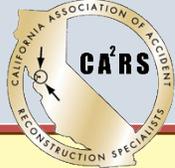
To try to arrive at the collision speed of the vehicle is very difficult, because not much work or testing has been done pertinent to this type of collision. Thus a group of investigators, including René, undertook conducting tests of these collisions. The tests were conducted at the Fresno Fairgrounds. A number of both low- and high-profile vehicles were acquired from wrecking yards or off Craig's List. The test set-up—dragging the vehicles underneath a loaded trailer—was complicated and involved often modifying or correcting steering problems with the vehicles to get them to track straight. René described this extensive set-up in his presentation. A good deal of data was collected in these tests, and the results were compared with conventional crush results using Campbell's methodology from the 70s testing done by Trego et alia on low-profile vehicles in the 90s



Castañeda et alia discovered large discrepancies between suggested speed predictions from these methods and his group's tests. In some cases, the speeds predicted by the above two tests were grossly inflated. In other cases they were grossly under-predicted. This is to be expected. The Campbell methodology applies to normal collisions where the crush zone of the bullet vehicle is engaged. Using crush zone stiffnesses for the greenhouse does not seem logical (editor's opinion). The Trego methodology applied to low-profile vehicles. It divides the greenhouse up into a 6x6 matrix of crush cells and assigns stiffness values to them. But one problem with the Trego methodology is that all vehicles are the same. There is no difference between a Suzuki coupe and a GMC Yukon.

One thing that was evident in the testing done by René's group is the special stiffness of a vehicle's B-pillar. With a strong B-pillar, often a vehicle's under-ride is stopped when the pillar encounters the trailer. The bullet vehicle's front then rotates upward and collides with the trailer's underbelly, its back rotates downward and leaves gouge marks on the pavement, and often this rotation leads to severe bending distortion of the vehicle frame.

René's group wrote an SAE paper on their results (SAE 2012-01-0614). They work out a relationship relating *crush volume* with initial kinetic energy. The crush volume is the volume of the bullet vehicle that is removed by encountering the trailer. This is a simple relationship, good for all vehicles, that gives kinetic energy as proportional to the square root of the crush volume. The individual collision results correlate fairly well with this curve. But René said more work needs to be done to develop an even better predictor of collision speed.



IN THE NEWS...

L.A. TIMES – 20 AUGUST 2013

## Upstart Tesla wins top U.S. safety rating; what will competitors do?

Adding to a growing list of accolades, Tesla Motors' Model S has secured the title of safest car on the road.

In its first model year, the premium electric sport sedan is one of just seven cars since 2011 — among hundreds — to receive a five-star rating in each of three federal crash-test categories and overall.

Administered by the National Highway Traffic Safety Administration, the tests also give a separate combined safety score, on



which the Model S ranked better than any other U.S. vehicle, according to Clarence Ditlow, director of the Center for Auto Safety, an independent advocacy organization.

"Tesla has thrown down the challenge to the industry as a whole. We are a new company and we beat everybody," Ditlow said. "All the other automakers need to accept Tesla's challenge and do as well or better as Tesla in NHTSA's crash test ratings."

Source: [gigaom.com](http://gigaom.com)

The NHTSA did not respond calls seeking comment.

The Palo Alto automaker trumpeted the results, the latest in a string of critical victories that most notably includes a tie for the highest overall rating ever given out by Consumer Reports, the trusted product-testing magazine. In May, the magazine gave the Tesla a score of 99 out of 100, a high reached previously only by the Lexus LS.

"The Model S set a new record for the lowest likelihood of injury to occupants," the Palo Alto automaker said in a statement.

Investors reacted by pushing Tesla's stock up \$4.68, or 3%, to \$146.58 in Tuesday's trading. Year to date, the stock is up almost 310%.

Federal regulators measure the severity of injuries that occupants of a vehicle would receive in a rollover, side and frontal crashes. The agency awards star ratings for each of those tests and an overall rating. In each case, five stars is the highest rating, one is the lowest.

Other vehicles also got five-star overall ratings, including the 2014 Chevrolet Silverado 1500, GMC Sierra and Sierra Denali 1500 — the first pickups to do so. But the trucks only received four stars on the rollover tests.

See [full article](#).

L.A. TIMES – 8 AUGUST 2013

## Honda Civic tops small-car crash test, Kia Forte scores worst

The Honda Civic was the only small car to earn the top rating in an insurance industry test that seeks to measure damage and injuries from a crash into an immovable object such as a post or a tree.

The two- and four-door models of the Civic received a "good" rating in the important new test, conducted by the Insurance Institute for Highway Safety, an industry group.

Continued on following page...



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The Dodge Dart, Ford Focus, Hyundai Elantra and 2014 model Scion tC earned “acceptable” ratings.

Six other popular models earned “marginal” or “poor” ratings, including the Chevrolet Sonic, Chevrolet Cruze, Volkswagen Beetle, Nissan Sentra, Kia Soul and Kia Forte.

“These tests are very important and are something the automakers watch closely,” said Dave Sullivan, manager of product analysis for AutoPacific Inc., an industry consulting firm. “It is pretty dramatic when you can go online and watch on video your car crash in a test.”

The test -- in which 25% of a car's front end on the driver's side strikes a 5-foot-tall rigid barrier at 40 mph -- simulates a wreck in which the front corner of the car hits another car or a solid object. The institute established the test because front corner crashes can be particularly severe.

As a group, the small cars fared worse than their mid-size counterparts in the same test, but better than small SUVs, the institute said.

Generally, the small cars that did poorly in the test had some of the same issues as larger models, says David Zuby, the institute's chief research officer.

