

CALIFORNIA ASSOCIATION OF ACCIDENT RECONSTRUCTION

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Schedule of ACTAR Accreditation Examinations

Accreditation through ACTAR is the best way to demonstrate your qualifications as a reconstruction professional. The following is a list showing upcoming test dates and locations, so you too can earn your accreditation.

Date	Location
April 15, 2004	Tallahassee, FL
April 23, 2004	Danvers, MA
May 1, 2004	Jacksonville, FL
May 4, 2004	Denver, CO
May 18, 2004	Rock Island, IL
May 28, 2004	Fort McCoy, WI

You may contact Al Baxter, ACTAR Administrator, at the address below or by phone at (800) 809-3818.

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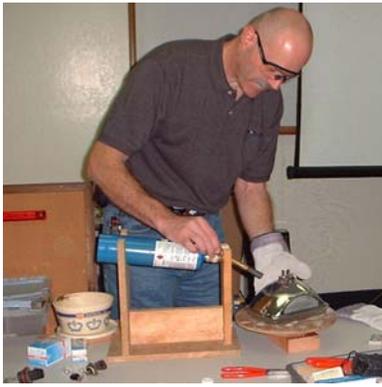
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LAMP ANALYSIS TRAINING REVIEW

By: Chris Kauderer

Rudy Degger & Associates, Inc., CA²RS Board Member



Captain Jim Domenoe “opens” a headlight for inspection

The Contra Costa County Sheriff's Department hosted our Northern California training session on January 28th and the Garden Grove Police Department hosted the Southern California session on February 18, 2004. Our special thanks go out to our featured speaker, Captain Jim Domenoe from the Riverside County Sheriff's Department, a well-known expert in the field of “Lamp Analysis”.

Introduction

Even though lamp analysis is only one small piece to a larger puzzle in collision investigations, the most common circumstance calling for examination of lamps is to determine if possible, whether they were on or off at the time a motor vehicle crash occurs. When a participant or some other witness says that one of the vehicles lacked lights, this statement may refer to headlights at night or signal lights by day or night. Sometimes such a statement is quite true; sometimes the person making the statement is lying for one reason or another. But usually, whoever makes the statement does not remember having seen lights, either because he took no note at the time or because he was looking elsewhere. So he/she infers that the lights in question were off. In any event, such a statement about lamps warrants checking them by examination.

Types of Lamps

The class began with a brief overview of bulb types

- Conventional
 - Sealed envelope (bulb)
 - Filled with Nitrogen to keep out Oxygen in order to prevent fire inside bulb
 - Resistance in filament causes heat resulting in light
 - Silica glass for bulb
 - Base is usually brass
- Halogen

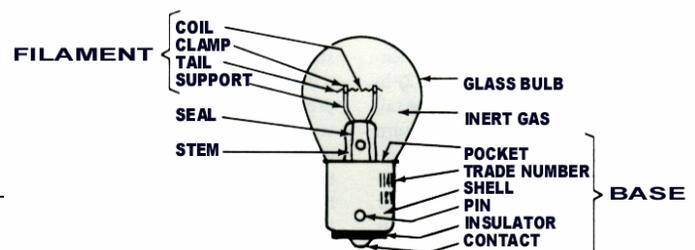
- More heat generated than in conventional light
- Bulb is usually quartz glass
- Filament is larger in size and wire gauge
- May have cap to diffuse the light
- Bulb is filled with halogen or other inert gas
- Advantage
 - Longer life
 - Smaller
 - More light per watt
- Disadvantage
 - Cost



- HID
 - Micro version of stadium lights
 - Bulb is filled with inert gas
 - Gas is heated and creates light
 - Takes a period of time for light to reach maximum brightness
 - Light is white, though it may appear to be “blue” depending on angle at which one looks at light.
 - Inside of bulb is pressurized
 - 3x atmospheric pressure when cold
 - 30x atmospheric pressure when hot
 - Currently no known method to determine if light “on” at impact
- LED
 - Light emitting diodes
 - Color used to be red only; now white and other colors
 - 1-4 volts of electricity is applied to negative side of electrons. The movement or excitement as the negative charge moves to positive side creates light.
 - Currently no known method to determine if light “on” at impact
- Neon
 - Another non-incandescent light type

Typical Parts of Small Bulbs

We were instructed on the typical parts of small bulbs (Fig. 1). Additionally, we were able to see what a normal or new bulb looked like (Fig. 2), bright luster of filament, evenly spaced coils, longitudinal draw lines, undarkened glass, and bright base.



