



Teaching the “Right Stuff”

The first of a series of articles on Teaching the “Right Stuff.”

Prevent SUV Rollover Crashes

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Driving an SUV poses several conditions that put the driver at increased risk of having a crash. And, according to NHTSA, rollover crashes account for most of the recent increase in SUV fatalities.

Most driver training programs use vehicles that are small and economical to operate. Does that mean we cannot teach SUV survival techniques? Absolutely not! You can teach the “right stuff” in any vehicle, and it should apply to all vehicles. Whether a motorcycle or an eighteen-wheeler, visual perception training to manage space is the same. If we isolate the true essence of the art and science of driving the only differences between vehicles are the options a driver has prescribed by the limitations, or capabilities, of the vehicle.

We need to prepare drivers during their initial training on how to control the vehicle from getting involved in a crash - and the techniques that we teach need to apply to all vehicles, especially SUVs.

The probability of having a rollover crash in an SUV increases as size and speed increases. The bigger the SUV and the faster it is traveling the greater the rollover risk becomes. Ford Motor Company recently had to pay a multi-million dollar settlement in a class action suit for falsely advertising the safety of SUV's. As part of their settlement, a program was developed to reach a major target group of 18- to 34-year old male drivers. This program is an after-licensing attempt to correct a problem: licensed, experienced adult drivers, not only teens, are not properly trained to operate an SUV when a normal situation turns into a demanding, split-second, out-of-balance maneuver.

Among the many factors that increases the risk of a rollover fatality are: excessive speed for road conditions, excess speed entering a cornering situation, being surprised by LOS-POT (Line-Of-Sight, Path-Of-Travel) blockages that suddenly reduce the space the driver intended to occupy, following others with less than four seconds of space, overloading, or improperly loading, passengers and cargo, not maintaining high enough tire pressure, and failure to wear safety belts. All of these factors, when they occur, can be classified as errors in prevention. The driver could have taken a different action to prevent the SUV from getting into an out-of-balance condition.

A rollover is the result of an out-of-balance condition that was not corrected. The only time the vehicle is in balance is when it is parked with no one in it. As occupants get into the vehicle the weight distribution is changed. When the driver applies the brakes there is an out-of-balance pitch axis sending more weight to the front of the vehicle. When acceleration takes place there is a pitch force to the rear of the vehicle. When the steering wheel is turned to the right there is a roll force exerted to the left side of the vehicle. So, as braking, steering and acceleration take place there is always a change in the pitch and roll axes.

Performing an evasive steering maneuver requires at least three steering actions. When the first steering action is taken, there must be without any delay, a second steering action in the opposite direction that is twice as great as the first steering movement. The reason for the second steering action is to counteract the roll forces of the first steering action and to bring the vehicle back to its travel path. The third steering action of an evasive maneuver is the same as the first. Its purpose is to counteract the roll forces of the second steering action and to get the tires tracking straight. The reasons drivers end up rolling an SUV are an excessive first steering action and a failure to immediately put in the correct second steering action. The first steering action is as easy as a knee-jerk reaction. However, unless the driver has received training in perceptual guidance with the eyes directed to the proper place, the vehicle rolls over before the second steering action is taken.

A driver operating an SUV at 70 mph in the left lane of an interstate highway experiences a tire blowout. The SUV begins to swerve towards the guardrail that is 18 feet away. What action must be taken and how much time is there to get the SUV back in balance? A steering action, with the driver's vision directed to the target area (space to the horizon in the center of the travel lane) and feet off the pedals is correct. There is one-third of a second before the guardrail is hit. Two wrongful actions take place with the untrained driver. First, he doesn't respond to the situation until the vehicle is off course heading towards the guardrail; and secondly, he looks at where the vehicle is going, not where he wants it to go. The SUV hits the guardrail and begins to rollover. When the occupants are not belted, there is the increased risk of being ejected.