“In the worst cases, safety cages collapsed, driver airbags moved sideways with unstable steering columns and the dummy's head hit the instrument panel,” Zuby said. “Side curtain airbags didn't deploy or didn't provide enough forward coverage to make a difference.”

The Kia Forte fared the worst of the small cars tested, the institute said. Its seat belt allowed too much slack, and the side curtain airbag deployed but didn't provide enough protection. The crash dummy's head hit the windshield pillar and instrument panel, according to the institute.

See [full article](#).

UNINTENDED ACCELERATION CONTINUES IN HEADLINES (L.A. TIMES – 23 JULY 2013)

## Toyota puts spate of lawsuits in rear-view mirror but faces many more

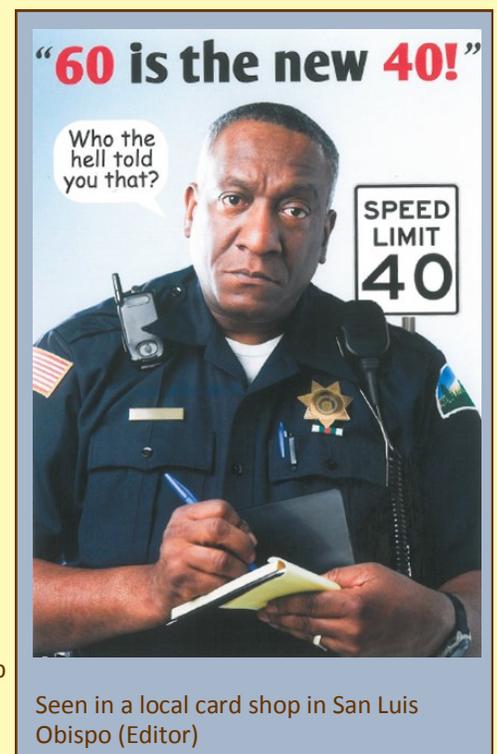
*Toyota has spent more than \$1 billion to settle lawsuits over sudden acceleration but still faces hundreds more, including a bellwether case that's up next.*

Toyota has spent well over \$1 billion settling lawsuits involving unintended acceleration, but the world's largest automaker still faces hundreds of other cases awaiting trial.

First up is a suit filed by the heirs of Noriko Uno, a 66-year-old bookkeeper who was killed when her Toyota Camry unexpectedly sped to 100 mph on a city street in Upland in 2009.

Jury selection started Monday in the Los Angeles County Superior Court lawsuit that argues Toyota Motor Corp. should have had a fail-safe system that enables the brakes to override the accelerator. A judge has selected the case as a bellwether case that will help set the direction for hundreds of similar lawsuits against the automaker.

See [full article](#).



Seen in a local card shop in San Luis Obispo (Editor)



Peter Uno, left, with his son Jeffrey Uno holds a photo of Noriko Uno, who died in the crash of a Toyota Camry. Their suit claims Toyota failed to install a safety device that would have prevented the crash. (Damian Dovarganes, Associated Press)

IMPORTANT TRIAL FOR TOYOTA OPENS (L.A. TIMES – 8 AUGUST 2013)

## Toyota trial opens in suit over fatal crash

*Toyota says that driver error caused the death of Noriko Uno, whose family argues that the carmaker failed to install a device that would have prevented unexpected acceleration.*

Toyota Motor Corp. has battled hundreds of lawsuits in recent years related to sudden acceleration.

But a landmark trial began Thursday with opening statements in a Los Angeles County Superior Court.

Other litigation has focused on whether there is an electronic defect that triggers unexpected acceleration in some Toyota cars. But Garo Mardirossian — the attorney representing the heirs of a woman who was killed when her Toyota Camry unexpectedly sped to 100 mph — is skipping that argument entirely.

Instead, the soft-spoken Mardirossian contends that Toyota is liable for a safety device it could have installed but didn't. He's asking the jury to award \$20 million to the heirs of Noriko Uno, the woman killed in the 2009 accident.

In his opening statement, he portrayed Toyota Motor Corp. as a callous automaker that skimmed on safety by not installing a brake override system on Uno's 2006 Camry. The system, which deactivates the accelerator when the driver presses the brakes, was available in some of Toyota's overseas vehicles at the time, but the automaker didn't include it on its U.S. cars.

See [full article](#).

TOYOTA EXECUTIVE TESTIFIES IN UNO TRIAL (L.A. TIMES – 28 AUGUST 2013)

## Toyota executive testifies in acceleration case:

### 'I am not very technical'

*Toyota's top U.S. executive, James Lentz, testifying in a trial involving the death of driver Noriko Uno, says he knows little technically about its cars.*

Taking the stand in a \$20-million product liability lawsuit, the top U.S. executive for Toyota Motor Corp. deflected questions on the technical details of his company's cars and the costs of installing a safety system that plaintiffs contend could have saved a life.

James Lentz testified Tuesday in a Los Angeles County Superior Court, where the automaker is defending itself against a suit alleging it caused the death of Noriko Uno. Uno's heirs say her Toyota Camry unexpectedly sped to 100 mph and crashed on an Upland street in 2009.

During about two hours of testimony, the automaker's North American chief executive pleaded ignorance on many questions. In his 31 years at Toyota, he has focused on sales and marketing rather than manufacturing, Lentz said.

"I am not very technical," he said.

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Lentz said he couldn't identify basic car parts when shown to him by the plaintiff's attorney. They included a small, silver engine control module, which acts as the vehicle's electronic brain, and a key component of the throttle system. Prior litigation has focused on whether an electronic defect in some Toyotas triggered unintended acceleration. But the attorney for Uno's heirs aims to prove that Toyota should have installed a low-cost brake override system in the car but didn't. The attorney, Garo Mardirossian, says such a device — it deactivates the accelerator when a driver steps on the brake — would have prevented the accident. Toyota rejects that claim.