Typical small lamp and its parts (Trade No. 1141, Bulb S8,

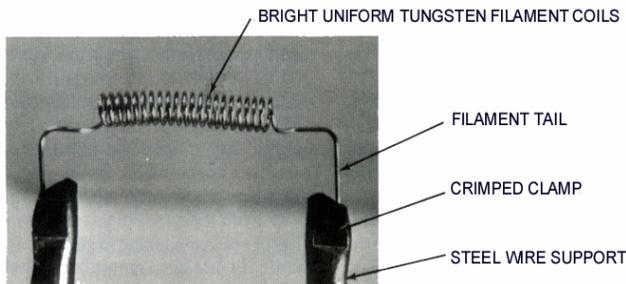
signs of whether the lamp was on or off. Avoid lamp removal at the scene.

Warning: Captain Domenoe warned against using the damage to light filament as a method to determine PDOF (Principle Direction of Force) in the collision. His experience has shown the components are too small and localized to be an accurate indicator of PDOF.

Inspection Sheet

Capt. Domenoe highly recommends anyone participating in any form of a lamp examination(s) make notes or use some type of an inspection sheet. Except in unusual circumstances, you cannot be expected to remember, after a few days, exactly the condition of each lamp when you examine them. Therefore, your observations will not be worth that much unless you make a record of them at the time you made them.

Figure 1



Normal, new lamp filament.

Figure 2

Aged bulbs will normally display a bright luster of filament, evenly spaced coils, rough and pitted filament, possible downward sag, possible darkened glass, and possible dirty base. While burned-out bulbs would display bright luster of filament, parted filaments, open circuit, rounded or ball ends, possible darkened glass.

Lamp Markings

Nearly all electric lamps are marked in one way or another to indicate how they may be used. The most common marking on an automobile lamp is the trade number. Lamps with the same trade number are interchangeable, even if made by different manufacturers. Thus, the trade number represents the size, shape, contact arrangement, voltage, wattage, filament configuration and other characteristics.

At-Scene Observations

Limited time, facilities, and other circumstances make it impractical to examine motor-vehicle lamps properly at the scene of a collision. But a record of lamp observations at the scene is important. At the scene of a serious accident, a number of simple observations can be quickly made. Noting valuable information may result in:

- Which lamps were on
- Which lamps were broken
- Observe whether the lamp switch was on or off
- Locate the magnitude and location of contact damage areas on the vehicle so that possible impact shock to lamps may be evaluated

Never switch on lamps at the scene of a collision to see if they work! If any lamp has been broken at the scene of an accident, switching it on may burn it out and so destroy

CRASH!

An actual collision or some new form of “twisted” artwork? You decide...



If anyone has an interesting collision reconstruction related photograph that could be published in a future issue of Skidmarks, please forward it to Jim Holder at jamesh@ci.garden-grove.ca.us

Blurbs from the Board



Gordon Gray
Chair



Kent Boots
Vice Chair



Bill Focha
Director



Karen Haverkamp
Director



Jim Holder
Director



Chris Kauderer
Director



Richard Shin
Director



Rudy Degger
ACTAR Rep.

Blurbs from the Board for Spring 2004

Dear CAARS Members,

We can turn the lights out on our Advanced Lamp Analysis training, which was held January 28th in Pittsburgh and February 18th in Garden Grove. Many thanks to Chris Kauderer and Jim Holder for hosting these two training sessions respectively. The training locations were outstanding and well attended by you, our members. The instructor, Jim Domenoe definitely shed some light on how to examine a lamp to see if it was on during a collision.

