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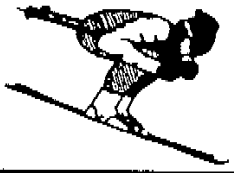
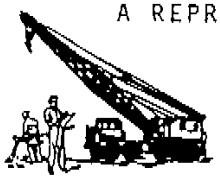

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ASA ACCIDENT AND SAFETY ADVISORY ASA

The Engineering Expert Talks to Attorneys ... Insurance Claims Personnel ... Safety Managers of Industry ... Educators ... and Government Agencies, on Timely Topics in Accident Litigation, Investigation, and Prevention.

by I. U. Ojalvo, Sc.D. Technology Associates

THE PROPER USE OF A TECHNICAL EXPERT

The proper use of a technical expert can determine the success of your case. By observing three basic principles, the attorney or insurance agent can be assured he or she will get the best results from the expert. These principles are:

* Involve the expert early.
* Have him explain the scientific basis of the case.
* Maintain good and timely communications.

Based upon experience with hundreds of cases over the past decades, these ideas are developed below to help maximize effectiveness and minimize cost when using a technical expert.

Early involvement is essential because evidence may be lost or changed as time elapses. Roadways change, buildings are remodeled, access privileges are lost, a defect which caused an accident may be corrected, evidence may be disposed of, etc. Simply sending a photographer or fact-gathering investigator alone to an accident scene may not be adequate, since he is not a scientist and may not know what evidence is important. In addition, an accident such as one involving an alleged slippery surface is not measurable from a photograph. Furthermore, witnesses move and become difficult to locate, their memories of the event will fade, or they could be less inclined to cooperate when time has elapsed. Another reason for engaging the expert early is that he can help in formulation of a complaint, counterclaim, or response to interrogatories before you are firmly committed. Thus, preparation and timing can be important factors in developing your strongest scientific case.

Understanding causation often requires an explanation by the technical expert. A good expert will be able to explain critical parameters and their importance to the case.

For example, the client should understand concepts such as "coefficient of friction" in a slip and fall case, or "human factors" when considering stair dimensions, or the significance of skid marks before and after vehicle-impact, or its crush pattern. Were "warnings" adequate or improper? Did they result in a person not knowing what to do in an emergency situation such as a cooking fire? Were fire-extinguishers available that went unutilized because people did not know how to activate them? Many experts have been involved in cases where devices such as pull-chains, which release fire-smothering chemicals, went unused because no one knew of their presence. Was someone injured by an elevator because the doors closed with too much force, or did not level properly? Was an important machine guard removed or deactivated by an operator? Was an accident caused by a design-defect, or was it poor manufacturing or maintenance, or a training defect? Who was responsible for machine set-up and educating its end-users? The machine's manufacturer, or his employer? Were government or industry safety standards violated? Equally important, the lawyer must understand the downside of the case, as well as its strengths. As the case develops, he will probably have to defend related attacks, and potential problem areas will influence compensation negotiations along the way.

In general, the more technical the case, the more important it is to understand crucial details, since the lawyer will need to question the opposition's expert and simplify and explain such information to a typically non-technical jury. The scientific expert should be able to explain related issues to you.

Communication with your expert involves learning what the expert can do for you. Discuss schedules, fees and the frequency required of reporting to you. Keep him informed of developments in a timely manner so that he can react adequately and prepare for situations arising when new information becomes available. It may be that additional analyses or tests will be required to verify or refute discrepancies in new evidence.

There have been situations where crucial information was revealed to the expert by opposing counsel at the time that his deposition was being taken. Such surprises tend to weaken an expert's effectiveness. By the same token, new government studies may have surfaced, and new information could buttress your argument and be helpful to your expert.

In conclusion, (1) get your expert on-board early, (2) have him explain the technical details of your case, and (3) maintain good communications with him throughout the investigation and discovery process.

