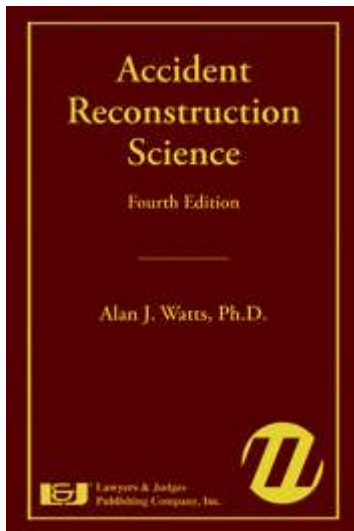


got math?



Accident Reconstruction Science – a book review from the desk of Joseph E. Badger

Back in December 1996, I wrote about a book devoted to those dreaded low speed crashes. The book was the collaborative effort of three men: Alan Watts, Dale Atkinson and Corey Hennessy.

Since then, the book has undergone upgrades (2nd Ed. 1999), an expansion, (3rd Ed. 2003), and now comes a revision, (4th Ed.): *Accident Reconstruction Science*. And this time, just a single author... whose impressive credentials reads like a Who's Who of many people but it is about only one: Alan J. Watts, Ph.D.

I do not want to merely suggest he is multitalented, but he authored or co-authored papers covering a myriad of topics from “Spacecraft Microparticle Impact Flux Definition” to “Optical Scatter due to Impact Effects” to “Potential Impact Damage Effects for Short Mission Spacecraft in a Highly Elliptical Orbit.” Whew.

Moreover, he designed and developed a durable bremsstrahlung radiation converter/shield that survives high-energy impulsive loading on materials and structures for the PRONTO II test facility at Sandia National Laboratories in Albuquerque. (No, I didn't know what bremsstrahlung was either, but I'll save you from looking it up. It is electromagnetic radiation produced by the acceleration or especially the deceleration of a charged particle after passing through the electric and magnetic fields of a nucleus. Now, know any more than you did before? But I digress.)

Watts designed & developed instrumentation and test fixtures while at Ktech (whose employees have comprehensive expertise in pulsed power engineering; airborne flight test and satellite systems support and tracking; research and development; large facility operations, maintenance, and engineering) [<http://www.ktech.com/>].

He was chief scientist at POD (“Programs on Demand”) in Albuquerque, NM. It was a private company categorized under Research Service, established in 1994 [<http://www.podassoc.com>] for thermomechanical response testing for underground nuclear response tests at the Nevada Test Site.

I met Dr. Watts long ago (1999) in Room H-1073 on the campus of the University of North Florida at the 17th annual session of the Institute of Police Technology and Management's (IPTM) Special Problems in Traffic Accident Reconstruction in Jacksonville. His topic: Low Speed Collisions. One might say that the man has been around the block a couple of times when it comes to the subject at hand.

If you want to check him out, do **NOT** Google “Alan Watts.” You will reach 1.5 million entries, none of which is our Alan James Watts, Ph.D. You need to go to <http://www.jurispro.com/AlanWattsPhD>. Trust me. That site is what's called an “expert witness directory.” It lists his curriculum vitae and cites, via the Publications link, the title of his first book. *Low Speed Automobile Accidents - Accident Reconstruction and Occupant Kinematics, Dynamics and Biomechanics*.

But about his new book *Accident Reconstruction Science*... First, if you are a math nut, you will go feral and become totally engrossed around Chapter 4, “Crush Responses in Two-Vehicle, Low-Speed Collisions.” There are gobs more equations in Chapter 6, “Energetics of Collisions.” By Chapter 12, “Rollovers and Side Trips,” you will be ecstatic.

Not to fear. If mathematical prowess is not your forte, you will still relish in Watts’ treatment of such topics as “Experiments versus Theory: Balderdash, Dishonesty and Junk Science” (Chapter 11), “Interesting Mechanical Models” (Chapter 9), and “Bumper Speed Limits” (Chapter 8).