Bon Voyage for those members who are headed out to sea for the CA²RS Cruise April 23-26. We still have a few cabins left so if you hurry you can get one. Contact Karen Haverkamp at (909) 789-0741 or khaver@ci.riverside.ca.us to reserve your spot on our voyage into CA²RS history. You will not only get 8 hours of training in Post Collision Passenger Vehicle Inspections but you will also experience many freebies thanks to Karen's hard work. Thank you Karen.

For those of you who are land lovers we will offer the same training topic May 19th in Vallejo. Please note the date change. The training is being hosted by the Vallejo Police Department, in their training classroom located at 111 Amado St., Vallejo. Make sure you contact William Focha at wfocha@sonoma-county.org and let us know you are coming.

Looking ahead for July 28th and August 18th we're bringing you a Momentum Review – and Case Study, presented by the honorable Rudy Degger. The July training session is being held in Stockton, with the location to be announced. We are in the planning stages for the August session in Southern California and it looks like we will be back in Anaheim at the Sheraton Hotel. This class will be an excellent refresher for those with thoughts of taking the [ACTAR](#) test to be hosted by CA²RS prior to our annual

conference in October. Items you will need for this class will be an engineer's scale ruler, calculator, and computer, along with a pen or pencil and notepaper.

Quarterly Training Registration: With our growing number of members it is becoming more and more important for you to register for each training session. This will ensure we have enough seating. But more importantly when we offer handout material we'll have enough for all who attend. This is going to be especially important for the July and August training sessions. ***We are only going to print enough handout materials for those who pre-register!*** Included in the handout material will be training aids, drawings, photographs, and a CD with all of the info for those of you who like to use your computers.

Web Site Updates: You may have already requested and received your new user name and password to access the "Member Only" area of our web site contact caars@hotmail.com and you will receive it via e-mail. The old user name and password have been discontinued. Also, look for a new Merchandise Page coming soon.

Conference 2004 Update: We're moving on two wheels with the planning of our 2004 Conference. It looks as if the Conference will be held in the wine country. How does Santa Rosa in October sound? We are focusing on motorcycle collision investigation. We haven't been able to lock in a date as of yet. Keep your eyes on our web site for future updates and of course by the time the next Skidmarks is printed it will contain everything you wanted to know and more about the conference. If you would like to assist with the Conference please contact me. We are narrowing down the topics to be covered and lining up the instructors. We are planning on doing some live test crashes with motorcycles into cars. Rider's are needed...any volunteer's?

Lastly, I'd like to once again encourage anyone who may have ideas for potential training topics to contact one of

the Board members and pass it on. We're also looking for meeting places in both Northern and Southern California for future training sessions. In considering a training location, take into account the number of members in the area and the effortlessness of commuting to the locality at the time the training is presented. In this way we can guarantee the greatest turnout.

As always, the Board welcomes any suggestions regarding future training topics or how to improve the organization.

Gordon W. Gray, CA²RS Chair

Just a reminder...

If there is any information you would like changed, added, or deleted from your mailing address, please contact CA²RS Headquarters immediately. If you would like information to appear in our newsletters you must submit your materials to Jim Holder. For deadlines please e-mail jamesh@ci.garden-grove.ca.us or call (714) 741-5823

Test your Skills By Kent E. Boots

(Answers on page 8)

You investigate a collision involving a 1986 Ford Aerostar Van. The vehicle ran into a large metal shipping container, which sustained little damage. The vehicle left 36' of locked wheel skid pre-impact with the container. The vehicle didn't appear to travel any distance post impact with the container.

You conduct skid tests at the scene of the collision and determine an average coefficient of friction value of .68; assume 100% braking efficiency.

You establish a station line across the front of a vehicle 13' forward of the rear axle since you don't know the location where the front bumper should be. The following measurements were obtained: $C_1 = 28.5''$, $C_2 = 29.5''$, $C_3 = 28''$, $C_4 = 28''$, $C_5 = 28''$, $C_6 = 32''$.

The total vehicle weight including occupants and cargo is 4,846 pounds. The undamaged bumper width is 72''.

You obtain the following crash test information from NHTSA¹ to determine the "A" and "B" stiffness coefficients.

