CALIFORNIA ASSOCIATION of ACCIDENT RECONSTRUCTION SPECIALISTS

SKIDMARKS

HANDS ON THE WHEEL...OR OFF?

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CA2RS.COM

Board Beat

As we enter into the Spring season of 2012, the CAARS organization has many developments. The Southern California 1st Quarter Training was presented on March 22, 2012. The presentation given by Craig Freis of Precision Simulation and Frank Hahnel of Leica, Inc. was well received by the Northern California members in February. Unfortunately, due to a scheduling conflict of the presenters the Southern California training date had to be rescheduled from February to late March. I believe the Southern California members will find the presentation worth the wait.

The CAARS Training Committee has arranged for a combined topic presentation for the 2nd Quarter Training. The two topics to be discussed are Expert Witness Testimony and Photography. These topics were chosen in response to the member survey taken at the 2011 Conference. Check the CAARS website for dates and locations.

Speaking of the CAARS website (www.ca2rs.com), the BOD has appointed a committee to redesign and upgrade the site to make it more informative and user friendly. Look for these changes in the near future. In addition, the BOD is also looking into the possibility of joining a social network to allow members a chance to interact.

At the recent BOD meeting, it was decided that the topic of the 2012 Annual CAARS Conference will be Motorcycle Investigation and Reconstruction. Once again, this topic was chosen in response to the member survey. The exact location and dates of the 2012 Conference, which will be held in Northern California, are TBD. As the balance in the CAARS account is $27,468.18 as of March 13, 2012, we remain in good financial shape.

Finally, it is with great sadness that I have to announce the recent resignations of two of our CAARS BOD staff members who have served admirably for years. Monica Franksen, our Treasurer, has stepped down in order to spend more time with her family. Though Monica will be missed, we understand her decision and wish her well. I am happy to announce that Ms. Nichole Hanley has agreed to take over the Treasurer responsibilities. Welcome, Nichole! The other CAARS BOD staff member who recently resigned is CAARS Newsletter Editor Tim Neumann. Tim is pending a promotion and also wanted to spend more quality time with his family. As I think you will all agree, Tim has done a tremendous job with the CAARS Newsletter. I believe the quality of our newsletter is unequaled; his efforts will be sorely missed. If you know of anyone who is interested in taking over the CAARS Newsletter Editor responsibilities please have them contact me. If you have any suggestions as to how we can made CAARS a better organization please feel free to contact anyone of us

Regards,

Chris Kauderer

CONT@CTS

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COVER STORY

ESTIMATED TIME of ARRIVAL

Vehicles that warn drivers of hazards, put the brakes on for them, and keep themselves in their lanes already are on the road. Cars that can talk to each other are just over the horizon. Is the crash-free future here? Not quite. It's true that safety features being introduced now could potentially eliminate millions of crashes. But even if these features were capable of preventing all crashes (and right now they're not) they won't be available in the vehicles most people drive for many years to come. A new report from the Highway Loss Data Institute (HLDI) shows that it typically takes three decades for a promising safety feature first introduced in a few luxury cars to spread through the fleet. More precisely, it will take at least that long before 95 percent of vehicles on the road could have a given feature either because it came as standard equipment or was offered as an option.

For instance, it won't be until 2016 that 95 percent of all registered vehicles could have frontal airbags, the authors predict, even though manufacturers began adding frontal airbags in meaningful numbers during the mid-1980s. Forward collision warning, which was rolled out in the United States in 2000, could take even longer. If it continues to follow its current trajectory, the crash avoidance technology won't be available in 95 percent of collision warning. All of them come with different expectations of potential safety benefits. Some are required by the National Highway Traffic Safety Administration, and some aren't. Researchers used HLDI data on the availability of features in each model and registration data from R.L. Polk & Co. If a feature was either standard or optional, it was considered available. Future availability was predicted by extrapolating the historical trends in the registration data. The researchers assumed that the number of new vehicles added each year and the attrition rate of older vehicles would stay the same. Although the report projects availability in 100 percent of the fleet, safety features never become universal in the real world. Collectors own and drive classic vehicles, and some people keep very old cars for sentimental reasons.

