

United States Driver Training

A blueprint for the future

Applying proven driver training practices to save lives

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SUMMARY

This paper focuses on the implementation, development, and effectiveness of European advanced driver training programs. These programs are taught in scientifically engineered track environments that use slippery surfaces to reduce tire-to-road friction for the purposes of teaching vehicle maneuvering techniques safely. Types of maneuvers conducted during training include over-steer and under-steer, emergency evasion and lane change, braking, and slide control among others. Throughout this paper this form of instruction is referred to as Slippery Track Training (“STT”). Key points:

1. US driving-related deaths total over 40,000 annually.
2. European countries that have successfully implemented STT have drastically reduced driving deaths such as Finland. As indicated by the “DAN Report 2000”, which states; *“The general accident statistics also show that the total number of accidents decreased by 22.6% between 1989 to 1995, from 100,996 to 78,211 accidents. The pre- and post-renewal groups were compared...”*¹
3. STT is now mandatory in many European countries. This began in Luxembourg 1995-96, and further reductions in accidents occurred as a result. As indicated by the “DAN Report 2000”, which states; *“The 34.3% improvement of fatal accidents for novice drivers, before and after the second phase training started in 1996, is a statistical fact.”*²
4. Certain groups in the United States such as vehicle insurance providers have actively resisted supporting STT practices because the misconception exists that they are unsafe.
5. Claims in the United States that STT is unsafe are based on outdated research conducted in Norway in 1988 (Glad 1988)³.
6. The appropriate improvements and safety measures have been applied to the old standards referenced in the Norway study (Glad 1988), resulting in measurable results and success across Europe.
7. The United States has not yet implemented the new European safety measures with regard to STT programs taught here in the US and thus, the misconceptions continue.
8. The purpose of this white paper is to explore the differences between STT practices that have been successfully applied throughout Europe compared to STT programs provided in the US, and to clarify the misconceptions as to the dangers and benefits of these programs. Ultimately, the goal of the author is to raise awareness to the fact that a solution exists that will benefit Americans, and that we need to investigate how to implement this solution here in the United States.

¹ DAN Report 2000 page 76

² DAN Report 2000 page 147

³ Glad, A. (1988). Driver Training Phase 2 – Effects on Accident Risk. Oslo, Institute of Transport Economics

INTRODUCTION

Research clearly indicates that certain regions in Europe have dramatically reduced motor vehicle accidents due to mandatory STT. Conversely, this form of training is highly criticized in the United States for producing unintended results that have likely lead to an increase in vehicle accidents due to driver error. Our research indicates that the training can be safely and effectively taught here using the learning's from successful operations in Europe. Why is this important? In the United States, Motor vehicle crashes claim nearly 43 thousand lives, cause nearly 3 million injuries, and cost Americans \$230 billion annually according to various federal government sources. According to the American Automobile Association, a person is injured every 12 seconds, or dies every 12 minutes, due to motor vehicle accidents in the United States. Tragically, among these accidents, approximately 300 thousand teenagers are injured and 6 thousand killed annually. Every potential solution to reduce these statistics must be explored. According to the Centers for Disease Control (CDC):

”The number one cause of death in the United States in the 16 to 19 age group is auto accidents.”

How does the US rank compared to the rest of the world with regard to motor vehicle accidents? Kevin Wilson, in his recent Autoweek Magazine article entitled “Licensed to Die – American driver training and licensing don’t measure up to world standard,” (the text is available at www.Autoweek.com), states: “While our safety agencies have focused on vehicles, technology and litigation, other countries have zeroed in on the cause of most crashes: drivers. Through education and rigorous law enforcement, they’ve improved driver behavior and driver performance, yielding far greater gains in traffic safety than we’ve attained.”

According to Leonard Evans in his authoritative book “Traffic Safety”, in a chapter entitled “The Dramatic Failure of U.S. Safety Policy.” (the text is available at www.scienceservingsociety.com), it states; “with regard to reducing motor vehicle accidents, Australia, Canada, Denmark, Finland, Norway, the United Kingdom, the Netherlands, Sweden and Switzerland all went from trailing the United States to leading it,” Mr. Evans goes on to say, “In 2005, the US recorded 43,443 traffic deaths, the highest total in 15 years. Sweden recorded 440 – their lowest total since the 1940s. Among US states with smaller populations than Sweden, 23 recorded more deaths than Sweden, 11 more than twice as many, and one (NC with 1,534) more than three times as many.”

Most experts agree that implementing effective, but stringent, European traffic regulations in the United States is unrealistic due to cultural expectations. Some options would include increasing the age to obtain a learners permit from 16 to 18 in the US, or increasing traffic fines to very high levels. However, there are elements of European driver “education” that can be brought to the United States, specifically STT. This paper explores how these programs can help reduce accidents in the US by improving driver behavior while not adversely affecting our civil liberties.

CONTEXT OF SLIPPERY TRACK TRAINING

European Slippery Track Training is now mandatory in countries such as: Austria, Estonia, Netherlands, Sweden, Finland, Luxembourg, Switzerland, and Norway. However, in 1988 STT programs were nearly abolished throughout Europe. This was due to a particular study (Glad 1988), which revealed that Norwegian STT methods were increasing accidents post-training. The training emphasized technical mastery of driving skills (e.g. successful vehicle slide control) and as a result were dangerously increasing levels of confidence among student drivers. For example, an over-confident driver (predominantly male) had less incentive to slow down before driving a vehicle through a corner because a professional driving instructor taught him/her how to control a sliding vehicle. The result was an increase in single vehicle accidents. It was not until the study (Glad 1988) was conducted that evidence clearly indicated that STT as it was taught in Norway at that time changed the attitudes of drivers with negative results. Instead of abolishing the “Norwegian” form of training altogether, the Europeans realized that if behavior can be negatively changed perhaps it could be altered positively, as well. Beginning in Finland in 1990, a new STT training curriculum was successfully implemented. The new STT programs lead to measurable reductions in vehicle accidents by improving driver behavior. A shift to behavior modification rather than a skill based training curriculum was key. We will explore those changes and the results herein.