NHTSA Test Number: 895

Test Speed: 56.7 kilometers per hour

Vehicle Weight as Tested: 1608 kg

Width of Damage: 1626 mm

$C_1 = 462$ mm

$C_2 = 508$ mm

$C_3 = 536$ mm

$C_4 = 531$ mm

$C_5 = 508$ mm

$C_6 = 422$ mm

I know I gave you the data in metric but this is how you will find it on the NHTSA web site. The conversion from kilograms to pounds is *2.2046. The conversion from kilometers per hour to miles per hour is *0.6214. The conversion from millimeters to inches is *0.03937

1. Determine the actual crush measurements based upon the actual rear axle to front bumper distance of 147'' (assume no bumper contour).
2. Use the barrier test data to calculate the "A" and "B" stiffness coefficients.

¹ http://www-nrd.nhtsa.dot.gov/database/nrd-11/veh_db.html

3. Using the adjusted crush measurements and the calculated stiffness coefficients calculate the damage energy and barrier equivalent velocity.
4. Calculate the energy lost during skidding.
5. Calculate the total energy and the vehicles speed at the start of the skid marks.

Quarterly Training Dates for 2004

Dates	Locations	Topics
April 23 rd – April 26 th	Training Cruise	Post Collision Passenger Vehicle Inspections
May 19 th , 2004	Vallejo PD, 111 Amado St, Vallejo	Post Collision Passenger Vehicle Inspections
July 28 th , 2004	Northern California, TBA	Momentum Review – Case Study
August 18 th , 2004	Southern California, Anaheim	Momentum Review – Case Study



Right-of-Way Collisions

By Kent E. Boots

First of all let's discuss the California Vehicle Code's definition of "Right-of-Way". Right-of-way is the privilege of the immediate use of the highway.¹ Only one person (or vehicle) has the privilege or the right to occupy a given space on a highway. In order to determine which party in a collision violated the other party's right-of-way, we have to determine who had the right to be there. As most of you probably already know, right-of-way violations constitute a major portion of the causes in motor vehicle collisions. When you read the Vehicle Code, there is not a tremendous amount of information (all right, there's no information) regarding issues like when the transfer of right-of-way occurs from one driver to another or what constitutes an "immediate hazard." There is, however, a significant amount of information in the California Peace Officer's Legal Sourcebook² and the Annotated Vehicle Code.³

I am often asked the question, when does one vehicle have to yield to another, or when does a vehicle have to yield to a pedestrian that is lawfully in a crosswalk. No

question of right-of-way exists until two motorists attempt to occupy the same portion of a highway at approximately the same time.⁴ The question of right-of-way arises only when there is a chance of collision if each party continues on their respective course.⁵ If there is no possibility of conflict, then there is no question of right-of-way. In order for there to be a question of right-of-way, it is necessary for one of the contending parties to swerve, slow, stop, or increase speed in order to avoid conflict or the potential for immediate conflict. Remember, there are only three things that a driver can do with respect to controlling a vehicle. They can turn the steering wheel, step on the brake pedal, or step on the gas pedal.

So the answer to the question is this:

- ❑ If vehicle one enters the path of vehicle two, and driver two has to take some evasive action to avoid a collision then vehicle one has violated vehicle two's right-of-way. Or in the case of a pedestrian in the crosswalk if the pedestrian has to alter their course in any way then the vehicle has violated the pedestrian's right-of-way. Remember though that no collision has to occur, but typically when a right-of-way violation occurs so does a collision. Remember though that this is the simplified answer and other factors, which I'll discuss later, have to be taken into consideration.

¹ VC 525

² California Peace Officer's Legal Sourcebook, Electronic Edition - Revision 119, California Department of Justice, Page 16.26a-16.36 (www.copware.com)

³ West's Annotated Codes, Vehicle Code Sections 21200 to 22347, West Group, Pages 206-279

⁴ Miller (1958) 161 Cal.App.2d 842

⁵ McLachlan (1939) 36 Cal.App.2d 754

Since right-of-way refers to a particular place of potential conflict, it also applies on a lane-by-lane basis. A driver may enter a lane if free, but must yield to traffic in other lanes if that traffic would be a hazard. A driver cannot pull into a lane when it is obvious that oncoming traffic will have to stop. A driver must consider any hazard on second or successive lanes at the time he/she prepares to enter them. This is especially important in cases where vehicles in the right-hand lanes are passing vehicles in the left-hand lanes that are stopped. Even when the oncoming vehicle in the lane closest to the left-turning vehicle surrenders its right-of-way, the left turning vehicle may not proceed beyond that first lane of traffic if vehicles approaching in other lanes will constitute a hazard during the turning movement.⁶

