


By Chris Hall

# Engaging A vehicle collision expert



**Having considered that engaging a vehicle collision (accident) expert might assist them with advancing a particular file, a solicitor needs to understand what an expert has to offer. Initial contact with the expert should seek to determine whether the expert has the appropriate expertise for the file. As with the legal industry, there are experts in the field of accident reconstruction of varying degrees of experience and understanding, and there are some experts who specialise only in a specific area within the general spectrum of vehicle accident reconstruction and analysis.**

**I**t is important to communicate freely with experts so that they can understand the general background of the incident in question and the underlying basis for a claim or soon-to-be-formulated claim. A solicitor who has already set the basic parameters of the claim can, in many cases, cut to the chase and ask the expert 'Do you have the appropriate expertise to provide an opinion in relation to X, Y and Z?' Care should be taken to distinguish road safety matters from accident reconstruction matters (that is, 'was that a safe driving manoeuvre?' as opposed to 'what was the consequence of a certain driving manoeuvre?'), as they are two entirely separate fields of expertise. It is also generally understood among reconstructionists that, at initial contact, the solicitor may not be set on the question of liability and may simply be 'testing the waters' by speaking with an expert. That should be clearly indicated to the expert.

Typically, on initial contact, a solicitor can expect questions

from the expert about the circumstances of the incident, and ultimately, assuming that the expert is engaged, they will require a significant amount of information. In order for them to provide some preliminary insight into what service can be provided and at what cost, it is beneficial for the expert to be given a good overview of the circumstances of the incident and the information available. However, if the initial contact with the expert is simply part of the preparatory stage prior to formulating a claim (or defence), little information may have been collected. In such circumstances, the expert can be questioned as to what documents and materials might be required in order to complete a general reconstruction, and it may prove that specifics for the basis of the claim do not evolve until after extensive interaction between the expert and the solicitor and the provision of further material.

It is almost a truism that the earlier the information required for a detailed reconstruction is sought, the more

likely it is to be collected. The better the data supplied to the experts, the greater the confidence in their opinion. In some cases, early preservation of vehicles can prove to be very valuable.

The information required does not necessarily have to be provided in direct form. It may be determined by interpretation of photographs and consequent visits to the scene. Short of exact measurements (generally in the form of a detailed and accurate plan) and associated descriptions being provided, the most valuable information available to the reconstructionist is generally in photographic form. The importance of clear, detailed, colour photographs of the scene and vehicles, preferably in digital format, cannot be over-emphasised. Care must be taken when providing plans to the experts. It is not uncommon for plans to be photocopied and joined. The photocopying can alter the scale and the pasting can cut out sections of the plan. Scaling from the plan can then cause inaccuracy in the accident analysis (for example, determining whether the separation between two tyre marks corresponds to the wheel track of a particular vehicle).

To assist in the early collection of background information for accident reconstruction purposes, what follows are some of the more common requests put to reconstructionists/experts, some insight into issues faced and some of the information required. By necessity the list is short, but it serves to illustrate the importance of collecting good information early.

#### WHAT SPEED WAS THE VEHICLE TRAVELLING AT?

The simplest analysis usually involves a single vehicle incident (car colliding with pedestrian or cyclist, or a motorcycle capsizing) where skid marks or scrape marks are observed on the road surface. The application of Newtonian physics to determine the speed at the beginning of the skid/scrape marks requires information regarding the nature of the marks (length, density, number, etc), the road conditions, surface type and slope, and in the case of a motorcycle slide to rest, the characteristics of any scrape/gouge marks (length, depth, etc), the rest position of the rider and how she/he came to rest.

If a vehicle has rolled over, the roll distance and characteristics of the terrain (hard or soft surface, sloping or level) are required to determine the vehicle speed. The curvature of yaw<sup>1</sup> marks on the road surface will also assist in determining vehicle speed, but the curvature needs to be accurately determined.

For multi-vehicle impacts, the reconstructionist may have a number of tools at their disposal, depending on his/her level of education/training and the level of financial commitment. The vast majority of matters can be addressed with manual calculations (generally no more sophisticated than solving quadratic equations or solution of simultaneous equations developed using the principles of Conservation of Momentum and Conservation of Energy). The information required includes point of impact, damage to vehicles, pre-impact motion of vehicles, positions of rest, surface conditions, presence of tyre marks and information as to

how the vehicles came to rest.

Where a more detailed and accurate reconstruction is required and there is sufficiently accurate data to support it, a computer-based simulation can be undertaken. Depending on the accident type and the manner in which the client wishes to present the results, a two-dimensional or a three-dimensional simulation can be carried out. These higher-cost options can provide the expert with much more detail regarding the collision (for example, occupant trajectories, instantaneous forces and rotational velocities), but their accuracy, as one would expect, is dependent on the quality of the source data. The data is essentially identical to that required for the manual calculations. Where the confidence in the source data is not high, the simulation packages can still be useful for conducting a consistency analysis (that is, is the available evidence more consistent with Driver A version or that of Driver B?). A number of reputable collision simulation packages are available and used worldwide (for example, EDC HVE, PC-Crash & m-smac).

More and more vehicles are equipped with 'black boxes' which control ABS (anti-lock braking system), airbag deployment, PCM (power-train control module) and ESC (electronic stability control). The 'black boxes' (control modules) store pre-event data which can be downloaded, with the appropriate equipment, and used to determine the onset of braking and the speed of approach. Typically, data from up to 5 seconds prior to a collision will be stored, but some units will store up to 25 seconds of data. The data thus obtained is accurate and provides an excellent picture as to how the driver responded to an emergency situation and the vehicle speed at the time of approach and collision. Currently, however, only a few experts have the expertise and equipment to carry out a download, on a limited number of vehicle models, in Australia.