DISPELLING OLD MYTHS

The *old* Norwegian slippery track training methods are similar in many ways to those provided throughout the United States today. As a result, US based driver safety advocates, researchers, and journalists that write about this subject express concern regarding training provided by US-based STT schools. However, they incorrectly assume that training here in the US is similar to programs provided in Europe. Herein lies the root of the confusion and misconceptions that continue to be argued. European STT methods have evolved since the discoveries made in Norway in 1988, and new programs were implemented in Finland beginning in 1990. European studies on this topic refer to this transition as the **pre-renewal** and **post-renewal** eras. Post-renewal STT programs are literally 20 years ahead of the US with regard to research, development, and successful implementation. These programs have reduced accidents attributed to driver error in measurable ways, and continue to do so. Post-renewal STT methods are fundamentally different by comparison to those taught in the United States.

The following are examples of the shortfalls of US-based STT that were addressed within the Post-renewal transition in Europe over 20 years ago; In the US, driving instructors have no effective ways to measure a student’s actual skill level when driving. This is due primarily to the use of uncontrolled and unpredictable training environments such as parking lots. Without a purpose-built driver training environment, US instructors can not enable students to lose control of their vehicles safely, and repetitively. They also can not predict the threshold of control for any given vehicle consistently. Without the ability to know the speed at which a vehicle will reach the threshold of control, instructors lack the primary benchmark required to analyze driver

skill. Moreover, students themselves have no effective way to analyze their own mistakes, which cause a loss of control during training maneuvers. Due to the unpredictable training environment, instructors in the US are forced to focus training on mastery of driving skills as the benchmark. According to research this simple but critical fact leads to accidents (Glad 1988).

The aforementioned Post-renewal training methods developed in Europe address the shortfalls of “skills” based training. They are proven effective as indicated by numerous studies noted herein. This paper explores the differentiators between US and European STT philosophies. Specifically, we will explore changes made by the Europeans during the early 1990s that lead to mandatory STT for all newly licensed drivers in many countries beginning in Luxembourg 1995-96. Both the compulsory and mandatory Post-renewal programs lead to significant reductions in motor vehicle accidents. A European Community study completed in 2000 entitled “The Description and Analysis of Post Licensing Measures for Novice Drivers (“DAN Report”)” states:

“The 34.3% improvement of fatal accidents for novice drivers, before and after the second phase training started in 1996, is a statistical fact.”⁴

THE EVOLUTION OF ROAD SAFETY TRAINING CENTERS - TO GET RSTC YOU MUST UNDERSTAND THE HISTORY

To understand how the European STT solution evolved and how it can be applied in the United States, we begin by reviewing its history and in particular why a purpose-built driver training center is necessary to support the new training curriculum. Modern European Road Safety Training Centers (RSTC) evolved beginning in Vienna, Austria in 1984. These facilities are commonly referred to as RSTC. They were developed by a company known as Test & Training GmbH (T&T) in cooperation with Austria’s leading Automobile-club Österreichischer Automobil und Touring Club (ÖAMTC). The ÖAMTC is the Austrian equivalent of the American Automobile Association (AAA). T&T and the ÖAMTC operate 10 centers throughout Austria.

RSTC facilities and related STT methods have been developed, refined, and researched during the past 20 years. However, no such facilities exist in the US. Therefore, training methods with proven efficacy do not exist here, and neither do the results. The design of these centers and the technology involved to run them is highly developed to support methods known to measurably reduce motor vehicle accidents by changing driver behavior. There are three primary phases of development leading ultimately to the combination of new STT methods taught at RSTC facilities beginning in approximately 1979:

- Pre-Renewal of methods Phase I (1979 – 1990) - European STT fails (Norway)
 - Note: US driver training is in this phase

⁴ DAN Report 2000 - page 147

- Post – Renewal of methods Phase II (1984 – 1990) - European RSTC transition
- RSTC becomes mandatory Phase III (1995 – present)

DETAILED EXPLANATION OF EACH PHASE

Pre-Renewal of methods Phase I (1979 – 1990) - European STT fails (Norway)

In June 2007, the European Commission published a report entitled "Supreme - Thematic Report: Driver Education, Training & Licensing" in *Summary and Publication of Best Practices in Road Safety in the Member States*. This report reviewed the best practices in driver education and training throughout Europe. It states:

“In 1979 a 2 - phase driver training program was introduced in Norway. The post - test 2nd phase of training consisted of 3 courses: a defensive driving course (classroom), a slippery surface track training and a course on driving in the dark. The track training was designed to allow the novice drivers to practice emergency maneuvering. An evaluation in 1988 revealed that novice driver accidents had significantly increased as a result of the training. The increased accident risk is attributed to overconfidence, especially amongst male drivers, following the skills - based training. The training was then changed to focus more on risk awareness and hazard perception. The phenomenon of increased risk taking following skills based training has been replicated in several studies and has implications for all jurisdictions with track based training for learner / novice drivers.”⁵