Leaving aside such holdouts, it would take a minimum of 24 years for the fleet to completely turn over under current conditions of approximately 240 million registered passenger vehicles and about 10 million new vehicles registered a year. In reality, it takes longer because not every new vehicle replaces one of the oldest. Despite very different histories, all the features in the report take about the same time from the moment they're first introduced to the point when they're available in 95 percent of registered vehicles. Other than forward collision warning, which is still in its early stages, the most gradual spread is for ESC (34 years). The fastest moving features are head-protecting side airbags and antilock brakes (31 years). These estimates only reflect the maximum percentage of vehicles that could have a feature. The actual percentage that have it would be lower, since for some vehicles the technology would have been offered only as an option. The path each feature takes on the way to 95 percent varies somewhat. Head-protecting side airbags, for example, shot up quickly in the beginning. It took 10 years for them to be available in 25 percent of the registered fleet, and it's expected to take 15 years to reach 50 percent. In contrast, ESC reached the one-quarter mark after 16 years and is expected to be in half the fleet after 20 years. It takes a decade or more for a feature to go from 95 percent availability in the fleet to just shy of 100 percent, thanks to the small percentage of drivers who rarely replace their vehicles.

Federal mandates, safety ratings that reward certain features, and other factors can speed up the rate at which technology ends up in new models and therefore in registered vehicles. For example, if all new vehicles were equipped with forward collision warning starting in 2013, it would take until 2034 instead of 2049 for 95 percent of vehicles to have been sold with that feature available. Interestingly, antilock brakes have spread quickly even though they were never required. Despite promising results on the test track, real world crash data haven't shown large benefits from the technology. "Antilocks quickly went mainstream when General Motors made them standard on some big-selling models," Moore says. "They got another boost from ESC because an antilock braking system is a prerequisite for stability control. Now that the government requires ESC on new vehicles, antilocks have essentially become mandatory, too."

Source: iihs.org/externaldata/srdata/docs/sr4701.pdf, From IIHS Status Report, Vol. 47. No1, Jan 24, 2012

BMW Offers Glimpse of its Next-Generation Driver Assistance System on AutoBahn

ConnectedDrive technology uses ultrasonic scanners

Posted: February 2, 2012 — an AOL Original
| by: Damon Lavrinc | Autoblog

Building on earlier technical advancements,BMW has offered a glimpse at the next iteration of its ConnectedDrive assistance system tweaked for the 5 Series. The original relied on radar and camera systems. The new version includes ultrasonic scanners and lasers to survey the road surface, lines and surrounding vehicles.

Like earlier versions, this one needs to have road data downloaded into the car before it can drive without human help. But in real-world testing on the autobahn, it slowed for traffic, accelerates to speed and changes lanes while the driver enjoys a hands-off automotive experience. It could be a while before the entire system enters mainstream use, especially considering the need for advance data.

But it's already inching forward. The 2013 BMW i3 will come with a Traffic Jam Assistant system that steers, accelerates and brakes the car up to 25 mph in traffic. The functionality is starting to arrive – just not at autobahn speeds.

First Quarter Training Review

Courtesy of Frank Owen

Quarterly training for Q1 2012 took place on February 9, 2012, at the San Ramon Police Department Training Center. The topic of this quarterly training was collision and criminal animation with special emphasis on 3D laser scanning to recreate a collision scene. The primary presenters for this training were Craig and Jason Fries of Precision Simulations Inc. of Grass Valley, California (precisionsim.com) and Frank Hahnel of Leica Geosystems, Orlando, FL (leica-geosystems.us). Craig and Jason explained their technical expertise, as animators of a collision or crime scene, and how their depictions must be supported by an engineering analysis of the physics involved in a crash.