See [full article](#).

USE OF IPHONE MAP APP LEADS TO TICKET IN FRESNO (L.A. TIMES – 25 APRIL 2013)

### Driver ticket for using iPhone's map app isn't giving up yet

*Steven Spriggs, who maintains that he was driving safely at the time, isn't taking 'convicted' for an answer. Urged on by supporters, he has filed another appeal.*

The Convicted Distracted Driver is sitting in a study carrel in the Cal State Fresno library, which, come to think of it, looks a little like a prison visiting room.

"I don't relish that title," said Steven Spriggs. "But that's what I am."

His crime: looking at his iPhone's map application while driving.

Spriggs, 58, is director of planned giving for the college. He is gentle and soft-spoken. Or maybe that's just because we are in the library.

Still, in his soft-blue dress shirt and gray tie, he looks more like an insurance salesman than a firebrand who sparked what court documents call a "media frenzy." But that's exactly what happened after Spriggs fought his conviction and lost.

"I believe in distracted driving laws with all my heart," said Spriggs, whose 22-year-old son was badly injured twice by distracted drivers in 2010. "But police officers should have real probable cause to pull you over."

On the evening he was ticketed, Jan. 5, 2012, Spriggs maintains he was driving safely. He was on his way home on California 41 in the middle of Fresno. Road construction forced the rush hour traffic to a stop. (Yes, big-city cynics, Fresno has a rush hour.)

Maybe there's a way around this, thought Spriggs. It was dark. He picked up his phone and opened the map app. The glowing screen gave him away.

See [full article](#).

IN OTHER NEWS: DISTRACTED WALKING (L.A. TIMES – 6 AUGUST 2013)

### Texting while walking – it's a killer

More pedestrians are getting killed and hurt now than 10 and 20 years ago.

In Los Angeles, nearly half of all car-related deaths now are pedestrians. (Yes, we have them here, as the Venice tragedy reminded us.)

Why is this? Crosswalks are better marked, and in some cases paved with textured material to signal their presence.

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“Walk” and “Don’t walk” signs are more plentiful, and are more clearly flagged, with those flashing countdown-to-red numbers. Drivers in L.A. wait for pedestrians more often and more courteously than elsewhere in the country, or the world. (More than once, I’ve stepped into a street in another city, obediently following the green “Walk” signal, and nearly got plowed by a car.)

The curve ball in these statistics, then, is pedestrians and what they do now that they didn’t do 10 and 20 years ago.

Like pay attention. Pedestrians are walking while talking on the phone, or distracted by music, trundling along with their heads down, reading texts or sending them, oblivious to traffic and traffic signals.

It’s the stuff of news reports, and of comic fodder on the Internet, where snickering commenters like to point out that it’s simply a

new method of culling the gene-pool herd.

But E.R. doctors aren’t finding it funny as the deaths and injuries begin to mount up.

Now, for the measures to stop them.

As The Times reports, the Department of Transportation is putting \$2 million in grants out there to combat this problem.

The transportation secretary is planning a pedestrian advocacy summit this autumn to, as the story says, “improve conditions for pedestrians.” Drivers are a big part of that, but pedestrians have to wise up too.

Fort Lee, N.J., took one approach last year. After three deaths of distracted pedestrians, it began issuing \$85 tickets for distracted walking.

London actually padded lampposts experimentally in Brick Lane because ambling texters were banging into them so often as they walked while texting. So British – oh, we’re terribly sorry our lampposts are in your way.

See [full article](#).

### CYLISTS/DRIVERS CLASH IN SAN FRANCISCO (SFGATE – 25 AUGUST 2013)

## Discord growing between bicyclists, police

The last thing San Francisco needs is more friction between bicyclists and the police, but events this week only increased the tension.

It happened at Sixth and Folsom, site of a tragic bike-truck accident on Aug. 14 that took the life of 24-year-old [Amelie Le Moullac](#). Le Moullac, who worked at a communications firm nearby, was killed when a large truck struck her while making a right turn.

A week later, during the morning commute, members of the [Bicycle Coalition](#) and four of her co-workers set up a memorial and information table on the corner.

It was a typical event for the coalition, which advocates for better bike lanes and safety awareness. The moderate group, media savvy and politically aware, should not be confused with the radical bike groups like Critical Mass. Execu-

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tive Director Leah Shahum says she even called San Francisco police and the Municipal Transportation Agency ahead of time to let them know about the gathering.

All went well until Sgt. Richard Ernst rolled up in his police cruiser and parked in the street, blocking the bike lane.

"He said he was, quote, setting an example," Shahum said. "He said, 'I am here to prove a point that bicycles need to go around the car. This is the exact situation as the one where the woman was killed.' "

Ernst's argument, apparently, was that bicyclists often stay to the right side as a vehicle turns, putting them in a truck's blind spot when it turns. Ernst's comments were recorded by the media, including KRON-TV, which captured him saying, "I was trying to show her, as an example, where cars are going to be."

In all, there have been three fatal accidents in or near the South of Market area in the past year, each the result of a collision with a large truck.

"The officer said, 'In all three of those cases, it was the bicyclist's fault,' " Shahum said. "I said I had been talking to officers and my understanding was that they were still investigating this one. He said, 'I've read the report. You haven't read the report. It was her fault.' "

The ham-handed approach was ill-advised enough. But what Ernst didn't know was that four of Le Moullac's co-workers (who are not members of the coalition) were standing on the corner, listening to him lecture Shahum about bike etiquette.