The “old” Norwegian Slippery Track Training practices focused on technical mastery of driving skills. Loss of control of vehicles by students was considered unpredictable, dangerous, and as failure. While loss of control occurred, instruction techniques emphasized successful mastery of skills just like they do today in the US. Research determined that mastering vehicle control is not as important as understanding the psychology involved that motivates the driver. For example, this form of training did not provide awareness as to the consequences of wrong decisions made by drivers. The training did not make an impression as to the physical limitations of the vehicle, or help the participant understand their own limitations. As noted above, this form of training produced over confidence predominantly in young males who left training feeling like they could handle dangerous situations. It was later determined that this form of training actually reduced confidence in some drivers (predominantly females). This was due to increased fear during training maneuvers. Both situations lead to an overall increase in accidents attributed to driver error. What was needed was a way to identify the actual skill level of drivers and align their confidence with their capabilities. As described in the “DAN Report 2000,” which states:

⁵ Supreme - Thematic Report: Driver Education, Training & Licensing – page 90

“Skills for vehicle maneuvering and mastery of traffic situations are the basis for successful operation in traffic and these aspects should be learned well during driver training. Psychomotor and physiological aspects are important as basic requirements for operations at the lowest levels of the hierarchy of driver behavior. However, these skills are used under guidance of higher level goals and motives. The driver selects the style of vehicle maneuvering and the strategy in a certain driving situation according to his or her goals. This means, that in addition to the training of basic skills, driver training should be able also to deal with the higher levels in the hierarchy and take into consideration the driver's goals connected with driving and for example skills for dealing with social pressures during a trip. Driver's goals may have an effect on both, increase or decrease of risks.

A hierarchical approach to categorizing driver characteristics for the purposes of providing instruction was developed. As indicated below “Vehicle maneuvering,” which was the primary objective in the Pre-renewal era (e.g. mastery of skills) is now at the lowest level of the instruction hierarchy. “DAN Report 2000,” which states:

“Hierarchical levels of driver behavior (Adapted from Keskinen 1996)

- 1. Goals for life and skills for living*
 - a. Importance of cars and driving on personal development*
- 2. Goals and context of driving*
- 3. Mastering traffic situations*
- 4. Vehicle maneuvering*
 - a. controlling speed, direction and position*

*“The idea in a hierarchical approach is that **failure as well as success** at higher levels affect the demands on skills at lower levels. A person's general goals for life and the means for satisfying these (e.g. developing one's identity with car-and driving related activities), as well as a person's general skills for life (e.g. self control) can be considered as the highest level in the hierarchy. For example, a young male driver, who is very enthusiastic about cars and driving, and focuses on these interests as a central way for building up his identity will also select his driving context according to this motivational orientation. This will have an effect on the second level (goals and context of driving) as certain qualitative properties of exposure such as night-time driving with friends where the driver is looking for opportunities to show off. This inevitably affects the demands and selection of internal models for mastering traffic situations. The strategy might be for example to maintain as high speed as possible in all situations. High speed driving, then increases the strain on the information processing with the risk of overloading the processing capacity and this may in turn lead to misjudgments or other mistakes in traffic situations. With a high speed also the demands on vehicle maneuvering increase.*

Another example could be a driver with a safety oriented strategy and a neutral approach to driving. This kind of motivation very likely leads to moderate

speed and perhaps even to a decision not to drive. These kinds of processes could easily be imagined to be present in e.g. female drivers with little experience in driving or elderly drivers. When the driver feels worried about his or her skills for coping in difficult road-conditions and is willing to maximize safety, and at the same time has no ambitions connected with driving, i.e. a decision not to drive or driving with a low speed is not considered as a loser's strategy, a safe way of operation is easily adopted. This leads to a less demanding driving task at the lower levels of the hierarchy and the result will be a safe trip, even though the absolute skill level for e.g. maneuvering may not be perfect.

When viewed from this perspective, it is rather easy to understand why several attempts to improve safety by improving skills at the lower levels of the hierarchy (vehicle handling skills on slippery road) have actually failed to decrease accidents (Glad, 1988; Christensen and Glad, 1996), exclusive vehicle handling skills of race-drivers are connected with high number of accidents (Williams and O'Neill, 1974) or that some groups benefit from training to master slippery road-conditions and other groups obtain a negative effect from it (Keskinen et al 1992; Katila et al.1996). If increased skills, or even worse, imagined increase in skills (Gregersen, 1996a) are used to satisfy needs for maintaining as high speed as possible, the results are very likely to be negative. If the motivational level fails to produce a safe strategy for driving, no level of skills in mastering traffic situations or vehicle handling is high enough to compensate for this lack of safety orientation and to result in greater safety.”⁶

Post – Renewal of methods Phase II (1984 – 1990) - European RSTC facility transition

Due to the research conducted in 1988 and coinciding with RSTC facility development begun in 1984, a fundamental shift occurred with regard to STT training techniques beginning in Finland in 1990. Methods were completely redeveloped, and training facilities such as RSTC became necessary to support these new methods. The goal was to change the attitudes of drivers so that they develop a safe driving strategy every time they drive a motor vehicle on public roads. To satisfy the requirements of the new hierarchical approach developed to improve driver behavior it was determined that “new” STT techniques must focus on providing a student driver with insight into their actual skill level versus their self estimated skill level. The new training curriculum must increase awareness as to how their actions affect vehicle dynamics, and provide insight into the mechanical limitations of any given vehicle. The training must help students learn to anticipate dangerous situations to avoid trouble. Accomplishing this required a training environment where students could safely lose control of their vehicles on their own. This would enable students to experience the consequences of their mistakes, and learn to manage dangerous situations should they occur. The environment must also enable instructors to analyze student performance before, and after, the threshold of control is reached. Though it is not specifically stated in European research papers, it is commonly known in countries such as Austria that RSTC facilities provided the ideal

⁶ DAN Report 2000 – pages 19-21

format. As indicated by the “DAN Report 2000” regarding the “Finnish driver training renewal of 1990.” The report states;