If a vehicle is stopped at an intersection and is yielding the right-of-way to other approaching vehicles, a vehicle overtaking the stopped vehicle has no duty not to pass it. In fact, a driver of a motor vehicle who is obeying the law has a right to presume that other persons operating motor vehicles upon the highway will perform their duty and obey the law.⁷ For example, if the law requires a motorist on an intersecting highway to stop, the driver on the through highway may assume that the other motorist will stop and yield the right-of-way.⁸

- There are several instances in which the right-of-way can transfer from one driver to another.
 - A driver can voluntarily give up his/her right-of-way.

A motorist having the right-of-way at an intersection may intentionally waive it, or he/she may give the appearance that they intend to waive it. If for example, a through motorist stops at the intersection and remains at a standstill while continuing to look away from his/her route of travel, or otherwise conducts himself/herself in such a manner as to create a reasonable belief in the mind of a motorist intending to turn left that the right-of-way has been waived, then the left-turning motorist may be entitled to assume it has been relinquished to him and rely and act upon that assumption until he/she receives notice such as to cause a person of ordinary prudence to believe to the contrary.⁹

A motorist cannot, however, intentionally waive the right-of-way of other motorists. This goes back to the lane-by-lane application in which one or more motorists may stop and waive a motorist through. The additional

motorists are in no way required to stop just because another motorist has waived their own right-of-way.

- A driver can involuntarily give up or forfeit his/her right-of-way.

Before the driver of any vehicle is entitled to the right-of-way, the driver must be operating his/her vehicle within the law.¹⁰ In one case a motorist traveling at the posted speed limit of 65 mph, with low beam headlights on was found to be driving at a negligent and excessive speed, inconsistent with any right-of-way he might otherwise have had over a pedestrian outside a crosswalk.¹¹ However, the implication in this case is that to lose the right-of-way, the driver must be far out of line. It's also important to note that the driver of a motor vehicle, which has entered an intersection prior to or at the same time as another vehicle, cannot arbitrarily rely on the right-of-way gained as the result of excessive speed or by other negligent act or violation of law on the part of the other driver.¹²

A review of cases nationwide generally indicates a loss of right-of-way during unlawful operation from exceeding posted speed limits to reckless driving. However, the majorities are for unreasonable violations, such as high rates of speed, reckless driving, speed exhibitions, and driving at night without lights.

- When does the right-of-way transfer from one driver or party to another?

There is no short answer to this question. Hopefully, everyone wasn't expecting the magic answer to end all debates on the subject. The three primary right-of-way sections, 21801, 21802, and 21804 are worded very similar with respect to the circumstances in which drivers are required to yield to other vehicles.

- ✓ 21801: "close enough to constitute a hazard at any time during the turning movement"
- ✓ 21802: "approaching so closely as to constitute an immediate hazard"
- ✓ 21804: "approaching on the highway close enough to constitute an immediate hazard"

In each of the above three sections a transfer of right-of-way can occur and the (b) subsection comes into effect. The wording for all three sections is nearly identical and states that once a driver has yielded as required in subdivision (a) of the respective section then drivers of

⁶ Kirk (1962) 202 Cal.App.2d 288

⁷ Bartmess (1956) 139 Cal.App.2d 394

⁸ Brinson (1963) 212 Cal.App.2d 168

⁹ Tye (1959) 174 Cal.App.2d 431

¹⁰ Carley (1958) 156 Cal.App.2d 643

¹¹ Beckman (1965) 236 Cal.App.2d 555

¹² Brown (1948) 84 Cal.App.2d 401

all other approaching vehicles shall yield the right-of-way to the vehicle entering, crossing, or turning in the intersection.