"He said, and I quote, he would not leave until I understood that it was the bicyclist's fault," Shahum said. "The friends and co-workers of the victim were within earshot and they were very agitated."

See [full article](#).



Le Moullac's bicycle at the crash scene (Photo: Will Tran)

[ALSO THIS... \(SFGATE – 29 AUGUST 2013\)](#)

### City's drivers, bikers both need to ease up

Repercussions continue after the tragic bike accident that killed a 24-year-old woman on a busy South of Market street on Aug. 15.

This week, the San Francisco Police Department issued an apology for an incident with a Southern Station sergeant after the accident and released not one, but two accident reports. The Bicycle Coalition has mobilized a letter-writing campaign to Mayor Ed Lee and suggested members attend the Municipal Transportation Agency board meeting on Tuesday to voice objections to conditions on Folsom Street.

That's fine. The death of Amelie Le Moullac was a tragedy, and it shouldn't be diminished. But it is an example of a large problem in the city - the dangerous and deep divide between drivers and bicyclists.

And, on a day when the city is about to put 350 bike-share bicycles on the street, that is more important than ever. Say what you will about scofflaw bike riders, most of them are experienced cyclists.

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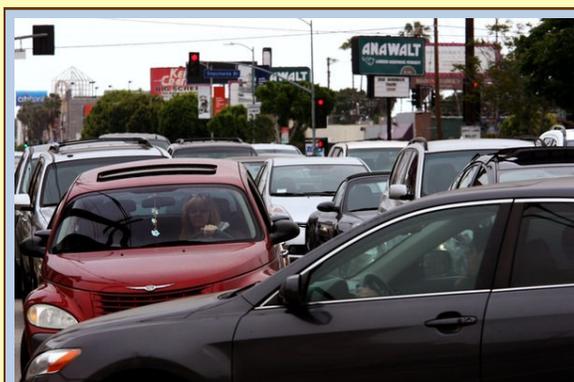
The bike-share program is an invitation for newbies to take a spin. Among the likely routes is Market Street, which is already teeming with commuter cyclists. The potential for head-slapping frustration is huge. (Although Kit Hodge, the Bicycle Coalition's deputy director, says accidents have been low in cities like New York that have implemented bike sharing, we will see.)

The Le Moullac case shows that there's a lot to be done, starting with turning down the volume.

See [full article](#).

EDITORIAL: MANDATORY CDRS STARTING IN 2014? (L.A. TIMES – 31 JULY 2013)

## What your car knows about you



The National Highway Traffic Safety Administration this year proposed that black boxes be required in all new cars and light trucks beginning in 2014. (Los Angeles Times / July 31, 2013)

*Black boxes aren't just for airplanes anymore.*

If you bought your car in the last few years, chances are it's equipped with a device that records such data as how fast you are driving and whether you're wearing your seat belt. Chances are you don't know it's there.

Black boxes aren't just for airplanes anymore. They were first installed by automakers as a way to analyze the performance of their cars if that became necessary, but it didn't take long for crash investigators to see them as a source of information about what led to an accident. Was the motorist really traveling within the speed limit, as he claims to have been? When did she begin to apply the brakes? Because of the boxes' value in accident investigations, and in determining recall-worthy safety issues, the National Highway Traffic Safety Administration this year proposed that they be required in all new cars and light

trucks beginning in 2014. Car companies are willing, and insurance companies support the idea because the information could be used to determine who is at fault in accidents.

But various consumer groups, including the Electronic Frontier Foundation, which advocates for individual privacy rights in the digital world, have their doubts. Right now, the information recorded by the black boxes is very limited. Though they continuously gather information, they also continuously erase it. If a crash occurs or an air bag deploys, the boxes retain only the data from a few seconds before to a few seconds after. But with new advances, the boxes might retain data for longer stretches of time. They might also include new information, such as the car's location or cellphone calls that were made using the car's equipment and how long they lasted. Another problem is that black box data are not considered 100% reliable at this point.

That shouldn't rule out their use in investigations. But the NHTSA, in its enthusiasm, has neglected to include adequate protection for consumers in its proposal. To start, the buyers of new cars should be informed, clearly and verbally, that the boxes exist and what they record. Right now that information is tucked away in the owner's manual, which isn't exactly bestselling reading material.

Information gathered by the devices should be limited to safety data, and the only information that should be available to investigators and insurance companies should be what's directly related to a crash — meaning the seconds immediately before and after. The boxes should not collect audio or video data; the conversation in the car before an accident

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should not be recorded. And the information should be available only by warrant or subpoena, unless the owner voluntarily surrenders it. Beyond that, the data gathered about a driver in the car he owns belong to him alone.

## In the news: distracted driving...and walking

HANDS-FREE TEXTING IS HAZARDOUS (THE ECONOMIST – 24 JUNE 2008)

## Why is hands-free texting dangerous?

TEXTING while driving can be extremely dangerous. As cars continue to become more computerised it will not be long, however, before hands-free texting and voice-control systems become widespread. A recent study published by the AAA Foundation for Traffic Safety, in Washington, DC, measured the level of mental distraction associated with performing various common tasks while driving. Its major finding was that using a hands-free, voice-driven system to compose text messages or e-mails is one of the most distracting tasks people are likely to undertake while driving. This conclusion is both alarming and counterintuitive, given that voice-driven systems are meant to enhance safety. So why is hands-free texting so dangerous?