“A new two-phase driver training curriculum was introduced in Finland in 1990. At that time the increase in accidents of the Norwegian two-phase system was already known (Glad, 1988)⁷. The focus of the Norwegian model was on improvement of skills for driving in difficult road-conditions. In Finland it was decided already from the outset to make a totally new curriculum, not only to add a second phase after the old training.” Additionally, “The aim of the new curriculum was to develop driver skills in such a way that the emphasis should not be mainly on technical driving and vehicle handling skills but more on higher level skills, e.g. anticipating.”⁸

THE RSTC SOLUTION - LEARNING BY DOING IS KEY

The changes made in Finland (1990) represent a radical shift away from training techniques similar to those available today in the United States. This is a fact that US-based researchers, driver safety advocates, and journalists consistently misinterpret when reviewing European research. The key to understanding the differences in training philosophies between US and European methods requires an understanding as to how purpose built training facilities such as RSTC are used to support unique STT programs. This combination has resulted in a paradigm shift in driving culture to one of awareness when behind the wheel versus complacency, or over-confidence.

Road Safety Training Center driver training modules are developed specifically to support a controlled, measurable, and failure-safe driving environment (for examples please refer to figures 1 and 2 below page 12). These modules enable a training curriculum to be shifted from a **“mastery of skills”** format to a **“failure-success”** based format. People learn through failure in school, in athletics, or while learning to play an instrument for example. Learning how to align confidence with actual skill level during dangerous situations is no different. Flight instructors require trainees to fly and land airplanes “dead stick.” This is a process where an instructor shuts down the engine during flight. The student must adapt to the situation and manage the gliding airplane. Altitude provides the time to address the situation, and professional observation enables safe simulation of hazard. The student has a chance to make mistakes and learn proper procedure in a realistic way. In essence, the process helps to align the trainee’s confidence with their actual skill level. Once the instructor understands the level of a student’s actual skill instruction can be applied effectively. A similar process was needed with driver training, and this is what the Europeans have developed with their Post-renewal STT programs and modern RSTC facilities.

All RSTC driving modules are designed to provide a safe environment to lose control of vehicles. This was accomplished by developing unique road surface materials and sophisticated water management systems combined with civil engineering methods

⁷ Glad, A. (1988). Driver Training Phase 2 – Effects on Accident Risk. Oslo, Institute of Transport Economics

⁸ DAN Report - page 71

that have evolved over time. Software was developed to control every aspect of the training environment. A new training format was conceived whereby instructors manage driver participation from control towers while maintaining contact with students using radios placed in vehicles (instructors do not ride in vehicles). This enables the drivers to make mistakes and overcome them on their own, and improves the ability of instructors to analyze student behavior. While photographs of an RSTC facility may look similar to programs taught in the US, further investigation reveals that they are radically different. For example, water is used in three ways (this can be seen in figure 2, page 12 below);

- First – unlike orange cones used by US schools, water is used to form surprise obstacles that remain in the driver’s line of sight during an exercise. This provides visual feedback.
- Second – water obstacles provide safe audible feedback when hit signaling to the driver that he, or she, made a mistake.
- Third – water is used in combination with proprietary road surface materials specifically to reduce the threshold of control of a vehicle to safe speeds.

All elements and components of each driving module work in unison to provide a controlled and measurable training environment that is predictable and safe. No matter what speed, weight, and momentum combination of any given vehicle—semi-tractor trailer, passenger car, mini van, or bus when driven through an RSTC training module the instructor knows the speed at which that vehicle will lose control – every time. It is physically impossible for a driver to control a vehicle in the RSTC environment past a certain point (i.e. the threshold). The threshold of control for the vehicle becomes the benchmark that the driver’s skill is measured against. Computer systems are used to monitor and measure the driving environment. Other elements involved (such as water, road slope, and slick surface materials) work in unison to reduce the “threshold” of control not only to a safe speed, but in ways that reduce the forces exerted on the vehicle while extending the period of loss of control. Extending the period after loss of control, safely, provides the student extra time to absorb the experience.

Despite repetitive loss of control, training is absolutely safe. Every competent involved with each driver training module is safety oriented and ample runoff space exists in each driving module to enable sliding vehicles to come to a safe stop. Vehicles literally slide and spin for many seconds, similar to losing control in winter conditions. The experience is analogous to the aforementioned flight school training.

As a result of the new training environment and failure-success based training process, drivers with lower confidence become less afraid and begin to focus on what they did wrong instead of their fear as indicated by the “DAN Report 2000,” *which states;*

“An increase in confidence in one’s own skills for driving in slippery road conditions and lower experienced risk became evident in the second questionnaire among the female drivers.”⁹

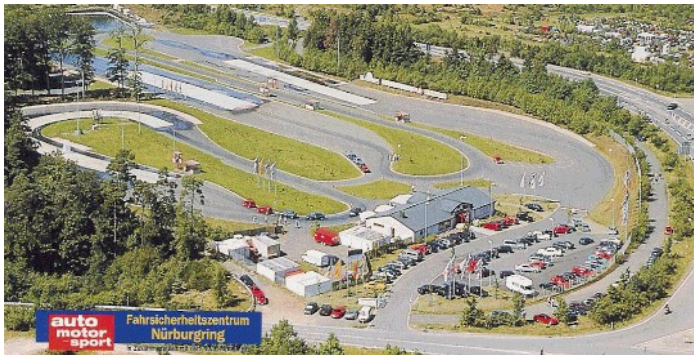
⁹ DAN Report – page 81

Drivers with over-confidence realize just how easily the threshold of control can be reached. In both cases, the students begin understand that they are not invincible, especially male drivers. As indicated by the “DAN Report 2000,” which states;

“The post-renewal male drivers were not as confident about their vehicle handling skills and their ability to operate in dangerous situations as the pre-renewal drivers. This kind of evaluation could also imply a safer and more cautious driving style.”¹⁰

Knowing the threshold and controlling the environment enables instructors to provide a failure-success based training process that increases awareness among students, but the key to successful impact with students is that they must learn-by-doing.