Craig also talked extensively about the difference between an animation and a simulation. An animation is a depiction of a sequence of events, and thus it is nothing more than an accurate portrayal of what transpired in a collision or at a crime scene. But this portrayal can be decisive. Juries today are composed of members often brought up on fast-paced media exposure, so it is critical to grab their interest in a short period of time. There is nowadays a known phenomenon amongst jurors called "the CSI effect." Jurors expect a quality of accident recreation and depiction that is portrayed on this popular television series.

Yet, one cannot simply display scenes that seem realistic but are not backed up by science. Craig demonstrated a tractor-trailer/bike accident animation that was graphic but that did not comply with the laws of physics. In this accident (see youtube.com/watch?v=TcbOXoXpX4o) a tractor-trailer tank truck overtakes a cyclist moving at a much slower speed. But then, during the course of its passing the cyclist, the truck slows or the cyclist speeds up so that both are moving at pretty close to the same speed. In the animation, there is no explanation for this phenomenon, and the unperceptive juror might accept this without questioning it.

Craig explained the proper genesis of an animation based on science. It consists of the engineering recreation of the dynamics of the crash in time slices, usually 0.1 second apart, that give the x-y-z coordinates of the vehicles involved along with their roll/pitch/yaw angles at each of these time slices. These positions are determined by the conventional methods of accident reconstruction—skid marks, braking energy dissipation, impulse/momentum calculations, energy dissipation from crash measurements, etc. Craig receives the raw data for his animation from an accident reconstructionist and then goes to work animating the scene and its events. He mentioned more than once the reconstruction program PC-Crash (pc-crash.com) as a source of the raw data he uses to recreate a crash.

Engineering calculations and the analysis of the dynamics of a crash are subject to the Daubert rule. Interestingly, animation is not. It is a portrayal of the science, not the science itself, and thus it is exempt from Daubert. Craig mentioned that the ruling precedent in California for admissibility of animations in the courtroom is found in People vs. Hood (for more on the admissibility of computer animations, see fredgalves.com).

Craig explained in detail how he creates an animation from raw data using 3D Studio to create his animations. The seminar also covered 3D laser scanning also used by Precision Simulations. This technology was explained by Craig and also by Frank Hahnel of Leica Geosystems.

Attendees learned about "point cloud data," the millions of 3D coordinates generated by a laser scanning system, how these are gathered from various scanning spots on a scene, and how they are combined into an overall 3D model of a crash or crime scene. A number of case studies were used to illustrate this technology. In one case a car ran up under a tractor-trailer that was trying to execute an illegal U-turn in the middle of a state highway. A good, long stretch of the roadway had to be scanned from multiple locations and knit together to complete the entire accident scene. In another, a driver executing a left turned in front of a truck. In both of these cases, it was important for the jury to understand the sight-picture of the drivers in the collisions to determine their role in causing or not being able to prevent the accident.

To demonstrate 3D laser scanning, Frank set up a Leica scanner in the parking lot in front of the training center and set up a mock crime scene involving a crashed automobile with handguns and other simulated crime accoutrements around the automobile. As the crowd looked on, Frank explained the technology while the scanner was busy doing its work. Then this data was taken back into the classroom, displayed, and post-processed. Frank showed how distances could be extracted from the point cloud and how it could be cleaned up to removed extraneous data, such as the fleeting image of a pedestrian who walks through the scene while the scanning is underway. The importance of the post-processing phase of the scan was emphasized.

Attendees asked about the cost of a Leica Geosystems laser. $150,000 to $200,000 for a Leica Scanstation 2. Frank also mentioned that there is an entry-level model, a C5, for $50,000. For those who want merely to contract out a scan and post-processing of an accident scene, the cost is around $4,000-$5,000.

Frank Hahnel, Leica Geosystems, demonstrates 3D laser scanning at a CAARS quarterly training seminar.

