EFFECTS OF DEFENSIVE VEHICLE HANDLING TRAINING ON NOVICE DRIVER SAFETY: *PHASE 2. ADVANCED DRIVER TRAINING*

FHWA/MT-06-003/8183-002

Final Report

prepared for
THE STATE OF MONTANA
DEPARTMENT OF TRANSPORTATION

in cooperation with
THE U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

April 2006

prepared by

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RESEARCH PROGRAMS

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Effects of Defensive Vehicle Handling Training on Novice Driver Safety: Phase 2. Advanced Driving Training

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16. Abstract

New teenaged drivers have the highest accident rates of any group of drivers. Research is needed to determine how to safely equip novice drivers with the important elements of experience before they encounter a need for it in an actual driving situation. The purpose of this research program was to conduct such a study. This report summarizes Phase 2 of the three-phase project. Phase 1 included (A) identification of potential participants, (B) development of recruiting materials, (C) recruitment and scheduling of participants, (D) preparation of training plans and instructional materials, and (E) coordination with the Montana Office of Public Instruction for use of their facilities and instructors for the training workshops. During Phase 2, approximately half of the participants received an intervention that involved a one-day classroom and behind-the-wheel workshop. The training took place 6 - 12 months after they complete high school driver education. During Phase 3, teens will be tracked for 4 years following the project to determine the driving history comparisons of the control group to those who received the intervention. Reported accidents, violations, and driving experience will be compared once per year during this monitoring period.

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The authors are pleased to acknowledge the considerable assistance provided by Mr. David Huff, Traffic Education Director for the Montana Office of Public Instruction, for his invaluable assistance and advice in all phases of this program. Mr. Huff provided important critiques of our initial program plans, assistance in coordinating with various Montana school districts to identify potential participants, and coordination of the effort with the Montana Driver In-Vehicle Education (D.R.I.V.E) training facility in Lewistown, MT.

The Defensive Driving training curriculum was developed by Mr. Fred Mottola of the National Institute for Driver Behavior whose years of experience in training young drivers provided a solid foundation for the training workshops. Dr. Jessica Hartos of North Carolina State University-Charlotte developed the tailored feedback system to provide the students and their parents with "report cards" on their driving ability.

The work was performed under Contract G176-05-W0434 between the State of Montana, Department of Transportation and the Montana State University. Ms. Susan Sillick served as the project's technical monitor.

TABLE OF CONTENTS

1 LIST OF FIGURES

2 EXECUTIVE SUMMARY

Young teenaged drivers have a considerably higher accident rate than any other age group. New teenaged drivers have the highest accident rates of any group of drivers. Research has found no clear evidence that traditional high school driver education programs have a positive impact on safe driving. To address this issue, some experts have recommended a multistage training approach in which the traditional training is later supplemented by a carefully designed advanced training program. Such an approach is advocated by the American Driver and Traffic Safety Education Association (Robinson, 2001) as part of a graduated licensing system in which, "Initial training of novice drivers will provide basic vehicle handling skills and the second training course will provide other safe driving skills, including enhanced decision making to reduce the risk of young drivers."

This project is a three-phase effort to evaluate the potential effectiveness of such a multistage program for Montana young drivers. Phase 2 efforts, detailed in this report, concentrated on three major areas, final preparation for training, collection of driving experience data, and the presentation of the training to the teen drivers.

WTI's subcontractor, Prof. Fred Mottola, completed development of the training curriculum and schedule. He provided specialized training for the Office of Public Instruction (OPI) cadre of instructors in the presentation of his training curriculum in the classroom and in the vehicles. He provided assistance with the installation and maintenance of the SkidMonster devices on OPI's vehicles. Subcontractor Dr. Jessica Hartos, with the assistance of WTI, developed an ACCESS database for the recording of performance scores for the participants on each exercise and the recommendation of post-training exercises in the form of a "report card".

Training was conducted by the Montana Office of Public Instruction. OPI scheduled Lewistown facilities and instructors for 18 one-day sessions during the summer of 2005. Each day, 12 young drivers were scheduled to take the training workshops in Lewistown. WTI contracted with school bus providers for the Great Falls and Billings school districts to provide transportation to and from Lewistown. Students from Harlem were bussed by their High School, which does not contract out its transportation services. Students from Lewistown and the surrounding communities provided their own transportation to the training facility.

At the training facility, the young drivers completed a detailed questionnaire concerning their driving experience since completion of drivers' education classes. They then completed approximately 9 hours of instruction in the classroom setting and behind the wheel. At the completion of the day's training, each student received a tailored "report card" concerning their driving performance and exercises they could do on their own to improve it.