Figure 1 - Aerial view of RSTC facility located in Germany



From this perspective, the various driving modules can be seen such as: cornering, braking, lane change, and aquaplaning. The white strips represent slippery surface material painted on the course

Figure 2 - Driving module view of an RSTC located in Germany



From this perspective, some of the various components involved to create the failure-success based training can be seen such as: water obstacles, slippery surface material, and engineered road slope.

THE PSYCHOLOGY BEHIND RSTC (POST – RENEWAL CURRICULUMN)

A typical Phase II RSTC program begins with the instructor pushing students past the threshold of control in a completely safe manner. By design, loss of control occurs sooner and at slower speeds than the student anticipated. The period of loss of control

¹⁰ DAN Report – page 80

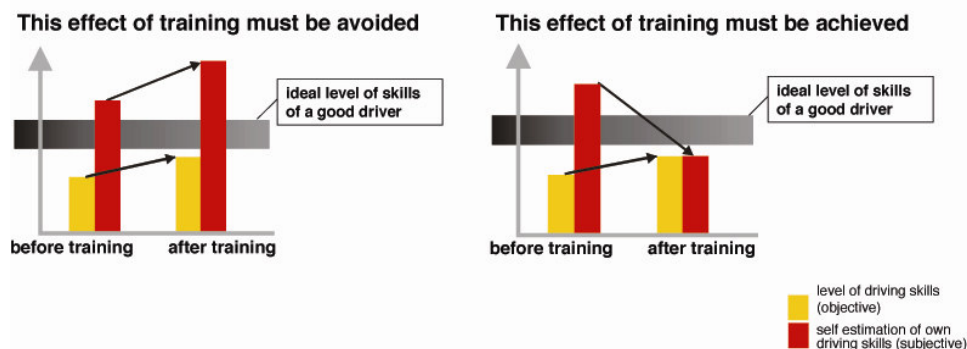
lasts much longer than anticipated. The instructors make it difficult for the student to actually control their own vehicle by manipulating certain aspects of the driving environment. This does a number of things effectively. Over-confident students become challenged to succeed. They literally must learn how to gain control of their own vehicle. This requires training. Because the instructors know the actual threshold speed for any given vehicle, and because they are not riding in the vehicle, their ability to watch while a student drives through a module enables them to easily determine what mistakes are made. Instructors use the environment creatively to force students to make mistakes such as over-reacting, which sends their vehicle into an unrecoverable spin, as previously discussed all components of each RSTC driving module are designed to work in unison to ensure safe loss of control of virtually any vehicle. The RSTC process enables instructors to analyze mistakes made by students while taming their ego. Once the ego is tamed, the training truly begins. Soon students learn to control their vehicles properly because the instructors and the students themselves can analyze mistakes effectively.

As previously discussed an aspect of the “old” versus “new” STT programs includes increasing confidence among lesser confident drivers (predominantly female). Old STT methods such as those provided in Pre-renewal Norway and the US often frightened students. This form of training reduces confidence leading to situations where frightened student drivers over-react prematurely, and put themselves into unrecoverable situations. Post-renewal STT methods address this by enabling loss of control safely and in ways that enable a driver to understand the situation that resulted due to their actions. Soon students become comfortable with the aspects of handling loss of control. They learn not only how to avoid dangerous situations altogether, but more importantly why to avoid them. As indicated by the DAN Report 2000,” which states;

“The learner driver shall, after the education, achieve increased insight in the advantages of avoiding risks and has the opportunity to realistically assess his/her driving skill.”

Moreover, they learn how to handle dangerous situations, if they occur, with confidence aligned with their actual skill level. The intended results of Post-renewal training are expressed the following graphic as indicated in the DAN Report page 228:

Example for a young male high risk driver



By enabling student drivers to experience the consequences of their mistakes, RSTC programs leave a lasting impression. The process provides students with tremendous insight into their limitations, and the limitations of the vehicles they drive. Through this process, students learn to align their self-estimated skill levels with their actual skill levels. They align their confidence with their learned skill sets. They develop a true respect for the potential dangers when driving vehicles based on the laws of physics, and they learn firsthand that these “laws” do not change no matter how much training they receive. They learn that there are limits, and that they are not invincible. Ultimately, they develop a strategy for safe driving.

Research as well as discussions with RSTC instructors suggests that as a result of RSTC training young drivers are more likely to pay attention while driving instead of talking on the phone. Teens that have attended these programs are less likely to ride in vehicles with drivers who they feel do not understand vehicle limitations. They are less likely to speed through corners. Specifically, they become aware of the consequences of their actions because they have experienced surpassing the threshold on their own with professional guidance (e.g. flight school).