Jason Fries, Craig's younger brother, then talked about accident scene reconstruction using a Red Digital Cinema Camera. This was also used in the U-turn accident mentioned above and in another case study of a pedestrian hit in a pet store parking lot on a rainy night. For both of these cases, the Frieses rented this camera and set it up to film from the perspective of the driver in each accident. Thus the combination of 3D laser point cloud data and high-resolution cinematography was demonstrated.

Craig also presented the reconstruction of the shooting of "Honda Mike" in San Francisco. In this case "Honda Mike" stole a souped-up Honda and led the SFPD on a chase through a crowded city before being cornered by the police. In trying to get away, "Honda Mike" crashed into a police cruiser, crushing a detective in the cruiser door. Officers shot "Honda Mike," and his family accused the police department of murdering him. Craig's reconstruction and animation placed the involved vehicles at the scene, showed how "Honda Mike" had been cornered, and how he then tried to escape, putting the lives of the police officers at risk. The complaint of unlawful death brought by the family was eventually dismissed. The seminar ended with the presentation of a recreated high-speed chase scene and murder of Yolo County Deputy Tony Diaz by Marco Topete in 2008 (see precisionsim.com for more

information on this case). Laser scanning of the scene and the careful analysis of the video from the dash camera of Diaz's police car enabled the recreation of the crime scene. The animation demonstrated the high plausibility that Topete set up the execution of Diaz in cold blood, refuting Topete's claim that he shot Diaz in self-defense. Topete was convicted of first-degree murder and is now sitting on death row at Pelican Bay.

So overall the quarterly training seminar was jam-packed with useful and interesting information and, with no doubt, was well worth attending.

Alpha Omega is an engineering consulting company based in San Luis Obispo, California, founded in May 2011 by Dr. Frank Owen, a professor of Mechanical Engineering at California Polytechnic State University. For additional information, go to aoengr.com.

Volvo's Driver Assistance System Enters Next Round of Tests

By end of year, SARTRE researches will add as many as six cars to hands-free driving line

Originally posted January 31, 2012, AOL — by Damon Lavrinc - Autoblog

Volvo has been making progress with its driver assistance system for more than a year. Recently, the carmaker's Safe Road Trains for the Environment *(SARTRE)* program reached a key milestone. With a specially equipped caravan in place, researchers sent the fully functioning "road train" into testing, during which drivers enjoyed their rides without ever needing to touch the steering wheel or other controls.

The technology utilizes cameras and radar-based sensors, and the vehicles in the caravan can travel up to 55 miles per hour while maintaining 20-foot separation. By the end of 2012, the SARTRE team intends to add up to six vehicles in the line. When might it enter the marketplace? It's still a ways a way, but if and when it does, it could improve fuel economy, reduce congestion and diminish driver error.

Vehicle-to-Vehicle Communication Coming Soon

Cars that talk to each other to prevent crashes are on the horizon.

by Douglas Newcomb, February 21, 2012 — editorial.autos.msn.com

More and more cars today have safety systems designed to actively prevent crashes. Features such as blind-spot warning, lane-departure prevention and forward-collision warning alert drivers to potential hazards before an accident occurs. But these features usually are found only on higher-end cars and are designed primarily to protect the vehicle in which they're installed.

According to Consumer Reports, an emerging low-cost technology could quickly become mainstream. Vehicle-to-vehicle (V2V) communication is being touted by the National Highway Traffic Safety Administration as the next big step in vehicle safety, and the agency believes it has the potential to prevent 80 percent of crashes. It wirelessly sends safety messages to other cars on the road using embedded wireless technology and provides information on speed, direction of travel and location to help the car itself avoid accidents.

Unlike more expensive active safety systems, the technology isn't cost-prohibitive to install and could rapidly reach all new vehicles with a deployment strategy and commitment from the auto industry and government. NHTSA has already begun testing in-car consumer acceptance. With assistance from the University of Michigan, NHTSA will study real-world scenarios starting this summer and, after compiling all the data, determine whether there's enough research to mandate the technology in all new cars.

