Dynamic Chiropractic

CRASH 2000: Human Volunteer Low and Moderate Speed Crash Testing

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On August 11-13, the Spine Research Institute of San Diego, in conjunction with Texas A&M University, conducted our second full-scale, human volunteer crash test workshop and training program at the United States Naval Training Center in San Diego. It was attended by 86 of the top experts in whiplash traumatology in the U.S. The thrust of the program was to continue last year's validation process of the auto crash reconstruction and occupant kinematic assessment method, which was jointly developed in Canada and here in the U.S. The method requires measurement of bumper isolator stroking after impact as an estimate of absorbed energy. This energy is then converted mathematically into speed change and, ultimately, into an occupant head linear acceleration value.

Another purpose of this year's crash series was to compare the occupant kinematics and forces between the striking (bullet) and struck (target) vehicles. The same instrumented subject underwent crash sequences with the same speed changes in the same vehicle under both conditions. While we have not yet crunched all of the numbers, it is clear that both the occupant kinematics and forces are dramatically different: being rear-ended is much more traumatic than rear-ending another vehicle when the subject, vehicle and speed change are held constant. This also addresses the common question: "How come it's always the guy in the front car who gets hurt?"

In our mid- to high-speed crash, two volunteers - both males with a lot of experience in crash testing - crashed head-on into each other. This action resulted in deployment of both air bags and significant structural damage to both vehicles. One of the volunteers sustained bruises and abrasions from the air bag over extensive portions of his arms, forearms, wrists, and trunk, but both volunteers were otherwise unhurt. This was the first such crash test involving a staged head-on crash, with both vehicles moving under their own power and with volunteer subjects in both cars. We performed a total of 19 tests (including the head-on) using one female and two male volunteers: another re-cord (for us, at least). I will report our results in future editorials.

C.R.A.S.H.: The New Organization

We have also recently launched the Center for Research into Automotive Safety & Health (CRASH), a non-profit organization dedicated to learning more about injury mechanisms related to motor vehicle crashes through scientific research. This organization will be unique from the standpoint of its public health and public interest focus. In the motoring history of the United States, we have made a great many strides in developing safer cars and trucks. This work, however, has come about largely as a result of pressure from consumer advocacy groups and the public, and has been moving only at glacial speed. For example, the notion that head restraints could mitigate some of the injury-producing forces of rear impacts has been with us since nearly the turn of the century, yet manufacturers seemed in no hurry to install them in their products.

It wasn't until Dr. Derwyn Severy testified in Washington in the 1960s that a Federal Motor Vehicle Safety Standard was put into force (1969) requiring manufacturers to so equip passenger cars. Still, since vans, minivans and pick-ups were not technically considered passenger vehicles, they were exempt from regulation, and manufacturers still did not equip those vehicles with head restraints. Worse still is the fact that the head restraints that did find their way into these cars were often nothing more than window dressing, hastily installed devices with little regard for ergonomics, occupant kinematics, and other critical engineering principles. As testament, the Insurance Institute for Highway Safety (IIHS) tested 169 passenger cars in 1996 for head restraint geometry (height and backset - the distance between the back of the driver's head and the front of the restraint) and rated only five percent as "good." Their website (a href="http://www.IIHS.org">http://www.IIHS.org) has the specifics of how the various makes and models fared in these tests.

Other literature shows that head restraints reduce injury in a very low percentage of cases - again as a result of poor design and also as a result of the occupant's failure to adjust them properly. I have written on this important subject a great deal in past editorials: head restraints are an important way of reducing injuries from rear impact crashes, but they work only when properly designed and adjusted.

Another example of the manufacturers' phlegmatic rush to implement safety features in passenger cars is air bags. The fact that we have had this technology since the 1950s is enough of an indictment by itself. Until Ralph Nader came along in the 1960s with his cause celebre - the Corvair - manufacturers did not regularly crash test their cars, and when they did, the results were held close to the vest. Consumers had no access to the results. The Federal Motor Vehicle Safety Standards were born as a means of forcing this type of crashworthiness research, largely through Nader's work, but its scope was woefully limited. As a result, the IIHS and the National Highway and Traffic Safely Administration instigated non-mandatory ancillary testing at higher speeds than specified in current regulations. The New Car Assessment Program (NCAP), for example, rewards higher levels of crashworthiness with higher star ratings. This testing has also had a beneficial effect because, although non-obligatory, no manufacturer is willing to risk the potential negative public opinion by not participating, so we have 100% participation. Since they are now competing on the basis of star ratings, and since they in fact use it in their advertising (when complimentary), manufacturers are playing to an increasingly safety-conscious public which is sending them a clear and unambiguous message: we want safer cars.

That being said, I can tell you as an insider (a consultant to one designer of head restraints and seats) that this "safety thing" is an uphill battle all the way. Making matters worse is the fact that there are still no current safety standards (other than that for the head restraints, which in its current form is inadequate) related to low-speed (and especially rear-impact) crashes. Nor are any standards forthcoming, despite the fact that these injuries represent the largest single cost to society and the largest contributor to long-term disability.

On the surface, one might think that insurers would likely lead the way in bullying manufacturers into producing safer cars. Insurers, after all, pick up a large share of the bill, but economics dominates this conundrum. Without the perceived threat of injury, which we all get by our own experiences or (for the luckier ones) through vicarious means, we won't be willing to pay high insurance premiums. Moreover, the minute the insurance industry begins to acknowledge there really is a problem with, for example, low-speed rear impact crashworthiness such that it warrants serious attention, they necessarily underpin their entire defense strategy, which is used against plaintiffs across the country in

courtrooms every day. To them, it is more important to let the motoring public learn the hard way that the risk of injury is very real, even in low-speed crashes, and then to apply liberal quantities of denial in court. This is where the "junk science" and dubious expert testimony serves them so well. It is dissimulation, or what the CIA calls "plausible denial." The question raised by this is, "Are there any special agendas in the research conducted by a consortium of insurers (i.e., IIHS) or the manufacturers?" Undoubtedly, although they both do conduct research, much of which is good and important, it is doubtful that the public interest is usually the highest priority of all.

That brings us back to CRASH. The center will be funded by tax-deductible donations from individuals and charitable organizations, not manufacturers or insurance companies who stand to benefit or lose based on the research that emerges. The board of directors of CRASH, who have no affiliations with such businesses, will set the agenda for research based on the public interest alone and the cards will fall where they fall. We are new, but you will be hearing more about us in the future. We do have a web "presence," but not a fully functional site yet. Watch us develop at http://www.AutomotiveSafety.org, and http://www.SRISD.com.

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SEPTEMBER 2000