SKIDCAR SYSTEM 2023 White Paper

SKIDCAR SYSTEM, INC (SSI.) has continually upgraded our curriculum to present to include training and support materials which address driving new vehicles with Electronic Stability Control. Most academies continue to address skid control with decades old methodology and physical training aids. The SKIDCAR™ can certainly address and deliver the standards mandated for training in yesterday's curriculum, but more importantly, we are the "state of the art " for validating and objectively learning how to migrate from analog to electronic vehicle control techniques.

We have been delivering ESC driving information to federal, state, and local police agencies since 2007. Our award-winning ESC Workshop for EVOC Instructors has been presented and made available for over 10 years. For the past 6 years and attendees have represented more than 150 departments. 2023 will bring many years of development and digital integration into our curriculum, focused on using the SKIDCAR SYSTEM in updated standards with technically correct and defensible exercises, classroom content, and outcomes.

A short SKIDCAR SYSTEM descriptive:

The SKIDCAR SYSTEM is attached to a motor vehicle in order to duplicate dynamics within a lowered speed. This allows critical driver training to be presented in a small area, at a secure speed, for safety and cost efficiency. Most SKIDCAR SYSTEM's have been in the field working for well over their designated life span of 10 years, and in the majority of cases the SKIDCAR equipment has outlasted the original vehicle it was attached to. Conversion kits, complete spare parts kits, Re-Certification and new Instructor Certification sessions are available to make the capital investment in SKIDCAR one of continued value. SKIDCAR SYSTEM INC is the only driver training company that has offered an EVOC and driver training industry symposium directly targeted at modern training concepts both with and without using our equipment.

The SKIDCAR is the only training tool on the market today that is adjustable for co-efficient of friction while in movement. Multiple memorized settings for both front and rear contact patches, plus HAL Controller custom calibrations, all come as standard with the SKIDCAR SYSTEM. After Instructor Training, your staff can quickly, easily, and consistently calibrate grip settings for duplication of a variety of grip scenarios, including adverse weather conditions. From wet roads to black ice, or traveling at a high rate of speed on dry pavement, SKIDCAR can bring a degree of realism that has no disconnect ie. skid pans, tire rings, and homemade manual lifting mechanisms that are too unrealistic and embody technically incorrect control actions.

With both journeymen and millennial drivers in mind, properly trained SKIDCAR instructors can create a driving environment where technically correct vehicle control concepts and techniques are instantly validated, in safety. The basics of car control still apply, as do physics. The steering wheel is now an elaborate multifunctional tool for communication with safety systems,

monitored by the vehicle. Much more elaborate than the brake, gas, and seat of the pants techniques used for control in older vehicles. These new vehicle control programs are engineered to NHTSA and internationally approved standards, and rooted in a base concept that assumes the driver knows how to drive the vehicle in a correct and safe manner.

Much like firearms training and defensive tactics, the SKIDCAR can isolate understanding and physical control problems. Using the SKIDCAR SYSTEM's exclusive Safe Speed Threshold course design, students receive the desired difficulty, consistency, and repetition to make proper motors skills training a reality, while utilizing a much smaller area than is required for successful use of other driver training devices.

SKIDCAR SYSTEM Course Design for Adverse Weather Conditions or Basic Vehicle Dynamics:

With modern use and recent new curriculum changes, we have simplified the driving lesson plan to be faster, more complete, and a more objective process for modern principals of vehicular control. Firearms, defensive tactics, and motorcycle operation all have much in common with the motor skills and thought processes important to driving a vehicle. We have aligned driving with the other physicals skills of Law Enforcement and brought the basics back to EVOC. These basics can also be applied to any driver outside of LE.