Vehicle Control and Perceptual Guidance

There are so many dimensions to driving that sometimes we only see the basics. Driving can be broken down into two learning tracks: vehicle control and perceptual guidance. Vehicle control is easy to see and easy to learn. Perceptual guidance is sometimes never learned. It is, however, the inputs a driver receives from perceptual guidance that determine when and how the outputs are transformed into vehicle control. For example, if perceptual guidance fails to input to the driver the presence of a stop sign, then there is no vehicle control in response to the stop sign. Or, if perceptual guidance inputs were not received until the last two seconds and the input of vehicle control transforms into the driver slamming on the brakes to stop, the driver to the rear may not have had perceptual guidance inputs that the car in front was going to make an unexpected stop. So, there is a rear-end crash and a failure of perceptual guidance by both drivers. Both drivers had the potential skills to achieve vehicle control but did not have enough time and space to effectively use them. Therefore, it is effective perceptual guidance that gives the driver time to be able to implement the necessary vehicle control outputs.

Now we come to the problem of SUVs. The problem with SUVs is that when there are late perceptual inputs, the vehicle control outputs are significantly more demanding than that of a smaller vehicle with a lower center of gravity and a more responsive tracking ability.

Your Students Need You

To develop perceptual guidance effectively a driver needs to learn how to use a set of tools that can only be acquired and developed during a structured driver-training program. Your students need you so that they can learn the right stuff. What a driver can learn without your teach-

ings are the basic vehicle manipulation skills: how to use the accelerator, brake pedal and steering wheel during routine situations. However, these basic skills fall short when there is a sudden demand placed upon the driver to perform precise output of vehicle control within the blink of an eye. That is then where an internal value system of autonomous skills must surface — and, that requires your training.

I am fortunate to have had the opportunity to train licensed and novice drivers in the detection and correction of an out of balance vehicle condition. In a vehicle equipped with a device called the Skid Monster we can recreate the sudden loss of traction to the rear wheels, or experience the equivalent of a 70 M.P.H. evasive steering action. When a novice driver is taught how to use the tool of “targeting”, where the eyes are trained to lead the movement of the vehicle’s tracking path, we see the “never been behind the wheel” student able to detect and correct an out-of-balance condition better than many drivers who have had years of experience. The secret is that the novice driver is taught, in the Skid Monster, what to look for as an unacceptable “off-target” condition and how to immediately take a proper corrective action. When we put drivers into the Skid Monster, whether it is a police officer, driving instructor, or the novice driver, during the first few minutes of driving when the vehicle spins away from the intended tracking path the driver, almost without exception, looks at where the car is going. After learning how to use vision correctly the transformation of car control is remarkable.

The average driver has not received perceptual training. The events that lead up to a crash don’t just happen within a split second. When a driver knows what to look for, the potential loss of vehicle control can be detected, prevented and controlled several seconds ahead of time. How do we do it?

Need to FIND, SOLVE and CONTROL a Problem

Drivers need to learn how to “Find” and “Solve” a potential problem 12-15 seconds ahead and how to “Control” the situation as the vehicle gets within four seconds of it. The student must learn, and practice, during several in-car sessions how to effectively use lane positioning, speed control, and communications. Seeing a parked delivery truck 12 seconds ahead on the right side of the road gives ample time to evaluate the best choice of lane positioning, speed control and whether there is a need to send communications. The driver is not going to crash into that truck while 12 seconds away, nor while 4 seconds away. The crash is going to occur when the driver is zero seconds away. Therefore, when at the four-second danger zone, the driver needs to re-evaluate speed selection, lane positioning and communications as if their life, or the life of a child darting out from the front of the truck, depended upon their choices, as we well know it does.

The last four seconds before a motor vehicle crash is the driver’s last opportunity to control whether one lives or dies. It’s the last opportunity to control whether one becomes paralyzed never to walk again, or in a coma for years on end, putting loved ones into a living nightmare of mental anguish and despair. It’s the last opportunity to control whether one will spend years in prison remembering the curve in road where the best friend was killed as the car slammed against a tree. If only, if only those last four seconds could be relived! How much would the family of anyone involved in a serious crash be willing to pay to get those last four seconds back? Well, you can sell anyone control over those four seconds by teaching them the “right stuff”.