But there are significant roadblocks to this utopian vision of accident-free driving. Hand-in-hand with V2V technology is vehicle-to-infrastructure (V2I) communication that loops in public-transportation safety systems, such as traffic lights. Together, they are referred to as V2X. While V2I systems are not new -- think of red lights timed with traffic flow and the automated toll features used on roads to communicate with cars -- it will take a large public investment to make it a reality. Plus, there will be plenty of older cars without the technology still on the road.

The other hurdles are issues of privacy and security. "The concern is that once you set up a mechanism to collect data for one admittedly beneficial use, there are no intrinsic limitations on that data being collected, retained, transferred and used for other purposes," Justin Brookman, director of the Consumer Privacy Project at the Center for Democracy & Technology, told Consumer Reports. Brookman pointed to OnStar's recent revision of its privacy standards after a public backlash over the company's policy of continuing to collect data -- and sell it to third parties -- even after a consumer canceled the service.

Vehicle-to-Vehicle Communication Coming Soon

"We're very conscious of the issues involving privacy with this system," NHTSA deputy administrator Ron Medford told Consumer Reports, "and are going to work very hard to ensure that we're not going to be collecting the kinds of data that's going to violate the privacy of individuals and disclose that kind of information." He also noted that the government is heavily focused on cybersecurity issues to ensure that vehicle data will be authenticated and that V2X systems can't be hacked.

Once these issues are overcome, cars in the near future could be talking to each other and to the transportation infrastructure, to prevent accidents. Brian Lyons, Toyota's manager of safety and quality communications, called it a natural evolution in automotive safety. "The first phase was about passive systems — airbags and so on," he told Consumer Reports. "The second was about active safety, including electronic stability control, collision-avoidance systems, etc. The third phase will be about car-to-car communication that can dramatically reduce the number of crashes on our roads."

http://www.wired.com/autopia/2011/12/autonomo-concept-is-half-car-all-driver/?intcid=story_ribbon

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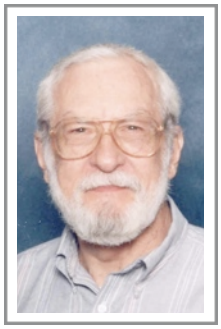
BOOK REVIEWS



Accident Reconstruction Science, Fourth Edition

Courtesy of Joseph Badger

"It is important to understand that, unlike a digital camera, we do not store images. What we do place in our memory is our interpretation of what we believe are important details that we derive from our visual sightings. Each time we pull these events from memory and study them, we may refine our interpretations and end up adding detail not present in our original stored memory. Following that mental activity, we will once again store the information in memory and this updated memory will incorporate these new interpretations and details that were not previously recorded."

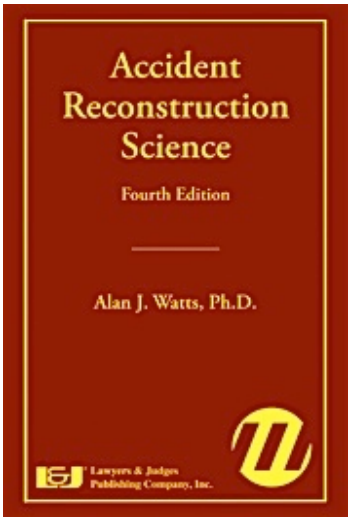
The above paragraph comes from the latest release from Lawyers & Judges Publishing Co., a compact 132-page soft-cover book titled Forensic Visibility. Written by James L. Harris, Sr., and his late son James L. Harris II, the book covers a diverse number of topics for a variety of readers.

It helps explain why witnesses change their stories after giving their initial statement to investigators. The involved person has time to revisit what he originally saw and tweak it into a version he finds more acceptable… at least perhaps more in his favor.

Anyone who has been doing crash investigations and accident reconstructions for even a short amount of time, know that eye witnesses generally make the worst witnesses and five so-called eye witnesses to an event may easily give you five separate – and often quite different – accounts of how the event occurred.