Example Course and lesson plan overview:
Each student is given 5 minutes to practice. The average lap time is 30 seconds. A short, 5 minute drive turns into 10 laps of repetitive practice for control. Vision, steering, braking, and throttle control are all experienced and must be repeated successfully. Because of the difficulty built into the varied grip settings, 5-minute sessions behind the wheel turn a discovery drive into a very disciplined time to concentrate, understand, and plan for strategic decisions to be assessed and implemented. In most cases, the SKIDCAR course is lined with cones or painted paths of travel. The driver is required to stop the vehicle if they are going to leave the course, then back out of the off course excursion and re-enter the course without hitting or displacing cones. This starts the thought process of "JUST STOP!" Just Stop is a more practical solution than the challenges of superior car control when a mistake has already been made in adverse conditions.

1) Identify in proper sequence the following components that make up stopping distances: perception of danger, decision time, reaction time, braking distance.
2) SIPDE: Search-identify-predict-decide-execute
3) Demonstrate proper procedure for operating an emergency vehicle during adverse weather conditions.

SKIDCAR SYSTEM INC utilizes a cognitive program with which we can plug in varied coefficients of friction to use for surprise driving events. Furthermore, the SKIDCAR can be set up in seconds to facilitate the simple use of braking correctly, then braking too late or too much. Ultimately, the consequences of bad decision making become real.

Using the ATSS Smart Light System adds to the objective measurement of understanding braking techniques when surprised, or when maximum braking has been decided as the best solution. The SKIDCAR allows for acknowledgment of how ABS systems work and feel. It allows for practice of the ABS basics of stab, stay, and steer to avoid objects by directional changes under steering commands. During this exercise, a driver learns the importance of perception, recuperation if possible, plus the reality that there are some consequences to action that cannot be repaired.

The SKIDCAR is set up to a push or primarily under steer, duplicating adverse weather conditions. During the course of driving through a modified oval, the driver will experience loss of grip when improper driver inputs are made. Corner entry, corner exit, and situational practice will occur from start to finish of the corner. Because the SKIDCAR is preset to the required grip for all students, the instructor as well as the other students have a front seat to the techniques, attitudes, and understanding of car control needed to pass the test. We do not change the setting to give unrealistic control issues. It is entirely up to the driver to learn the solution for their own inability to control the vehicle to course expectations.

Example Exercise Layout:
Using each straight side of the SKIDCAR small oval course with dog leg, minimal specialized cone displacements are necessary. SKIDCAR is set to a difficulty level duplicating 60 to 70 MPH dynamics.

1.0 Straight line braking from 30 - 35 MPH. The driver is asked to demonstrate 100% emergency braking. Complete three repetitions.

1.1 Braking, then turning under 100% braking. An offset lane change takes the driver through a braking and turning Maneuver. Complete three repetitions

1.2 Turn, brake, and crash. The fatal mistake drivers make when avoiding or swerving away from an obstacle, then braking once rotation has been realized. Complete two repetitions.

3) Demonstrate proper braking methods while operating a vehicle during skid situation.

The SKIDCAR can be adjusted to validate proper braking methods and techniques. A simple push of a button can isolate front or rear contact patch issues and show the driver where their thought process, lack of planning, or misunderstanding of basic concepts caused the problem.

Objective completion and grading is possible as each exercise can be done at the same grip level. If the ATSS Smart Light System is used, braking, avoiding, and intersection clearing while braking, can all be effectively taught. In old curriculum, brakes are acknowledged as what is used to slow or stop a vehicle. Today the brakes are used as tools by the engineers of these ESC programs to generate stability and grip. We offer advanced driver understanding of this concept to promote driving *with* the vehicle instead of against it. Furthermore, new

ESC equipped vehicles have the capability of being able to stop in a radius at high speed. Even in a corner, the new vehicles with ESC, ABS, TC, advanced braking systems, and advanced suspension engineering, can be safely stopped when needed. JUST STOP is the maxim for today's drivers.

4) Demonstrate proper steering methods while operating a vehicle during a skid situation.