In 2006 a study published by the United States Department of Transportation concluded that inattention while driving accounted for 78% of all crashes and near crashes. The authors of the study observed 109 drivers over the course of an entire year and recorded their daily driving habits. But inattention was loosely defined and encompassed three potential modes of distraction: visual, physical and cognitive. In the AAA Foundation study, the authors focused specifically on the cognitive component of inattention while drivers performed particular tasks. The drivers were asked to keep their eyes on the road and, in most cases, both hands on the steering wheel. One of the tasks involved interacting with a hands-free texting system in the car to respond to an incoming message, dictating the text and controlling the system using voice commands. The speech-to-text transcription was error-free because it was, in fact, being carried out by a human behind the scenes. Even so, the results were alarming. The researchers rated each activity on a scale from 1.0 (no distractions) to 5.0 (performing difficult maths and memory problems). Listening to the radio or to an audio book turned out to be the least distracting activities, with scores of 1.21 and 1.75 respectively on this scale. Talking to a passenger scored 2.33 and talking on the phone scored 2.27 if hands-free and 2.45 if hand-held. The most distracting activity, with a score of 3.06, was hands-free texting.

See [full article](#).

FROM THE WASHINGTON POST (12 JUNE 2013)

## Brain can't text while driving even hands-free

Using voice text messaging, included in systems such as Ford Motor Co.'s Sync and Toyota Motor Corp.'s Entune, is more distracting to drivers than making calls with handheld mobile phones, a study by AAA found.

Texting a friend verbally while behind the wheel caused a "large" amount of mental distraction compared with

Continued on following page...

“moderate/significant” for holding a phone conversation or talking with a passenger and “small” when listening to music or an audio book, the AAA Foundation for Traffic Safety found in a report released today.

Automakers have promoted voice-based messaging as a safer alternative to taking hands off the wheel to place a call and talk on a handheld phone. About 9 million infotainment systems will be shipped this year in cars sold worldwide, with that number projected to rise to more than 62 million by 2018, according to a March report by London-based ABI Research.

“As we push towards these hands-free systems, we may be solving one problem while creating another,” said Joel Cooper, a University of Utah assistant research professor who worked on the study. “Tread lightly. There’s a lot of rush to develop these systems.”

See [full article](#).

FILM FROM WERNER HERZOG DEALS WITH TEXTING AND DRIVING (L.A. TIMES – 13 AUGUST 2013)

## Stop texting and driving! (Here’s a video that might help)



Director Werner Herzog takes on texting and driving in this 35-minute YouTube documentary, "From One Second to the Next," presented by AT&T, Verizon Wireless, Sprint and T-Mobile.

There's no real good excuse for texting and driving, but people seem to keep doing it anyway -- which is why esteemed documentarian Werner Herzog has directed a 35-minute documentary on texting-and-driving accident victims.

According to U.S. Department of Transportation statistics, 3,331 people were killed and 387,000 more injured in crashes involving a distracted driver in 2011. Officials estimate that at any given daylight moment, 660,000 drivers are using their phones or other devices while driving.

The video tells four heart-wrenching stories of Americans involved with texting-while-driving accidents.

The first segment begins with a young woman standing alongside a street holding out her hand, with her palm empty. “I had my brother in my hand, and all of a sudden, my hand was empty,” she says -- and the documentary then goes on to tell the story of Xzavier, a young boy paralyzed from the diaphragm down after a distracted driver ran through a stop sign and struck him along the side of the road.

Other segments tell the story of a young man who struck an Amish buggy, killing its three passengers; of a woman permanently disabled after being struck by a teenager; and of a young man who sideswiped a car, which then spun into an oncoming truck, killing two passengers in the resulting collision.

Through interviews with the people involved -- with perpetrators as well as victims -- each of the stories details the physical as well as the emotional toll of texting-and-driving crashes.

Herzog told the Associated Press that AT&T proposed the documentary; the company was expected to distribute the film to 40,000 high schools as part of the It Can Wait project website, which includes pledges not to text and drive.

The film was also sponsored by Verizon Wireless, T-Mobile and Sprint.

"I knew I could do it because it has to do with catastrophic events invading a family," Herzog told the AP. "In one second, entire lives are either wiped out or changed forever. That kind of emotional resonance is something that I knew I could cover."

"I knew I could do it because it has to do with catastrophic events invading a family," Herzog told the AP. "In one second, entire lives are either wiped out or changed forever. That kind of emotional resonance is something that I knew I could cover."

Continued on following page...

He added, "There's a completely new culture out there. I'm not a participant of texting and driving — or texting at all — but I see there's something going on in civilization which is coming with great vehemence at us."

[DISTRACTED DRIVING AMONGST POLICE OFFICERS \(KTNV, LAS VEGAS – 7 JUNE 2013\)](#)

## System aims to reduce distracted driving for police officers

Taking your eyes off the road for just seconds can have deadly consequences but it's not only cell phones that lead to distracted driving.

Many police officers rely on computers in patrol vehicles. A new system aims to protect the police while they protect the rest of us.

Despite Nevada's ban on handheld communication devices, it's not hard to catch distracted drivers.

"For the general population, I think it's still a very severe problem," said Erin Breen.

Breen is director of University of Nevada, Las Vegas Safe Community Partnership.

"Drive down the street and you still have people going out of their lane in both directions," said Breen.

Switch perspectives and jump in the back seat of the patrol car of Fort Wayne, Ind., police officer Raquel Foster.

"I'm surprised with all the multitasking that we do, with all the distractions, that we aren't involved in more accidents," said Foster.

Fort Wayne police worked with a manufacturer to develop Archangel II. The goal: reduced distracted driving for officers. With the system, police cannot type information into their vehicles when the cruiser is traveling 15 miles per hour or faster, though the screen can still update with new information.

"Police administrators are fooling themselves if they think their officers are out in the field and not entering data while their vehicles are moving," said Ft. Wayne police chief Rusty York.

Read [full article and watch video](#).