As a result of the post-renewal programs, Norway went from a dismal accident rate with STT programs proven to be counter productive in 1988 to currently leading the US in reducing motor vehicle accidents attributed to driver error. Germany, Austria, Luxembourg, Sweden, Finland lead the US in reduced accidents in the same period as well. One significant and measurable reason is due to the fundamental changes that European countries made to their STT methods. A description of the pre and post renewal shift is explained in the “DAN Report 2000,” pertaining to Swedish STT. It states;

“At the skid training, in which all applicants have to participate before they take the driving test, emphasis is laid on safety margins and risk awareness. The advocates of a revised form of skid training presumed that a skilled driver is not necessarily a safe driver. First the current skid training aims to avoid that drivers abuse the skills they acquire in the course, second the benefits of the training should not lead to over-estimation by the participants. In a Swedish experiment (Gregersen 1996) two different strategies for training were compared with regard to their influence on estimated and actual driving skills as well as the drivers' degree of over-estimation of own skills. One of the strategies was to make the learner as skilled as possible in handling a braking- and evasive maneuver in a critical situation. The other strategy concentrated on awareness of limits of own skills of braking and evading. The "skill group" estimated their skills higher than the "insight group" before their performance was measured in a test situation after the training. No difference was found between the groups regarding their actual skills in the test situation. The results confirm the main hypothesis that the skill training strategy produces more false overestimation than the insight training strategy, in this case even without any difference in actual skills. Recently this safety aspect has been introduced in the national curriculum for skid training and applied to most of the skid courses in Sweden. In the near future the curriculum for the Swedish skid courses shall be compulsory and binding for all

training centres. In the following the change in curriculum is illustrated by quotations from the old and the new concept.¹¹

Author's note: training that puts these skills at the top of the driver behavior hierarchy - should be avoided

*An example from the **old curriculum** for skid training:*

The candidate should, after the course, be able to perform the following:

- *Starting and acceleration braking on high as well as low friction surface*
- *Hard braking at a speed of 60km/h*
- *Hard braking and evasive maneuver*
- *Correct a skid when driving in a curve on low friction*
- *Choose appropriate speed according to the situation*
- *Master the special conditions that come with low friction driving and be prepared for suddenly occurring danger, for example kidding vehicles*

Author's note: The STT focus noted below is necessary to improve driver behavior. Training that supports this curriculum is currently not available in the United States:

*An example from the **new curriculum** for skid training :*

- *The education shall focus on demonstrating the difficulties involved in driving on low friction and the possibilities to avoid the risks involved in such driving.*
- *Car control skill aspects shall be limited and the risks combined with overestimation as a result of the education shall continuously be shown.*
- *The learner driver shall, after the education, achieve increased insight in the advantages of avoiding risks and has the opportunity to realistically assess his/her driving skill¹².*

PHASE II RESULTS – POST RENEWAL

After a few short years of analysis the results of the Post-renewal training process were clear. As The “DAN Report 2000” indicates regarding Finland:

“The general accident statistics also show that the total number of accidents decreased by 22.6% between 1989 to 1995, from 100,996 to 78,211 accidents.” Further, “The pre- and post-renewal groups were compared regarding their accident risk. The number of drivers with accidents (data from insurance companies) was related to the number of license holders (official driving license register). The post renewal drivers had less accidents (χ^2 -test). The amount of 18-20 year old drivers involved in accident had decreased in both sex groups.”¹³

¹¹ DAN Report 2000 – page 190

¹² DAN Report 2000 – page 191

¹³ DAN Report 2000 – page 76

This indicates a direct and positive impact on young drivers. The success continued into the mid 1990s. Again as indicated by the “DAN Report 2000,” which states;

“Implementation of compulsory training course in Comar Berg – Luxembourg Results: “The overall improvement for all fatal accidents and all age categories between 1993 and 1995 as well as the years 1997 and 1999 was 24.2 %, the second highest improvement (- 37.28%) was reached for the age category 18-24 years.”¹⁴

The programs continued to develop positive results through the 1990s and started to become mandated beginning in Luxembourg in 1995-96. As again indicated by the “DAN Report 2000,” regarding Luxembourg, which states;

“The 34.3% improvement of fatal accidents for novice drivers, before and after the second phase training started in 1996, is a statistical fact.”¹⁵

RSTC becomes mandatory - Phase III (1995 – present)

Reductions in vehicle accidents due to post-renewal STT were measured and thoroughly documented during the 1990s in studies performed at facilities in numerous countries such as Austria, Luxembourg, Sweden, and Finland. Due to the positive results RSTC programs became mandatory for all newly licensed drivers beginning in 1995 in Luxembourg. Standards for facility quality control and instructor training requirements were developed and enforced. As indicated by the “DAN Report 2000,” which states:

“The laws from 1995 and 1999 issued by the Ministry of Transport of Luxembourg fixed the quality regulations necessary for the dispensation of the second phase driver training. At the same time the government determined an auditing team to inspect the training facilities and the subject matter of the training. The instructors as well as the facility itself and the material taught have to be approved and certified by the national authorities. The following aspects are regulated in the quality management procedure:

- 1. Objectives and philosophy of the training*
- 2. Duration of a complete training session (minimum 7hours)*
- 3. Teaching units (subject, content, sequence and duration)*
- 4. All details of the training units and the material taught have to be documented in operating manuals checked and certified by the authorities*
- 5. Exact description of the tools (infrastructures, surfaces, buildings, vehicles, equipment, etc.) used to hold the training.*
- 6. Location of the training facility*
- 7. Safety areas and devices*
- 8. Insurance policies*
- 9. Modalities of the organization of the training*

¹⁴ DAN Report 2000 – page 144

¹⁵ DAN Report 2000 page 147

10. Education, formation and behavior of the instructors
11. Security register
12. From 1st January 2001, the organization of an authorized center and the offered training have to be certified in agreement with the ISO 9001 norms to assure the quality of the service.”¹⁶

Many other countries providing STT have now made STT mandatory, and regulate standards in similar ways to those in Luxembourg. STT has obviously evolved since the negative aspects were discovered in Norway during the late 1980s, or these governments would not obligate their citizens to attend. Germany now has 60 centers operated by various companies including the leading German automobile club known as ADAC. The key word is “evolved.” According to the aforementioned EC report “Supreme - Thematic Report: Driver Education, Training & Licensing:”