The half of the teen drivers who were not drawn to take part in the training workshops were mailed survey forms that were identical to those completed by the students at Lewistown.

3 INTRODUCTION

3.1 The Safety Statistics

Each year, roadway accidents take the lives of approximately 40,000 people and seriously injure approximately 3 million in the United States (U. S. Department of Transportation, 2005). The costs of these accidents approach $200 billion.

Young teenaged drivers have a considerably higher accident rate than any other age group. New teenaged drivers have the highest accident rates of any group of drivers. Figure 1 shows that drivers under the age of 20 have a crash rate four times that of the general driving population (Williams, 2003). The highest accident rate is experienced within 2 years of receiving the driving license. Obviously, the crash rate decreases with driving experience and increased maturity. Research is needed to determine how to safely equip novice drivers with the important elements of experience before they encounter a need for it in an actual driving situation. Many novice drivers' accidents involve improper reactions to skids, panic stops, run-off-pavement, and other unusual situations unfamiliar to the young driver. Other accidents can partially be attributed to lifestyle issues such as risk-taking, risk-seeking, peer pressure and approval, and substance abuse.

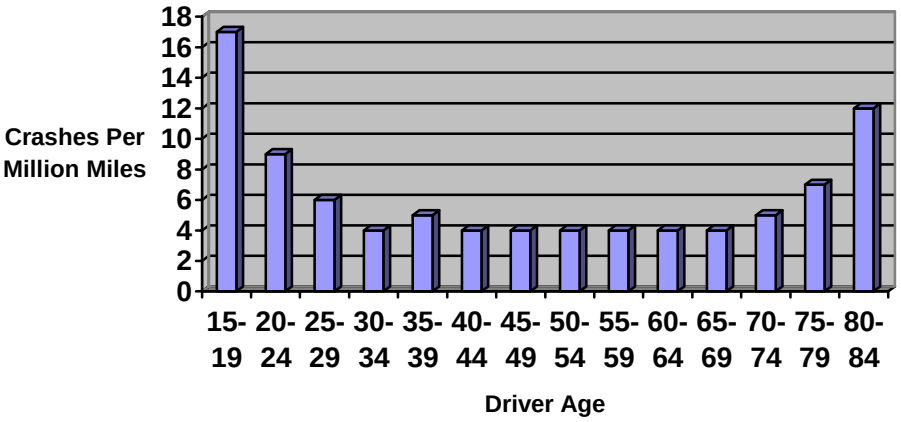

Figure 1: Accident rate by driver's age

Driver education in European countries is much more rigorous than that in the United States. Classroom training is presented on vehicle operating principles and basic maintenance. Typically, behind-the-wheel training provides much more emphasis on the more advanced aspects of vehicle handling in potentially hazardous conditions. Also, the minimum age for driver licensing is usually higher than the ages mandated by the States in the U.S.

Several organizations in the United States offer training in advanced vehicle handling for novice drivers (Car Control, n.d. a). Such training is intended to supplement basic driving classes and typically includes vehicle control on skid pads, obstacle avoidance, rapid deceleration braking, and maneuvering near the vehicle performance limits. While there is considerable anecdotal evidence that such training, added to the standard driver instruction, creates a more skilled and capable novice driver, few systematic studies of its effect on the safety of young drivers have

been completed. Where such studies have been done, results are contradictory and subject to interpretation and controversy.

3.2 Research on Driver Training

A large percentage of young drivers receive their driving training in school-based classes. These classes require numerous hours (typically 30) of classroom instruction on rules of the road, vehicle operation, and safety. The nascent drivers then spend several hours (typically 6) behind the steering wheel driving in parking lots or in normal traffic on familiar streets. Only rarely do they experience circumstances in which the vehicle must be handled at its performance limits. Most carefully controlled research has found that standard driver education classes have little impact on subsequent driving safety (e.g., Stock, et al., 1983).

Many questions have been raised concerning the effectiveness of conventional young driver's education programs. Some advocates declare young driver's education programs as successful while other experts see problems with such programs. A former researcher at the Insurance Institute for Highway Safety, Williams (2003) declared these short-term programs as unrealistic approaches to increasing the safety of young drivers. On the contrary, a recent study conducted by the Oregon Department of Transportation (ODOT) and the Center for Applied Research found "significantly lower rates of convictions, suspensions and crashes" for those taking the driver education course versus those who learned through 50 hours of informal, supervised training (Triplett, 2005).