Many police officers rely on computers in patrol vehicles. A new system aims to protect the police while they protect the rest of us. See video by KTNV.

[LONG ARTICLE IN ACCIDENT RECONSTRUCTION JOURNAL ABOUT DISTRACTIONS WHILE TEXTING \(ARJ JULY/AUGUST 2013\)](#)

## Distraction effects of manual number and text entry while driving

*Editor's note: This ARJ article is a serialization of an August 2011 study written by NHTSA (DOT HS 811 510). The report gives the results of a NHTSA study on the distracting effects of specific text entry tasks while driving. A test protocol was developed with tasks centered around telephone number entry and address entry into a navigation system. Manual entry was compared with voice entry. Typing on touch screens was compared with hard-button entry. Glance behav-*



ior was studied to correlate the length of looking away with driving degradation. All of this is explained in detail in the study. The report is 129 pages long. It contains a detailed reference section and cites a number of earlier studies carried out on distracted driving. The report is being serialized in the July/August ARJ (Part 1) and the September/October ARJ (Part 2).

See [full NHTSA report](#).

CAARS MOTORCYCLE CRASH TESTS REPORTED IN ARJ (ARJ – JULY/AUGUST 2013)

## 25 Moving motorcycle into stationary car tests: CA<sup>2</sup>RS 2009 DATA

by Wade Bartlett, Bill Focha, and Chris Kauderer

(Editor: This article reports on motorcycle crash tests conducted in 2009 at the Sonoma County Sheriff's Emergency Vehicle Operations Track at the Sonoma County Airport. These results were also reported at the 2012 CAARS Annual Conference in South Lake Tahoe. These tests expand the database of crash tests from a dataset accumulated during motorcycle crash tests held at the same site in 2004. At that time, a relationship was worked out by Dr. Bruno Schmidt. It is

$$S = (2*L) + (0.88*C) + 15.7$$

where  $S$  is speed in mph,  $L$  is the change in motorcycle wheelbase (inches), and  $C$  is the maximum crush measured in the target vehicle (inches). The new tests were held to add to the dataset used to develop the above relationship and either confirm it or suggest a modification of it. The new tests seem to suggest that a slight modification is necessary.

Twenty-five tests were run involving 25 motorcycles and eight cars. Motorcycle weights ranged from 348 lb to 670 lb. Car weights ranged from 2114 lb to 3125 lb. Collision speeds ranged from 29.8 mph to 60.9 mph. The motorcycles were run into the cars using a trailer-mounted fastening system to allow the motorcycles to move somewhat naturally at speed into the stationary cars. These were T-bone collisions. Cars were struck in-line with the CG and then off-center, near the front and rear tires. The before and after locations of the cars were recorded, so that total movement and rotation could both be documented. Scene diagrams were constructed showing beginning and end positions for the cars and the end position of the motorcycles.

Scene measurement and documentation are explained in detail in the article as well as the configuration of the trailer used to "drive" the motorcycles into the cars.

The results of the tests as far as a new model to predict speed are not yet complete. There is more data to be added to the dataset from even more tests run since 2009.

Unfortunately there is no link to this article, since [Accident Reconstruction Journal](#) is not on-line.)

### INTERNATIONAL NEWS

GERMAN PROGRESS TOWARD NETWORKED VEHICLES (VDI NACHRICHTEN – 28 JUNE 2013)

## Networked cars can save 11 billion euros

**AUTOMOBILE ELECTRONICS:** *One Of the biggest networking projects of the automobile industry was completed successfully last week. The fleet trial "simTD" showed that billions of euros worth of economic damage in auto traffic could be prevented. And the project confirms that the technology for vehicular communication is mature for production cars.*

Continued on following page...



## CALIFORNIA ASSOCIATION OF ACCIDENT RECONSTRUCTION SPECIALISTS

If all vehicles were networked with each other and with the traffic infrastructure, Germany could prevent economic damage at the level of 11 billion euros each year. This is the result of a fleet experiment “simTD”, which was presented 20 June in Frankfurt am Main.

The installation costs are much lower. “For every euro that we invest in traffic networking, we achieve 8 euros in savings,” estimates Ulrich Eichhorn, technical business leader of the association of automobile manufacturers.

Alone the prevention of accidents contributes a savings of 6.5 billion euros per year, and lower environmental damage adds another 5 billion in savings, according to calculations of the researchers.

Guido Zielke, head of the Federal Traffic Ministry, sees the use of networking in flowing traffic: “The infrastructure doesn’t have the necessary capacity to accept the increasing traffic.” Florian Rentsch, the state minister of economy and traffic in Hess (a German state) agrees: “We need innovative systems to be able to deal somehow with the growing traffic volume.”

Since 2008, under the rubric “simTD” (Safer Intelligent Mobility—Test Field Germany) the automobile industry has developed the necessary technology. With 69 million euros the project is one of the largest combined projects of the industry. All German auto manufacturers, including Ford and Opel, as well as suppliers Bosch and Continental have been working together with Deutsche Telecom and six research organizations.



Avoid traffic jams and accidents—that is one of the goals of networked vehicle communication. Future cars can benefit from the experience of past cars. (Picture source: dpa)

See [full article](#).

AND THIS... (VDI NACHRICHTEN – 28 JUNE 2013)

## Data exchange makes driving much safer

**AUTOMOBILE ELECTRONICS:** *The idea of networked cars has been around for a long time. With a large fleet trial the automobile industry has been able to prove that Car-To-X technology is ready for production cars.*

Outfitted with a multitude of sensors, control devices, and sensors, modern utility vehicles have been “intelligent” for a long time. What is still missing to approach real human intelligence is the capability to communicate with each other—for example, to be able to mutually warn each other of impending danger. Although the chicken-and-egg problem exists with the introduction of this kind of networked system, it is rational, however, to outfit the street traffic infrastructure with intelligence.