#### HOW VISIBLE WAS THE PERSON, CYCLIST, MOTORCYCLIST OR ONCOMING VEHICLE?

Visibility issues invariably require a visit to the scene to determine how the environment affected the ability of a driver to detect the object with which s/he collided. Night-time visibility is quite variable and the time of the incident should be determined as accurately as possible so that the reconstructionist can replicate the background light conditions as closely as possible. Any issues regarding changes in the street lighting since the accident should be established, and possible problems with lighting on the night of the accident should be explored.

Any visibility tests conducted by reconstructionists must take into account the 'awareness' factor. When attending the scene days, months or years after the incident, an expert is aware of the circumstances and knows what s/he is looking for under prevailing light conditions. That generally leads to a visibility distance that is substantially longer than occurs in the actual accidents where a surprise element is often involved. The expert must apply a compensation factor to address the difference between the 'test' visibility and the visibility on the night of the accident (assuming lighting conditions to be the same).

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Of paramount importance in determining visibility in pedestrian accidents is the reflectance<sup>2</sup> of the clothing worn by a pedestrian. Unfortunately, this is often overlooked in the early days of developing the file and, in many cases, the colour of the clothing remains uncertain. Early recording of the precise clothing, with photographs (or better still, retention of the clothes) will always assist the expert.

**WHAT TIME ELAPSED BETWEEN FIRST POSSIBLE SIGHTING OF THE VEHICLE/PERSON AND THE IMPACT?**

Commonly referred to as 'time-to-impact', this time period is often sought to imply that a person may or may not have reacted in a manner consistent with normal driving. However, simply because an object is within a person's field of view does not necessarily mean that the object will be immediately detected and recognised. The greater the angle to the left or the right at which the object is located (eccentricity), taken from the direction in which the person's gaze is focused, the less likely it is to be detected, even within the person's field of view. Modern vehicles are equipped with major A pillars which hold the windscreen and resist roof crush in the event of a rollover. Unfortunately, the A pillars also cause an obstruction to the line-of-sight towards objects which are located eccentrically. It is important to establish the pre-impact location of vehicles/pedestrians over a good number of seconds prior to impact rather than the final moments so that line-of-sight issues can be properly addressed.

In the situation where a driver has turned right across the path of oncoming traffic, the time-to-impact will be assessed on the distance travelled from where the lateral movement of the vehicle would be obvious to the oncoming drivers up to the point of impact, and the average speed over that distance. Commonly, drivers intending to turn right will creep out into an intersection, and consequently, it is important to know the position from where the turn acceleration into the turn began. The level of acceleration applied to the vehicle is important, and that information should be sought from the client by the solicitor. It might simply be described as slow, normal, or rapid, and that can be sufficient for a range of 'time-to-impact' to be estimated.

**WHAT WAS THE REACTION TIME OF THE DRIVER?**

This is an often-put question which is, in most cases, not appropriate. It is generally not possible to determine the reaction time of the driver, particularly with the information typically available to the expert. A more appropriate question is: 'Under the circumstances, is the indicated response time of the driver consistent or inconsistent with that of a typical alert driver?'

A reasonable amount of research into driver perception/reaction time (PRT) has been conducted over the last 30 years, to the point where many situations can be modelled to give an expected range for PRT (15th to 85th percentile or 5th to 95th percentile). However, each situation must then be analysed to determine whether or not the circumstances of the incident in question fits the model exactly. If it does

not, then adjustment should be applied. For example, non-discretionary glances (the driver scanning quickly through the field of view as part of the normal driving process) can become important if activities away from the direct line-of-sight to the vehicle/person is taking place. In a case where a vehicle or pedestrian has entered from the right, it is important to know if there was an activity to the left or straight ahead which demanded attention, however briefly (such as vehicle about to exit from a driveway). Non-discretionary glances can add substantial time to a driver's detection and recognition of the vehicle/pedestrian with which they collided. Since detection and recognition is the first phase of the PRT of the driver, a delay in detection will directly increase their PRT. Hence, it is also important for the solicitor to collect as much information as possible about state of the scene and surroundings in the lead-up to the collision.

An expert should quickly dispel myths that a solicitor may have adopted in formulating their initial ideas about the value of their client's case. For example, the concept that a motorcycle or bicycle can be slowed as quickly as a car or steered as rapidly to avoid an obstacle can be addressed, or the difference between a design PRT and the expected PRT can be explained (the former including an in-built safety margin). Skid resistance and stopping distance data published in the 70s and 80s may have been superseded, and two vehicles of the same weight colliding head-on at the same speed is not the same as one of those vehicles colliding with a solid barrier at twice the speed. Momentum is not the same as energy and speed is the magnitude of velocity.

An expert will not become an advocate for the solicitor's cause, but can assist in highlighting strengths and inconsistencies within a claim. The expert can be engaged in a consultancy role as a 'shadow expert' or technical manager in matters that involve a multidisciplinary approach to expert evidence. No matter what the intended role for the expert, the solicitor will be responsible for providing the bulk of the information required for the accident reconstruction and analysis. The earlier the decision to collect that information is made, the better the information will be. Even if settlement of the claim is not foreseen for many years, a time and financial commitment to early evidence collection will be valuable in the event that an expert is engaged. ■

**Notes:** 1 Yaw marks are tyre marks produced on the road surface when a vehicle develops excessive oversteer (that is, starts to spin). 2 Reflectance is the ability of a surface to reflect light rather than absorb it.

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