James Sr. and his son James II, began working on outlines for the book some seven years ago, but in 2009, Senior concentrated on completing the book. He has an extensive background that equipped him. He told me that his early desire to write the book was actually triggered by the experience he had when he first joined the Visibility Laboratory in 1954. "As I began to learn about the human visual system, I found myself, time after time, surprised as to visual system capabilities and limitations. I began to realize that from time of birth, I received no training as to how to use my eyes.

"As a child, I learned from a variety of experiences such as bumping into table legs, etc. I think this is the way it works for most people. The net result is that, as I became an adult, I took my eyesight for granted and had [many] false perceptions about my actual visual performance capabilities and limitations. One of the goals of the Visibility Laboratory was to apply what we learned about the human visual system to real world situations."



Mr. Harris has some actual hands-on work investigating collisions as a police officer. He served as a Level 3 Reserve Officer with the San Diego Police Department for 9 years. According to Harris, "The Level III program was an attempt to bring on board volunteers with specialized knowledge that might be of use to the Department. After graduation, I took some Police Academy coursework in accident investigation. In many accidents there are important questions related to visibility issues as to whether parties involved should have been able to make visual sightings that would have allowed them to take actions that would have avoided the accident."

That brings us to the present and the book itself. Forensic Visibility has only four chapters: 1. The Human Visual System; 2. Forensic Photography; 3. Pedestrian and Automobile Accidents; and 4. Aircraft Accidents.

The last chapter may be of only minimal interest to most who read this review mainly because the majority of us rarely, if ever, get to reconstruction or even investigate an aircraft accident.
The chapter discusses a wide range of topics from midair collisions to collision avoidance to tower detection, pilot responsibilities and more.

The second chapter should interest anyone who takes photographs at crash scenes. The chapter is probably bit too technical for most of us. I mean how often do we enter discussions about The Concept of Linearity or Adjusting the Luminance of the Projected Image? Or, does the equation 100*CS/C = 100*BB/(BB+BS) ring a bell? But technicalities aside, I am sure the conscientious crash reconstructionist will get something useful from the text.

Although that first chapter discusses Central Fovea Resolution and Daytime Peripheral Resolution, there are sections to benefit the curious reader.

But the third chapter, Pedestrian and Automobile Accidents, is worth the price of the book all by itself. The authors cover The Collision Triangle, Photographic Documentation, Pedestrian Sighting of an Oncoming Vehicle While Making a Mid-Block Crossing, Comparison of Driver and Pedestrian Visual Tasks in Mid-Block Crossings, Intersection Lighting Provided by Streetlights, Trip/Slip and Fall Accidents, Vehicle/Vehicle Accidents, Distance Judgment, Eyewitness Testimony, Importance of Signal Lights, and Unlit Stationary Vehicles at Night, among others.

The senior author notes that he is "a mathematically oriented engineer" and he admits and recognizes "that the equations and graphs may not be at all helpful to some readers," [but] "for them, I have attempted, as best I can, to offer a verbal interpretation." Moreover, he hopes "that those readers can simply pass over the mathematical approach." However, if you are mathematically inclined, here is a text you can jump in with both feet.

The senior James L. Harris worked on the design of radar systems for active missile defense and in 1954 he joined the staff of the Visibility Laboratory, Scripps Institution of Oceanography, University of California. His primary research activities at the laboratory included research as to the capabilities and limitations of all types of light-sensing devices, the development of computer techniques for the extraction of reliable data from photographs, and the application of the labs vision research data to the topic of visibility and visual search in real-world situations. The Visibility Laboratory was named by NASA as the lead laboratory in studies made during two Gemini space flights to determine whether prolonged weightlessness resulted in a reduction in the visual acuity of the astronauts. Those contacts resulted in Mr. Harris being named Principal Investigator in a series of grants from NASA to study the role of vision in aircraft midair collisions. Forensic Visibility is available online at lawyersandjudges.com and if you'd like to contact Mr. Harris, Sr. with questions about his book, his email address is JSr@hvsic.com.