The fundamental technology for the “Car-to-X” communication has been developed and tested since 2008 by the German industry under the collaborative research project “simTD”. “Our goal was to increase the sensor range through communication and thus broaden also the telematics horizon of individual vehicles,” explained project leader Christian Weiß of Daimler.

Even at the beginning of the project the partners had agreed that the WLAN and cellular communication channels should be employed, in order to exploit the best possible coverage. All vehicles were therefore outfitted with a gateway, so that the WLAN standard ITS G5 as well as the cellular data exchange over IP were employed.

See [full article](#).



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## LETTER TO EDITOR

*(Editor's note: I got the following letter regarding comments I made about the ACTAR exam in the March 2013 CAARS newsletter. As always, comments are welcomed because they foster a discussion among members on issues important to them. Keep the cards, letters, and emails coming.)*

First of all, congratulations on your passing the ACTAR exam, on the first try. I'm one of the many who had to take the practical portion a second time in order to receive accreditation. I suspect for the same reason you stated in your March 2013 "Letter from the Editor". By the way, "Thank You" for your involvement with CAARS.

I understand in, an academic situation, you are able to critique how a student "worked" the problem with previously developed erroneous data and determine they do understand how to solve the problem albeit they have a wrong answer. In that situation partial credit could be considered.

ACTAR, respectfully, is not about training persons and giving them direction on what they did wrong that led to the "domino effect". That should have already been done. ACTAR is about testing people about previously obtained skills and knowledge to ensure they are skilled, as you now can attest. ☺

In the real world of accident reconstruction if you make a mistake it DOES affect the rest of the reconstruction. If you do not evaluate your work by using different methods or possibly a peer review to let "fresh eyes" inspect your work, the mistake can be devastating to your reputation. Or it may never be caught. I think I can speak for most in saying we hope this occurs very infrequently, but in reality it does happen.

As CAARS member Tom Shelton said, more than once, "We're not putting rockets on the moon." In a vacuum, we could all investigate the same crash, work it up and have the exact same answer. In reality, there are many variables and estimations made/used to find the net results. They will not be the same.

There is no "perfect test". However with the multitude of backgrounds and experience levels of the "accredited ones" a better test could be created. Any volunteers?

Regards,

*Jeffrey A. Guyer, ACTAR #464*

Incident/Accident Reconstruction Specialist  
San Bernardino County Department of Public Works  
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LATE-BREAKING NEWS (L.A. TIMES – 4 SEPTEMBER 2013)

## Bill further curbing cellphone use by teen drivers goes to governor

Lawmakers on Tuesday sent the governor proposals to further curb cellphone use by teenage drivers and to clamp down on scalpers who electronically scoop up blocks of tickets for concerts and sporting events.



**Cathleen Galgiani, D-Stockton**

The cellphone measure would bar those younger than 18 from using voice-operated hands-free texting programs while behind the wheel. They already are banned from using cellphones while driving, even with hands-free devices.

"Distractions from using a voice-operated device endanger not only the driver but other motorists as well as pedestrians," said the bill's author, state Sen. Cathleen Galgiani (D-Stockton).

She added that her bill, SB 194, would "hopefully decrease traffic fatalities caused by distracted driving."

A study released by AAA in June found that using hands-free devices to talk, text or send email can impair a person's ability to drive safely.

The findings "clearly spell out just how dangerous this distracted kind of driving is," said Steve Finnegan, government affairs manager of the Automobile Club of Southern California.

"We're extremely pleased to see this legislation moving forward to make sure the newest and least experienced drivers are banned from this activity," Finnegan said.

A broader proposal, which would have banned the use of voice-activated texting by all drivers, stalled in an Assembly committee in May.

See [full article](#).

ASSOCIATED PRESS (3 SEPTEMBER 2013)

## No hands-free texting for teen drivers under bill

SACRAMENTO, Calif. -- Teenage drivers in California would be banned from texting while driving even if they use hands-free methods under a bill headed to Gov. Jerry Brown.

A 2012 state law allows drivers to use hands-free devices to dictate, send and listen to text messages while driving. But teens were banned in 2007 from using cell phones while driving and were not exempt from last year's law.

SB194 from Sen. Cathleen Galgiani of Stockton would clarify that drivers under 18 are prohibited any cell phone use while driving, including voice-activated apps like Apple iPhone's Siri.

Supporters, such as the California Association of Highway Patrolmen and Driving School Association of California, say distractions to novice drivers are a significant safety concern.

The Assembly approved the legislation Tuesday on a vote of 64-4.

TECHNICAL CORNER

# Anti-lock braking systems: How they work, what good are they?

by Frank Owen, Alpha Omega Engineering, Inc., San Luis Obispo, California

When getting into accident reconstruction it was puzzling to me during my self study to see so little written about ABS systems (anti-lock braking systems). For example, all of the skid marks shown and analyzed were with locked brakes. It was natural to ask several questions:

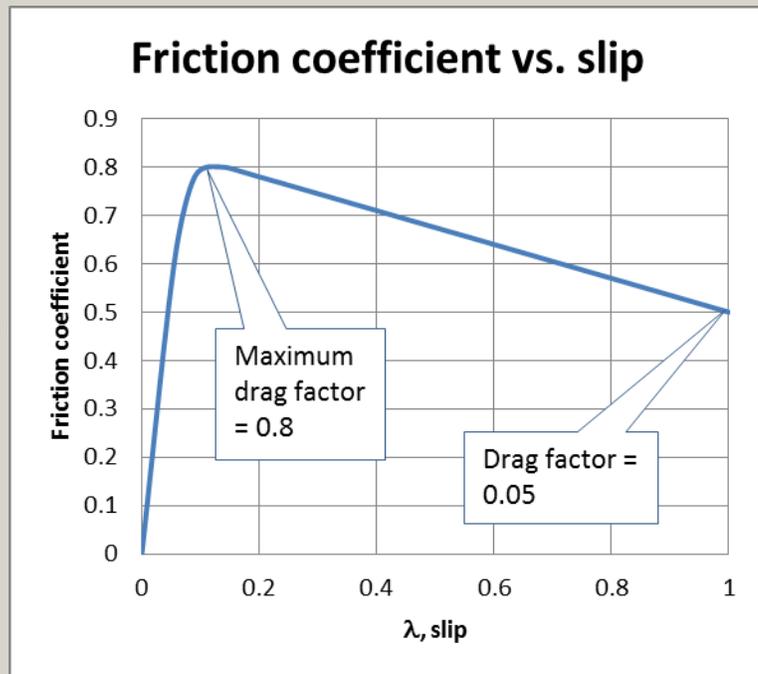
1. Why no mention of ABS systems? Did they have the same performance as locked brakes, so that there was no need for special mention of them in the AR world?
2. Do ABS systems lead to shorter stopping distances?
3. What do ABS skid-marks look like?

After reading further and posing these questions occasionally, it became evident to me that anti-lock brakes are not well understood in the AR technical community. This article's purpose is to dispel some of the reigning fuzziness regarding this topic.

### ABS systems' principle of operation

ABS systems exploit the fact that *static friction* is normally greater than *dynamic friction* for an object on a surface. If there is no sliding movement between two surfaces, it takes more force to bring about sliding than is offered against motion once sliding begins. An example is pushing a heavy cardboard box across a floor. It takes more force to start the box moving than the box offers as resistance once it is moving. With motion between the surfaces, they unlock, and the resistance offered to sliding drops off, often significantly. With tires on pavement, the coefficient of dynamic friction can be much less than the coefficient of static friction, since the sliding tires can quickly heat up and melt, reducing the sticky force between the tires and the pavement. Skidmarks are nothing more than the traces of melted rubber left by sliding wheels.

So if brakes could bring tires up to the point of impending sliding and keep them there, the braking force would be significantly stronger than it would be for locked, sliding tires. Actually tests have shown that a little bit of sliding is good. 10-20% slippage leads to the maximum braking force. Prior to the common use of ABS systems in the mid-90s, drivers in rainy or icy climates were taught to pump their brakes rather than to stand on them, thus avoiding or



**How the friction coefficient (drag factor) changes with slip**

Continued on following page...



# CALIFORNIA ASSOCIATION OF ACCIDENT RECONSTRUCTION SPECIALISTS

minimizing slippage.

## **How the friction coefficient (drag factor) changes with slip**

The figure above shows how the drag factor changes with slip for a typical vehicle. The maximum drag factor is 0.8. It is achieved at a slip rate of about 12%. Locked brakes represent 100% slippage. There the drag factor is just 0.5. So theoretically, an ABS system would increase the stopping force by 60%  $[(0.8 - 0.5)/0.5]*100\%$ . So an effective braking system for the above situation would aim to keep the slip at about 12%.

Practically, the way an ABS system works is that it senses slipping. When the wheels start to slip, the hydraulic pressure in the brake lines is automatically released through a relief valve. Then the brake pressure is reapplied to maintain the braking force. This release and reapplication is automatic and very fast. Often the driver feels a pulsing through the brake pedal that is this application/release cycle happening again and again in a sequence. With today's sophisticated sensing, computing, and control systems, slip can be measured and calculated, so that the control algorithm delivers slip that gives the optimum stopping force.

Because of the application-slip-release cycle, anti-lock brakes leave a sort of dotted-line skid mark. That is, it is not a continuous smear, like you see with locked brakes and melted rubber. Since the tire melting is diminished, the black parts of the skid marks are lighter than sliding skid marks. Also, since the tire continues to turn during the application-slip-release cycle, one sees evidence of braking around the entire circumference of the tire instead of just on one spot where the tire has skid.

## **Reality vs. theory**

As it turns out, based on what I have read and discussions with a couple of people who have taken measurements and designed ABS brakes, how an ABS system performs depends greatly on the type of surface a vehicle is on. On wet or slippery pavement, the stopping distance can be greatly shortened by an ABS system. On dry surfaces, this often is not the case. In both cases, however, the ABS system usually allows steering to be maintained. A sliding vehicle loses steering control, so the driver cannot steer around obstacles or around a curve. In is different on loose surfaces such as gravel or snow. A sliding tire creates a small wedge of material in front of it, and this helps greatly to increase the braking force. Thus ABS systems on loose surfaces often lengthen the braking distance, though they do help to maintain steering control in the vehicle.

My colleague, Prof. Peter Wolfsteiner of the Munich University of Applied Sciences, used to work for Knorr Bremsen (Knorr Brakes) in the 1990s. He said that much has changed with the introduction of Electronic Stability Control systems. This is a layer of sophistication above that of simple ABS. Brakes can be controlled now on all four wheels individually (a four-channel ABS system), thus allowing automatic yaw control to prevent spin-outs.

This short article does not explain everything there is to explain about ABS systems. But it is a start. If you have comments to offer or questions to ask, please send them to me at [fowen@aoengr.com](mailto:fowen@aoengr.com). I'll keep adding to the topic in coming newsletters as interest and need demand.



# CALIFORNIA ASSOCIATION OF ACCIDENT RECONSTRUCTION SPECIALISTS

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