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WHIPLASH DURING LOW SPEED IMPACT: *FACT OR FRAUD?*

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A car is stopped for a light when it is unexpectedly rear-ended by a vehicle from behind. It is not a hard impact and there is little or no damage to either vehicle, because the energy absorbing bumpers have protected them. Nevertheless, the passengers of the struck vehicle complain of neck, shoulder and back pain. The next day they allegedly experience even greater pain and visit a medical person who claims that they have been injured. Insurance claim representatives, attorneys, medical, engineering and biomedical experts are then brought in and various conflicting allegations, testimony and opinions are expressed. Do we have a legitimate injury claim on our hands or a situation of fraud? Insurance literature sources claim that 1/3 of such cases are fraudulent; yet, there is a body of research that indicates that low speed impact involving nondamaged vehicles can sometimes cause whiplash.

What are the scientific and medical issues involved? In the following, we shall briefly summarize them and explain what technical information is available to analyze such events.

What is the syndrome called "whiplash"? Here is a brief description. A stopped car is struck by another vehicle from behind, the struck car and torsos of its passengers are thrown forward. However, the heads of the passengers lag behind for a fraction of a second, causing their necks to be hyperextended (unduly strained as the torso flies forward while the head stays behind). As their torsos rebound against the seat backs, their heads now move forward, but are snapped back again, by their necks, and overshoot the torso, again causing the neck to be hyperextended. This effect is most severe if the headrests are too low and set too far back, as they are in many cars. The whole occurrence takes less then a second.

Although the person experiencing this situation does not have overt signs of injury, the possible occurrence of soft tissue damage to the overstretched ligaments of the neck has been well documented. This damage may be permanent, causing chronic pain and limitation in neck movement, the full extent of which may not be apparent until about a

day after the accident.

Unfortunately, the effects of whiplash are often downplayed, and its sufferer thought to be malingering, on the grounds that injury isn't visible. Also, experiments have shown that the forces to the neck during whiplash are not much greater then those occurring during normal activities (e.g. "plopping down into a seat", "hopping onto a step", and even sneezing). However, unlike whiplash, normal events do not take a person by surprise, so one can instinctively brace the neck muscles in anticipation, and control the force transmitted to the cervical soft tissues. With whiplash, the force to the neck is violent and sudden, and is not filtered through the neck musculature. Hence, those with thinner or weakened necks (i.e. women and those who have had prior neck injury) are more prone to the effects of whiplash, which can occur from an impact to the car as low as 3G's.

A problem facing investigators of a whiplash case is that the impact velocity of the striking (rear) car is typically not known with certainty, and this value is needed for determining resulting forces. A conservative estimate of the speed can be surmised by using the damage threshold of the cars' bumpers (because whiplash injury is caused by low speed impacts involving no (or minimal) damage to the bumpers; hence most of the shock is transmitted to the passengers' necks). Testing has shown the damage threshold of bumpers of many cars to be about 5 mph; thus investigators may derive whiplash forces to the neck based on a maximum 5 mph impact velocity to the struck car. However, most crash testing involves the car impacting a rigid barrier, which does not yield in any way, rather than a relatively flexible bumper of another car. Hence, the crash testing can be more severe than an actual impact with another car, and can, in fact, be equivalent to the car's being struck with another car at up to twice the velocity used for the barrier test.

Testing has shown that the maximum loading to a rear-ended car was amplified about two and a half times when it reached the heads of the occupants. The testing also revealed that this occurred about a fourth of a second after impact.

The momentum and loading to cars which are involved in a rear-end impact (of low enough impact velocity so that there is no permanent deformation of the bumpers) can be fairly accurately modeled as a mass-spring system. This enables determination of the loading effects on the cars and heads of the occupants, by input of known quantities (masses of the cars, bumper stiffness, relative velocity between the cars at time of impact).

It is thus possible to determine the likelihood of a claim of whiplash injury being legitimate. Based upon how consistent all incident data is with available research findings, and on using as precise a computer model as possible, an engineer with a proper dynamics and biomechanics background can help to determine the viability of a claim.