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Skidding to a stop leaves an identifiable trail that can be used to determine a vehicle's speed before skidding began. For a level road, the speed in miles per hour at the initiation of skidding is simply the square root of the product of 29.94 times the drag factor times the distance in feet. The drag factor is a dimensionless value that can vary substantially, from a low value of 0.10 or 0.20 for ice to a high value above 1.00 for new, dry, brushed concrete. The drag factor is also the coefficient for the vehicle's rate of deceleration in g's, where one g is the acceleration of gravity, which is 32.2 feet per second per second. In other words, where the drag factor is 1.00, the vehicle will lose 32.2 feet per second of its velocity during every second that it is skidding.

This can be helpful in a situation where a long skid distance is present in a lower speed zone. For instance, a vehicle which skids 130 feet on dry, level asphalt before colliding with another vehicle indicates that, had it skidded to a stop, it would have been going 52 mph at the beginning of the skid, if the drag factor was 0.70. Since it didn't stop, it was traveling faster than that speed by some amount that is not intuitively obvious. But, 52 mph is already 17 mph over the posted speed limit, and that knowledge may be all that you need.

Skidding is simply one method of dissipating the kinetic energy acquired by the vehicle. If it doesn't skid to a stop before colliding with an object, or if it doesn't skid at all before colliding, whatever kinetic energy it possesses at impact (ignoring certain minor losses, like certain frictional values) will appear as damages to itself, damages to the struck object, and post-impact movement of itself and the struck object. (There are a few special cases, such as an impact with a pole, tree, or similar object, in which the struck object is not displaced and may not exhibit visible damage, which fall outside the purview of this statement.) It is the evaluation of the energy losses associated with vehicle damages and post-collision travel which require evaluation by a qualified accident reconstructionist. If you think of those energy losses in terms of the vehicle's initial speed, each can be represented by an increment of that speed. When these values have been tabulated, they cannot be added arithmetically (as 10 plus 20 equals 30) but must be added algebraically (by the sum of the squares method). In other words, if the skidding portion represented a 40 mph speed loss, the damage represented a 20 mph speed loss, and the post-collision travel represented a 10 mph speed loss, the speed at the initiation of skidding was the square root of the sum of 40 squared plus 20 squared plus 10 squared, or approximately 46 mph. This can also be appreciated more fully by recalling that a vehicle which is traveling twice as fast will skid to a stop in four times the distance.

An issue which frequently develops for the accident reconstructionist is the value of the drag factor. There are several aspects to that topic. One aspect involves the variability of test results: taking one car and skidding it over the same surface for ten times will (probably) give ten different results, but they should be similar. For example, one might expect that all ten experiments would produce results between 0.76 and 0.84. The weighted average might be 0.80. So, for that vehicle skidding on that surface, you would use 0.80 plus or minus 0.04. Or, you could simply use the tabulated range of 0.75 to 0.85. Do the arithmetic yourself; you won't notice the difference between the results you get from your experiments and the results you get using tabulated values. Another aspect of that topic relates to variations between different cars and different tires. In general, there will be only minor differences in braking performance achieved by changing tires on a particular vehicle. There are some vehicles, however, which have inherently higher performance and will stop shorter than their more tame cousins. In other words, you can't expect a station wagon or minivan to stop as quickly as a sports car.

Another issue relates to vehicles with an anti-lock braking system (ABS). Currently produced vehicles with four-component ABS can generally stop shorter and straighter under virtually all pavement conditions, including wet roads and slick patches along the deceleration path, then can their non-ABS-equipped brethren. Many vehicles with ABS will leave identifiable marks during skidding, but those marks are generally different in appearance than the skid marks created by vehicles without ABS. In calculating speed loss, one must use a higher value of drag factor for an ABS-equipped vehicle than for one without ABS. For example, where a sedan without ABS might decelerate at a factor of 0.8, a similar sedan with ABS might decelerate at a factor of 0.85, 0.90, or even higher. Although it was generally true that vehicles with first-generation ABS would usually take more distance to stop on a wet road, more modern ABS systems have rendered that generalization invalid.

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Or, you may contact me directly with your questions, by the method of your choosing.

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