Misdirection of Eyes Leads To an Out of Balance Condition

In order to find a potential problem in a timely manner, we need to know what to look for. In order to know what to look for, a mental image must be presented often enough for unconscious awareness to occur. If you saw a child climbing onto an open window ledge that was on the fourth floor, would anything else matter at that moment besides making a very conscious attempt to get the child back to safety? We know from early on that falling from high places will cause bodily damage. We also learned that if we run and slip on a banana peel we are likely to fall and get hurt. Just think about running at full speed and stepping on a banana peel unexpectedly with one foot, while the other is in the air. We would be off balance and unprepared. It would be very challenging to get the body back in balance. If the runner looked down at the foot while trying to get the body back in balance, there would be a disastrous fall, even for a good athlete. Looking down at the cause of the unbal-

anced condition, at the precise fraction of a second when vision is needed to get the body back in balance, increases the off-balance condition. What the runner must do is lift the head up and look to the horizon to let it serve as a reference to tell the body what corrective adjustments to make. For a driver, when the vehicle gets out of balance it is most important to have the discipline to not look at where the vehicle is going, to not look at what caused the problem, but to look to the horizon to steer very forcefully and deliberately to the path the vehicle was tracking before the incident occurred. From the first in-vehicle session we are able to teach a driver how to use a very powerful tool—targeting. Targeting gives the student practice throughout the training process on how to develop looking to the horizon into habit. Whether it is a tire blowout, a rear wheel skid, or an evasive steering action the eyes must lead the hands and feet to get the vehicle back in balance without hesitation and with the sureness of a Blue Angels pilot.



You are driving an SUV when it hits a patch of black ice and suddenly it is spinning towards the school bus. Where must you look? To the target area! However, the untrained driver will instinctively look at the school bus.

The Tool of "Targeting"

Students learn how to use targeting in the classroom before applying it to an in-vehicle session. The classroom activities are able to give the student physical-equivalent-mental-rehearsal opportunities to prove that they are able to use the "tool" of targeting. Once successful usage is demonstrated in the classroom, then, as soon thereafter as possible, the student should apply that same process during an in-vehicle session

Classroom Activities Save You Time and Money

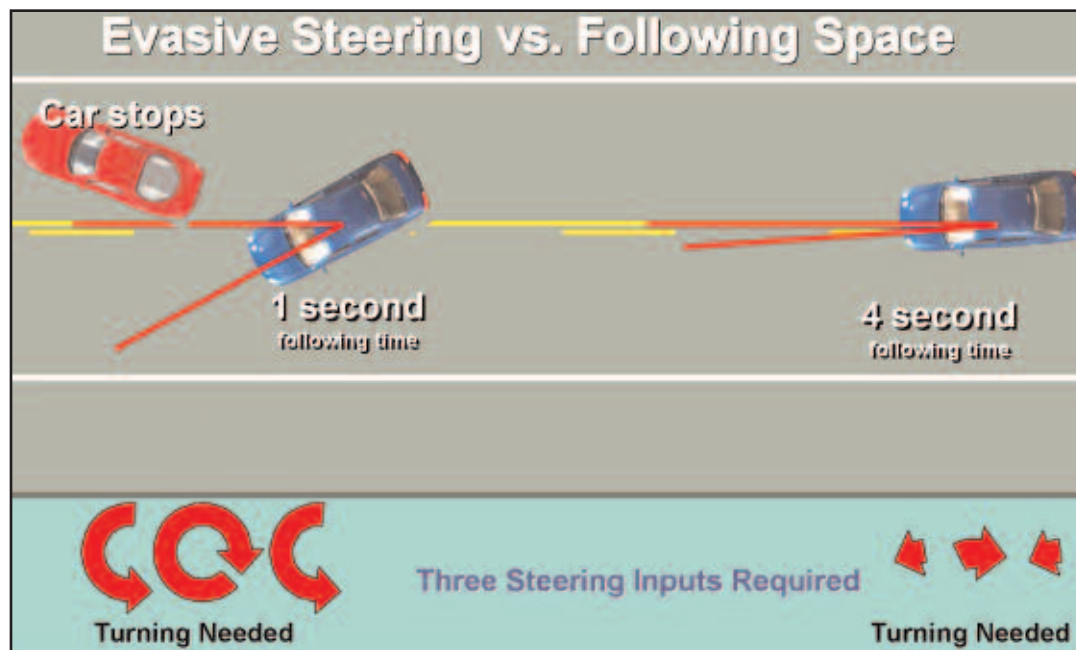
How to locate a target can be practiced in the classroom, or, you can take the whole class outside and practice selecting targets in a parking lot. It's a good learning environment. You can spend 10 minutes in the parking lot performing physical-equivalent-mental-rehearsal of targeting skills by having the students hold a simulated steering wheel (plastic picnic plates can be used, or you can purchase a set of steering wheels at www.NIDB.org), while you direct them to walk towards various targets. Everyone has a good time. The students love it. And you, as the administrator of the program, will save money. If you have a class of 30 students, you spent 10 instructor minutes preparing all of the students with skills that would have taken 10 minutes for each student to accomplish in the vehicle. That would have cost 300 instructor minutes; you saved 290 minutes of valuable in-car instructor time. Imagine the savings if this same ratio is applied to many of the other skills and behavioral patterns the students must learn. It surely can improve the quality of in-vehicle activities when the student has already demonstrated some success of the expected performance.

