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Minimum Speed Calculations from Skid Marks on Various Roadway Surfaces

by Todd Hutchison

Whether a vehicle skids on a dry, new, sharp Portland Cement roadway or an ice covered hillside, if a proper determination of the drag factor and length of the skid marks is known, a minimum speed of the vehicle can be obtained. The minimum start of skid speed is calculated by using the following minimum speed formula:

$$S = \sqrt{30d(f+g)n}$$

S=minimum speed in MPH at start of skidding

d=skid distance measured in feet

f=friction factor where the skidding occurred

g=%grade .01 for every % grade, +for uphill, -for downhill

n=brake lock-up factor

The distance portion of the formula is the total distance of the skid marks in feet, less the wheel base (the distance between the front and rear axles).

The friction factor is the coefficient of friction of the roadway surface

where the skidding occurred, and this takes into consideration the slope of the roadway. This is done by adding or subtracting the % slope of the roadway to or from the level roadway coefficient of friction. If the level roadway coefficient of friction is .7 and the accident occurred on a 5% down grade, the adjusted coefficient of friction would be .65. (Example: .7 - .05 = .65)

The brake lock-up factor is 1 for automobiles and pick-up trucks that have all 4 wheels locked at the time of the skidding. If the vehicle is equipped with a ABS braking system, the skid marks may not be seen as easily. ABS brakes will leave skid marks on the roadway, but generally they are much lighter and not as easily seen. These marks do not stay on the pavement as long after the accident. When all of the ABS brakes are working properly, the vehicle will have a conservative "n" factor of 1.0, and the vehicle will maintain steering capacity.

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Table 1 shows a range of coefficients of friction of various roadway surfaces.

Table 1: Tire-Roadway Friction Values

SURFACE	DRY		WET	
	-30 mph	+30 mph	-30 mph	+30 mph
Portland Cement				
New/Sharp	.80/1.20	.7/1.00	.50/.80	.40/.75
Traveled	.60/.80	.60/.75	.45/.70	.45/.65
Traveled Polished	.55/.75	.50/.60	.45/.65	.45/.60
Asphalt / Tar				
New/Sharp	.80/1.20	.65/.100	.50/.80	.45/.75
Traveled	.60/.80	.55/.70	.45/.70	.40/.65
Traveled Polished	.55/.75	.45/.65	.45/.65	.40/.60
Excess Tar	.50/.60	.35/.60	.30/.60	.25/.55
Gravel				
Packed/Oiled	.55/.85	.50/.80	.40/.80	.40/.60
Loose	.40/.70	.40/.70	.45/.75	.40/.75
Cinders				
Packed	.50/.70	.50/.70	.65/.75	.65/.70
Rock				
Crushed	.55/.75	.55/.75	.55/.75	.55/.75
Ice				
Smooth	.10/.25	.07/.20	.05/.10	.05/.10
Snow				
Packed	.30/.55	.35/.55	.30/.60	.30/.60
Loose	.10/.25	.10/.20	.30/.60	.30/.60

Note that the speeds calculated from using the above published coefficients of friction tables are estimates only, and whenever possible an inspection of the roadway surface should be made to determine the actual coefficient of friction. Also, this formula only gives the minimum speed that the vehicle was traveling. In cases where heavy crush damage resulted from the collision, the speed of one or both of the vehicles involved may be much higher.

Call one of VCE Investigative's skilled Investigators to help with all your Vehicle Accident Reconstruction questions at (615) 781-3844.

Recent Changes to the Tennessee Blasting Laws are Enacted

Beginning in October all blasters renewing their license will be required to show completion of continuing education classes. The new law requires 5 hours of continuing education for all blasters renewing their license in 2004. At present there are a limited number of approved courses for blasters to take.

While several other administrative changes were made to the Laws and Regulations governing the enforcement of the Tennessee Blasting Standards Law, there were no major changes made to the vibration limits established by the Law and the Standard Table of Distances contained in the Law, which govern how blasting can be safely conducted around residences and commercial buildings. The vibration limit is still 2 inches per second peak particle velocity.

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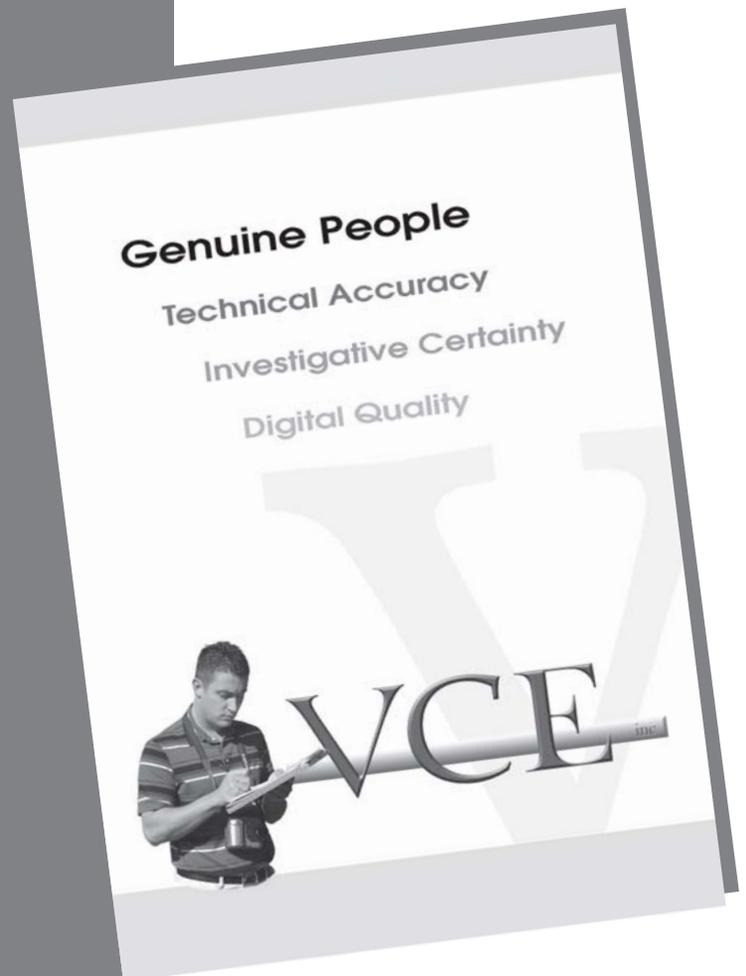
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The logo for VCE inc, featuring the letters 'VCE' in a large, bold, serif font with a horizontal line through the middle. The word 'inc' is written in a smaller, lowercase font to the right of the 'E'.

Logo Makeover!

We have enclosed with this newsletter mail-out one of our new company brochures which features the look of our new logo.





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VCE, Inc. began operations in 1975, and our key employees now have 200 plus years of experience. All of our Investigative services are enhanced by this collection of experience.

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