Also new from L&J, is the 512-page Third Edition of Boat Accident Reconstruction and Litigation. The First Edition, by Dr. Roy Hickman, P.E., came out in 1996 and Michael Sampsel, P.E. was listed as a contributor. This latest version shows Mr. Sampsel as a co-author.

According to the publisher, "This updated and revised edition has even more information to help you understand the complexities of boating accidents. In this edition are expanded chapters on boat accident reconstruction, an entirely new chapter on skipper responsibilities, and updated information recreational boating law. Whether you are a beginner or

ARE YOU READY? 2012 ACTAR EXAMINATION DATES & LOCATIONS

APRIL 2012

Tuesday, April 17: Hershey, Pennsylvania at the PSP Academy with at 0700 hours start time. Sponsored by PSP. New applications must have been received by February 17, 2012. Exam registration cutoff date: March 17, 2012.

Friday, April 27: Taylor (Detroit), Michigan after the SAE World Congress. Sponsored by MSP. New applications must have been received by February 27, 2012. Exam registration cutoff date: March 27, 2012.

Saturday, April 28: Jacksonville, Florida before IPTM Special Problems. Sponsored by ACTAR. New applications must have been received by February 28, 2012. Exam registration cutoff date: March 28, 2012.

MAY 2012

Monday, May 21: Seattle, Washington at the Seattle PD Airport Way Center. Sponsored by WATAI. New applications must be received by March 21 2012. Exam registration cutoff date: April 21, 2012.

Thursday, May 24: Deadwood, South Dakota after the MwATAI Conference. Sponsored by MwATAI. New applications must be received by March 24 2012. Exam registration cutoff date: April 24, 2012.

JULY 2012

Friday, July 13: Sandy Springs (Atlanta), Georgia at the Sandy Springs Police Department. Sponsored by ACTAR. New applications must be received by May 13, 2012. Exam registration cutoff date: June 13, 2012.

Sunday, July 22: Mt. Pleasant, South Carolina before the SCARS Conference. Sponsored by SCHP. New applications must be received by May 22, 2012. Exam registration cutoff date: June 22, 2012.

Monday, July 23: Golden, Colorado at the Colorado State Patrol Academy. Sponsored by CSP. New applications must be received by May 23, 2012. Exam registration cutoff date: June 23, 2012.

All tests prohibit the use of laptop computers, but allow pre-approved calculators. Refer to www.ACTAR.org.

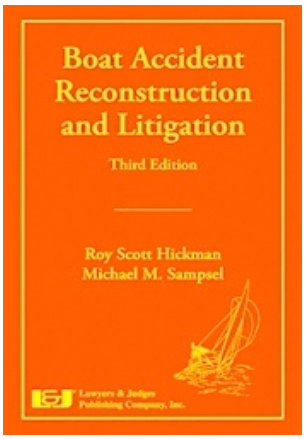
The ACTAR Governing Board of Director meets at the end of March this year. Updates will be in the next newsletter.

from the bookshelf

experienced litigator or any expert dealing with a boat accident, the information contained in this excellent resource will save you hours of research time hunting through less complete texts and online services."

The book's 18 chapters cover everything from Nautical Terminology, Boat Operation, Accident Reconstruction, and Product Liability Issues to Boating Regulations, Swimmers and Personal Floatation Devices, Maritime law, Skipper responsibilities and more.

Boat Accident Reconstruction and Litigation is a hard cover (or case bound as the publisher likes to say) edition and available online at lawyersandjudges.com.



About the reviewer: Joseph E. Badger is an internationally known accident reconstructionist and consultant who has had over 100 articles published in such periodicals as Law and Order magazine, Accident Reconstruction Journal, Accident Investigation Quarterly, and others. Mr. Badger retired after 20 years with the Indiana State Police and resides in Bloomington, Indiana.

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