ESC and modern technology result in a new found need for understanding correct steering techniques, and therefore maximum grip for steering solutions must be understood. Over and under steering events previously taught for vehicle control no longer exist in today's modern autonomously controlled cars with ESC. Rotation using the front or rear wheel axis can no longer be accomplished without ESC systems activating programmed electronic solutions for directional change that do not match old control techniques or results. The driver must realize that they cannot change direction with the brake or gas by using a slide as they used to. Within these ESC controlled grip repair events, the driver is getting fewer clues that the ESC has been activated and is trying to correct the vehicle's trajectory. The driver used to be able to read what the car needed in order to gain control. Now it is almost impossible to determine exactly what the car is doing. The driver must beware of how to interface with the car's control systems.

5) Demonstrate proper acceleration methods while operating a vehicle during a skid situation.

The driver bases the difference in modern driving techniques on understanding how the throttle is only controlled part time. Two systems are used for controlling wheel spin or slip: Electronic Stability Control covers slip (yaw) and Traction Control covers wheel spin through acceleration. Over-use of the steering wheel in regards to path of travel can cause the traction control to activate, limiting access to torque and reducing control by blocking more throttle. The old standard of "when in doubt, stand on the gas" does not work today. Influencing directional control and spinning the wheels for optimum launch, no longer exist with today's modern cars. Drivers who have fought long and hard to control their vehicle with the throttle have no solution with the new cars of today. Even if the steering wheel is straight does not mean that 100% gas can be implemented for acceleration. A very short and straightforward exercise in the SKIDCAR can prove beyond doubt what the difference is from manual throttle control and electronic throttle control. The SKIDCAR can offer the perfect conditions of not too slick, and not too much grip, to expose drivers to the real outcome of ESC, TC, and its suite of increasing technologies to help with control.

6) Demonstrate the ability to regain control of a vehicle experiencing an under steer.

Front wheel skids, also described as push, plow, or understeer, are the outcome realized by too much speed, too much steering, and/or the incorrect perception of impending loss of control responsible for crashing a modern car. The technically correct knowledge of how tires contribute to grip, and what turning those tires does to grip, can be easily taught in the SKIDCAR. Instant validation when the driver steers too much, too late can be realized and repaired through repetition. The same can be realized if weight transition is improperly placed where needed.

7) Demonstrate the ability to regain control of a vehicle experiencing an over steer situation.

A rear wheel skid, fish tail, power slide, or over steer is what ESC and Traction Control are designed to eliminate. Modern systems make over steer a problem only in over driven analog cars without ESC. If the vehicle's position is maintained on the roadway, and that roadway is clear of ice, snow, and loose debris, it is practically impossible to spin a car out through activation of a rear wheel skid.

In adverse weather or loose surface conditions rear wheel slides can occur. The fix for this event is contained in the steering, which will communicate with the ESC algorithm. The ESC and TC will continue to control how much throttle or brake can be used, and when. The driver is helpless except for steering.

Traction control can be turned off in all new vehicles. Traction control can only allow tire slip at 0 to a very shallow degree of yaw. Once the car starts to yaw, the ESC system steps in to control the amount of slip.

8) Demonstrate the ability to regain control of a vehicle experiencing an all-wheel skid.

With the advent of mandated control technology as of model year 2012, the only reason for an all-wheel skid is through inappropriate action, overreaction, or surprise by the driver. The SKIDCAR SYSTEM is the ONLY technology available today to expose drivers to the intended design and implementation of autonomous and semi-autonomous vehicle control features. With mixed fleets, the agency can defeat the controls and train old skid control techniques for use in older cars and SUVs only. New vehicles are designed to push or under steer first, then control the rotation of the vehicle per driver steering input. The obvious outcome is that there is no solution, correction, or recuperation when a modern car is driven outside the engineering envelope of ESC that is written around the laws of physics. You make bad decisions, drive too fast, you crash

For more information, contact SKIDCAR SYSTEM INC at (866) 754-3227
or via email at info@skidcar.com.