However, I must admit that the text is chock-full o’ formulae. In addition, if algebra and trig make you squeamish, you might as well skip Chapter 16, “The Heavy Vehicle versus Light Vehicle Problem.” For example, there is an equation that commences on page 237, but I never quite figured out where it quits. Around page 254, I think. However, there are some charts and graphs that Watts and Weintraub wedged in among those 17 or so pages.

On page 327, Watts slipped in a short chapter (only two pages) on “Event Data Recorders” with nary a single equation, graph or chart. The author explains why he didn’t dwell on EDR usage “for the simple reason that the practice of *reading* data is precisely that: it is reading data, it is not the act of reconstructing an accident, although the data may be usefully compared with the results of a proper reconstruction.”

Although Watts is primarily into the biomechanical, he states: “... we have renamed this fourth edition and have also removed the section on biomechanics and occupant responses. However, we retain all the biomechanical references to help those who wish to independently study the literature.”

In case you haven’t heard by now, Lawyers & Judges Publishing Co. produces “legal books specializing in accident reconstruction and litigation, forensic economics, nursing home litigation, forensic science and more.” If you go to their website (<http://www.lawyersandjudges.com/>), you might see a blurb and link to Alan J. Watts’ book on the site’s home page.

You will see where the book was “Written for the reconstructionist, attorney, automotive engineer, or other interested professional, this brand new edition examines the science of reconstructing and analyzing an automobile accident.” Click on the “Learn more...” link to, uh, learn more. Or if the book’s information has been moved, simply enter “Watts” (without the quotes) in the Search box to be taken to the correct page. Click on Table of Contents to see all the chapter and subchapter headings.

I asked Dr. Watts if I could mention his email address in my review – in case readers had specific questions about his book – and he said, “Yes, you can give my home phone (505-255-2572), my cell (505-991-3659) and my email (xprt@comcast.net).”

Whatever you do, though, don’t try to find him at www.alanwatts.com. Sure, the site itself exists, but it’s not about **our** Alan Watts, Ph.D. That site is about an Alan Watts who was profoundly influenced by the East Indian philosophies of Vedanta and Buddhism, and by Taoist thought, which is reflected in Zen poetry. And that Alan Watts died in 1973.

Just to get personal with the author, I asked him how long it took to write the book. He said, “Several months of real writing (don’t have a ghost writer like many of the ‘political’ books that seem to appear in short order), but many years of pondering.”

I wonder why Alan wrote it in the first place. [I guess we're on a first-name basis now.] He said, "Why? It started with Steve Weintraub 'nagging me' to produce a follow-up. [Weintraub is president of Lawyers & Judges Publishing Co.] He claims I have a 'following' (not sure if that's true). Problem: the longer I pondered the more good books appeared! ... So eventually I chose to describe my own techniques for solving crashes using the well-known Mathcad computer program, and show how the 'low-speed' approach smoothly moved into 'high-speed' cases."

As for the purpose of the book, Alan said, "Many experts seem to be using 'ready-made' computer codes that can also do animations. Problem: it's not obvious how many users actually understand the science behind the solutions, so I've attempted to explain the logic. Sometimes even I understand what I've said!"

You should be able to understand it too, although you may find some terms and expressions not usually found in other accident recon books. Terms such as *single-photon emission computer tomography*, *elastomers*," "*repetitive stress syndrome*," and *prediction of damage*. (Actually, you won't find "prediction of change" mentioned by those very words. Alan uses only the acronym POD. I guess I figured you would know that one.)

To buy the book, contact Lawyers & Judges at <http://www.lawyersandjudges.com/>. If you prefer ordering the old-fashioned way, write to P.O. Box 30040, Tucson, AZ 85751 or call (520) 323-1500.

(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. Having retired after 20 years with the Indiana State Police, Mr. Badger resides in Bloomington, Indiana.)