“As a result of the evaluation, the course was changed in Norway and has now been integrated into a single phase of training. The implications of these findings are, moreover, relevant to a number of other countries, especially those with obligatory track - based training modules for learner and novice drivers, such as: Austria (2nd phase), Estonia (2nd phase), Netherlands (RIS), Sweden (initial phase), Norway (initial phase), Finland (2nd phase), Luxembourg (2nd phase), and Switzerland (2nd phase).”¹⁷

EFFECTS OF MANDATORY RSTC FOR NEWLY LICENSED DRIVERS

As indicated above, Road Safety Training Center design and development was pioneered in Austria beginning in 1984. As such, Austria has played an integral roll in the development and application of “Post-renewal” Slippery Track Training methods. Even though RSTC facilities have been part of the driving culture in Austria for over twenty years, these programs were not mandatory there until 2003. Studies performed by certain government bodies such as the Austrian Ministry of Transportation indicated that the leading cause of accidents among teenage boys in their country was in fact single car accidents. This high-risk age group of 18 to 20 year old males was also less likely to attend compulsory programs as they believed that they did not need such training (e.g., over-confident). The best way to address this issue was to mandate STT programs taught at RSTC facilities. This is exactly what the Austrians did. The decision was prompted by a country wide road safety plan established in 2002, which includes objectives such as reducing all motor vehicle accidents in Austria by 50% by year 2010. As described in a report entitled, “Austrian Road Safety Programme” edition 2004, which states:

“The Austrian government introduced in January 2002 an extensive road safety programme that establishes the following target: to halve the number of deaths by year 2010.” Further, “By the year 2010, this programme should contribute to the eventual reduction of road fatalities by 50% and the reduction of injury accidents by 20%. By carrying out the described measures the target of

¹⁶ DAN Report 2000 – pages 215-216

¹⁷ Supreme - Thematic Report: Driver Education, Training & Licensing – page 92

reducing fatalities by 25% and injury accidents by 10% should be reached 2004.”¹⁸

The results of the new mandatory training were measured in a recent study by BARTL & ESBERGER Institut Gute Fahrt, Vienna (2005): entitled; “*Multi-phase driver licensing - first analysis of effectiveness*” The study states:

“The multi-phase driving license (second phase training) was introduced in Austrian law in early 2003. All learner drivers must thus complete a safe driving course, psychological group discussion and two feedback drives with a driving school in the first year after gaining the license. After a hesitant start – the first safe driving courses only began in the summer of 2003 – the first full observation years of 2004 and 2005 for 18 and 19 year old novice drivers can now be considered.

The multi-phase license is described in law as ‘second phase training’ (§§ 4a, 4b und 4c FSG). This is understandable from a legal perspective as the basic training has long been legally determined and now a further phase has been added after obtaining the driving license. The term ‘multi-phase driving license’ is, rather, the one used by traffic experts because this conveys the idea of continuous ongoing training through several modules which provide a harmonious and seamless continuum. In no way should the new multi-phase driving license be considered solely an ‘annex’ to initial training.

The focus of the present analyses is on traffic accidents with personal injury in a before-after comparison and in comparison to all other age groups. A process evaluation in the form of a feedback analysis is also included.

Context of the multi-phase driving license

The question as to whether any post-license measures could reduce accidents (and if so, which) was first comprehensively documented and analyzed in the EU DAN Project – Description and Analysis of post licensing measures for Novice drivers (Bartl, 2000a).

Obligatory ‘anti-skid training’ for learner drivers in the 1980s actually led to an increase in skid-related accidents, as Glad (1988, in the DAN Report) revealed. An obligatory technical driving course in Luxembourg was analyzed as part of the DAN Report and no accident-reducing effects could be found. In contrast, a combination of practical driving exercises and demonstrations on a driving track, a feedback drive in regular traffic and a psychological self-evaluation of one’s own driving style led to an accident reduction in Finland in the 1990s (Katila et al., 2000, in the DAN Report, p. 80).

¹⁸ Austrian Road Safety Programme” edition 2004 – pages: 3 and 5

The initial basis of the Austrian multi-phase training for categories A and B can thus be traced to the successes from Finland. Worthy of particular mention is the two hour traffic psychology group discussion which is combined with the six hour safe driving course in order to stave off any potentially negative effects from the latter training, and to form a common unit as laid down in § 4a Abs.4 FSG and § 4b Abs. 2 FSG of the multi-phase law. Exercises which could lead to overconfidence in one's abilities should be avoided (§ 13b Abs.1 FSG-DV).

The exact training requirements for the driving teachers, safe driving instructors and psychologists are also laid down in law. The two hour feedback drives also include discussion. The first feedback drive takes place between two and four months after obtaining the license. This feedback drive is not required for learners following the more comprehensive L17 driver training programme. The second feedback drive takes place between six and twelve months after the license. The combined safe driving course and psychological group discussion take place between the third and ninth month. Failure to attend these modules results initially in reminders and extended probationary period and ultimately to withdrawal of the license.

The law was passed in the summer of 2002 by all 4 political parties in parliament.”

Mandatory Multi-phase driver licensing results in Austria according to the study (BARTL 2005):

“2135 18 and 19 year old car drivers were involved in accidents causing personal injury in the first half of 2003. In the first half of 2005, this figure was only 1896. This is equivalent to a reduction of 11.2%.”