The courts have generally held that although their wording is different that the same legislative intent holds true for all three sections. An "immediate hazard" is determined primarily between the factors of speed and distance of the approaching vehicles. The courts are reluctant to lay down a hard and fast rule though. The circumstances of the traffic on the through highway must govern a driver's conduct in determining whether it is an "immediate hazard."¹³

Example: An approaching automobile 60 feet from the intersection traveling at 45 miles per hour constituted an "immediate hazard" to a motorist intending to make a left turn.¹⁴

Example: An approaching automobile 75 feet from the intersection traveling at 25 miles per hour constituted an immediate hazard to a motorist entering the through highway.¹⁵

The key is that the motorist must complete their turn or enter the roadway only after cautiously estimating that the vehicle approaching from the opposite direction is not so close to the intersection so as to constitute an immediate hazard. If the motorist "miscalculates" and a collision occurs, then the question is whether or not a reasonable prudent person in making the same turn, under the same circumstances, would have reached the same conclusion.¹⁶ This most certainly would be a decision for a jury to make, and most of the case law states that these decisions rest with the trier of fact.

The driver's statements are very important in helping you establish whether or not an approaching vehicle may have been an "immediate hazard." If a driver makes a statement that they saw the approaching vehicle and believed it was traveling very fast or in excess of the speed limit, this would be a good indication that they should have known the approaching vehicle presented an immediate hazard. On the other hand, let's say that they travel this route often. They saw the vehicle some distance down the road, and have pulled out numerous times before without being in a collision or causing a vehicle at that distance to take any evasive action. This might be a good indication that the speed and distance of

the approaching vehicle may have effected a transfer of right-of-way.

The necessity of yielding the right-of-way is no longer limited to vehicles in motion, but applies as well to those not in motion. Especially if they have arrived so close to the intersection as to constitute a hazard to the driver as he makes his left turn or U-turn. Two cars that seem about to occupy the same space at the same time are obviously both "hazards"; each is a hazard to the other. If both cars are stopped by a red signal at an intersection, generally speaking, each becomes a hazard to the other at the moment the signal turns green. "Hazard" has been defined as not a certainty, but a risk.¹⁷

There is one situation where perhaps the transfer of right-of-way is somewhat clearer. Let's say for example that a left turning vehicle could proceed to complete its turning movement without constituting a hazard to other oncoming vehicles. However, in the act of doing so its progress is impeded by pedestrian traffic, or for other reasons beyond the drivers control it is unable to clear the intersection, then oncoming vehicles are required to yield the right-of-way to the driver making the left turn.¹⁸

In every right-of-way collision you need to establish which party is entitled to the privilege or the right to occupy that particular space of the highway. This will help you identify the particular vehicle code section to use. Determine if the party that is entitled to the right-of-way intentionally waived their right-of-way or gave the appearance that they did. Determine if the party that is entitled to the right-of-way is operating within the law or if they are far out of line. Finally, if the applicable section allows for the transfer of right-of-way, try and establish whether the approaching vehicle presented an "immediate hazard" taking into consideration the vehicle's speed and distance.

Test Your Skills Answers

1. Free space: 9" (156 - 147 = 9), Adjusted crush measurements: $C_1 = 19.5"$, $C_2 = 20.5"$, $C_3 = 19"$, $C_4 = 19"$, $C_5 = 19"$, $C_6 = 23"$.
2. "A" value: 337.81 lbs/in and "B" value: 102.74 lb/in².
3. Damage energy: 163,856.12 ft-lbs and Barrier Equivalent Velocity: 31.82 mph.
4. Skid energy: 118,630.08 ft-lbs
5. Total energy: 282,486.20 ft-lbs and Vehicle speed: 41.78 mph.

For detailed solutions, contact Kent E. Boots by E-mail: kboots@ocsd.org

¹³ Marcellus (1942) 51 Cal.App.2d 630

¹⁴ Holstlander (1952) 112 Cal.App.2d 589

¹⁵ McSweeney (1943) 60 Cal.App.2d 807

¹⁶ Washam v. Peerless Automatic Staple Mach. Co. (1940) 45 Cal.App.2d 174

¹⁷ Miller (1958) 161 Cal.App.2d 842

¹⁸ Kirk (1962) 202 Cal.App.2d 288