The following behaviors can be practiced in the classroom using the simulated steering wheels: Positioning hands on the steering wheel. Gripping of the steering wheel. Turning of the wheel techniques. Target identification and targeting. Using central vision to see target. Using fringe vision to see positioning. Checking the left, front, right zones before turning steering wheel. Turning head in direction of steering before steering. Seeing targeting path. Using transition pegs for steering recovery

In-Vehicle Targeting Practice

This activity will require the student to drive back and forth from one end of a parking lot to the other to begin perceptual training. Select targets at eye level on the perimeter of the parking lot.

Aiming for Targets: Have the student identify a target, check the left, front and right zones to be certain the path is clear, then turn her head before moving toward the target. While aiming for the target, have the student keep the car straight in its travel path. After the student



has success keeping the car on target, give the command to steer off target to the left or right, then get back on target. Make certain that the student keeps her head focused on the target while the car is moved off target. This will simulate a skid situation when the car moves off target. It represents what would happen if the car went into a rear wheel skid.

On-Target, Off-

Target: With the car going 10-15 mph in a parking lot clear of obstacles, have the student release grip from the steering wheel, but keep hands hovering near the wheel. You grip the wheel and quickly pull it off target. The driver must, as soon as the car is off target make a spontaneously steering action to regain control on target. This activity will come close to representing a rear wheel skid, demanding the student to look to the target area and immediately take the correct steering action.

Having four seconds of space is the right stuff. When a driver is traveling at 70 M.P.H. and traffic ahead comes to a brake-slamming stop, a driver with four seconds of space has four seconds of time to brake, or if needed, to take an evasive action. The driver with one second of space only has one second to brake and/or steer. A braking action will not stop the vehicle in time. To take an evasive steering action would require the driver to make a half turn of the wheel to left, a full turn to the right, and another half turn to the left (see the illustration). And, all three of these steering actions must be performed within one second. The first steering action comes instinctively. However, if there are two empty lanes and a guardrail to the driver's left, *the SUV will be in the guardrail within one-half second after the first steering action* and then it rolls over.

Imagine that! You can teach, in your car, in a parking lot, the essential visual perception skills a driver needs to keep any vehicle in balance, especially an SUV.

If you would like to have in-depth details on how to conduct activities in the classroom and in the vehicle to keep the car in balance, you can e-mail me at Fred@NIDB.org and I will send you free materials.