Discussion of the results

The objective of the multi-phase driving license was to combat the number one killer of young people – the traffic accident. In order to reach this goal, the content of the multi-phase training needed to be made in such a way as to reduce the frequency of the most common accident type in which young people die – the single-vehicle accident. In 2002, 64% of road fatalities amongst 18-24 year old drivers were single-vehicle accidents; in 2004 this figure was only 54%. This can be cautiously considered as an indication of the effectiveness of the new measures. In any case, the traffic psychologists are obliged, according to the law (§13c FSG-DV), to address the causes of single-vehicle accidents, such as collisions with trees, etc, in the group discussion, and to work towards developing strategies to deal with such situations. Indeed, it can be seen as a paradox that such a simple traffic situation as driving on an empty country road - which almost every novice driver has mastered after only a few hours of driving – actually represents the most deadly traffic situation. Clearly, by addressing this theme in the psychological component, and indeed more and more in basic training too,

there can be an accident-reducing effect. This change within accident types is a poignant one, independent of the number of driving licenses issued.”¹⁹

STATE OF STT IN THE UNITED STATES

The United States is literally 20 years behind Austria, and all other countries that learned from the mistakes made in Norway during the pre-renewal era, and successfully implemented STT programs that require RSTC facilities during post-renewal era. No such facilities exist in the United States. Therefore, the positive results do not exist either.

Current US STT programs are alarmingly similar to those taught in Norway during the pre-renewal era in that they emphasize mastery of driving skills as described above in the sections entitled “Context of Slippery Track Training,” and “Pre-Renewal of methods Phase I (1979 – 1990) - European STT fails (Norway).” Further, STT services in the United States promote a high performance image. The instructors typically have a high performance driving background. In many cases race car drivers are teaching the American teenage population how to master driving techniques such as slide control. This promotes over-confidence (Glad 1988). Every parent certainly will realize upon grasping this concept that it represents a recipe for disaster for young drivers. As research indicates; a highly skilled driver is not necessarily a safe driver.

In the US, our instructors of novice drivers are primarily parents. In countries such as Sweden, Austria, Luxembourg, instructors are government-certified as driver training specialists. In the US STT programs rely on watered down parking lots for a training environment. RSTC programs rely on a highly controlled and specialized training environment designed for failure safe driving, and to measure driver skill levels. In the US, a driver learns about vehicle dynamics on public roads - usually when things go wrong, and eminent danger is present. At RSTC, in Europe the same driver can learn about vehicle dynamics and how to control his/her vehicle safely in dangerous situations with confidence aligned with actual skill. When something goes wrong on public roads he/she has a much better chance of surviving. Better yet, the awareness and insight that each driver obtains through a **failure-success based training process** will help them avoid an accident all together. This is what research such as the DAN Report verifies. Authors and members of steering and scientific DAN-committee who contributed to the DAN Report referenced throughout this paper include 10 psychologists, 1 engineer, 1 political scientists, 1 sociologists, and 2 Jurist Dr. of Law. The DAN Report references numerous additional studies and reports conducted during the past two decades. Many of these studies include before-after test groups to determine the effectiveness of pre versus post renewal era STT. The results are conclusive. These programs are saving lives by improving driver behavior.

¹⁹ BARTL & ESBERGER Institut Gute Fahrt, Vienna (2005) - Multi-phase driver licensing - first analysis of effectiveness – page 10

CONCLUSION

The United States must apply the RSTC solution to reduce accidents – now!

The countries that deemed Slippery Track Training ineffective in Norway during the late 1980s (Glad 1988) are the same countries that now mandated this training, including Norway. They are saving lives in Europe with STT. This is a “statistical fact.” However, this fact is not expressed by US based driver safety advocates, researchers, or journalists who write about the STT subject. They frequently sight the aforementioned European studies without explaining the evolution of the training between the pre and post renewal periods. They do not explain the results, or the fact that this training is now mandatory and why. They take the position that all STT no matter what methods of training provided are counter productive. The problem with this assumption is that it requires that all STT programs are identical in nature. Clearly this assumption is incorrect. The confusion appears to derive from a lack of proper interpretation of the RSTC solution and post-renewal STT methods by US experts. As a result they do not understand how to interpret the European research. Further complicating matters is the fact that after 20 years of development, European RSTC programs are now an integrated part of driving culture within the countries that implemented such practices. As a result their research assumes that the reader understands the solution. Detailed descriptions of the process are omitted. This makes understanding the finer details as to differentiators between US and European STT programs difficult to assess. Language barriers also exist. However, many reports completed in Europe are now translated into English. This paper is written with the main purpose of clarifying the Post-renewal solution. As the author of this paper it should be known that I am involved as co-founder and managing director of a company founded to bring RSTC to the United States. The purpose of this paper is to clarify that a solution exists, and to put that solution into proper context by leveraging extensive research and hard data combined with a lay summary explanation. The goal is to help parents, teachers, politicians, law enforcement, employers, and driver training experts alike begin to understand that all Slippery Track Training is not alike, and that there is a path to successful improvement of driver behavior before us to reduce the number of road deaths in the US.

Fortunately we have *a blue print for the future of driver training in the United States*, in the forms of RSTC and post-renewal STT method development. The US can catch up quickly, but only if the powers that be pay attention and study the actual benefits carefully. European traffic laws and regulations may be too stringent for US citizens. Therefore, they will not likely be applied anytime soon. However, the RSTC solution can be implemented in the US now. The laws of physics don't change due to cultural differences. Every 12 minutes that we delay another US citizen dies in an auto accident. Let's not wait any longer.

Please show your support today by logging on to the DRIVE RSTC INC website and signing our petition at www.DriveRSTC.com. Help us bring the proven Road Safety Training Center programs to the United States.

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Robert J. Cole is co-founder and managing director of DRIVE RSTC INC, a US company based in Northern California, which was founded to bring the time tested and proven RSTC solution to the United States. The company mission is to save lives through enhanced driver training. Mr. Cole spent four years traveling throughout Europe researching the RSTC solution. He has compiled extensive research on the subject, and intimately understands the differentiators between US and European practices.

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