International literature demonstrates little proof that formal driver instruction increases driver safety, yet arguably these programs have failed to adequately address age and experience related factors that contribute to young driver's increased risk of accidents. It is believed that such programs can be more effective if they are more empirically based, addressing the age and experience related factors (Mayhew and Simpson, 2002). Mayhew and Simpson state the reasons why formal instruction fails to reduce crashes:

- Driver education/training fails to teach the knowledge and skills critical for safe driving.
- Driver education does teach safety skills, but students are not motivated to use them.
- Driver education fosters overconfidence.
- Driver education fails to adequately address lifestyle issues.
- Driver education fails to tailor content to student needs.

The well-known Dekalb driver education study, conducted in suburban Atlanta, was one of the first attempts to systematically validate the benefits of driver education (Stock, et al., 1983). A cohort of 16,000 high school students was examined. The participants were divided into three groups receiving no training at all, a minimal curriculum of 20 hours of training, or a Safe Performance Curriculum (SPC) of 70 hours of training. The SPC curriculum was based on a task analysis of required driver skills but little information survives about how it was conducted. The methodology has generated considerable subsequent debate, especially concerning the equivalency of the three groups, but the bottom line finding was that there was no significant difference between the training groups in driving safety after the first six months after

completion. One observation was that drivers in the "no training" group delayed obtaining their driver's licenses as compared to drivers in the other groups.

Mayhew and Simpson (2002) completed a synthesis of research related to safety benefits of young driver training. They concluded that the major effect of traditional, school-affiliated driver education programs is to make licensing more readily available to younger drivers. They found no clear evidence that these traditional programs have a positive impact on safe driving. The authors recommended a multistage training approach in which the traditional training is later supplemented by a carefully designed advanced training program that:

- Is focused on pyschomotor, cognitive, and perceptual skills shown to be associated with high collision rates among young drivers.
- Includes experiences demonstrating the value of safe driving practices.
- Incorporates experiences that make the drivers more aware of their own limitations.
- Uses techniques developed to address lifestyle and risk-taking behaviors.
- Recognizes that there are individual differences in skill levels and addresses specific skill deficiencies of the individual participants.

Such an approach is advocated by the American Driver and Traffic Safety Education Association as part of a graduated licensing system in which, "Initial training of novice drivers will provide basic vehicle handling skills and the second training course will provide other safe driving skills, including enhanced decision making to reduce the risk of young drivers (Robinson, 2001)."

A study of over 400 graduates of an urban, east coast course for young, previously licensed drivers reported that the graduates had 77% fewer accidents than their peers (Car Control, n.d. b). That number, however, was probably inflated by a weak research design in which the more careful and highly motivated teens were self-selected into the training classes. A much more carefully designed and controlled study was needed to validate those striking results.

Skill-based training has created much discussion among driver education experts. Research has shown that skill based strategies may produce overconfidence of one’s own skills (Gregersen 1996a). For example, Glad (1988) found that those partaking in skid training, as mandatory part of the training, had an increase in slippery road accidents. Another study found that after the introduction of skid training into the education curriculum higher rates of accidents occurred in slippery road conditions (Keskinene et al., 1992). It is believed that many skid training courses were based on maneuvering skills, leading to overconfidence. To counter this effect, it has been suggested that a distinction be made between training of skills and training of risk-awareness. Skill-based training concerns understanding vehicle control and maneuvering while risk-awareness is designed to increase knowledge, experience and recognition of dangers (Gregersen, 1996b; Advanced, 2003). A recent study on the effectiveness of skid-car training for teenage novice drivers in Oregon found that females who received skid-car training had no change in crash rates, while the males appeared to have higher rates in the two years after training. However it did appear that those receiving the training had relatively fewer slick surface and rear-end collisions (Jones, 1995).

The EU project Advanced (2003) developed several recommendations for post license driver training. These recommendations were not objectively based but were based on the consensus of the researchers and investigators working in the area. The general recommendations include:

- Courses should focus on the specific needs of the participant and encourage them to improve their driving style and behavior.
- Track based driver courses should focus more on risk awareness than on maneuvering skills.
- Comprehensive feedback and discussion sessions should be conducted after each on-road exercise.
- To maintain individual attention, group size should not exceed 10 participants per instructor during track-based courses.
- Training must be relevant to real-life situations; exercises and discussion should be related to real life scenarios.
- Overconfidence should be avoided; this is done by allowing students to fail (i.e. hit obstacles, lose full or temporary control of the vehicle).
- Good client-trainer relations should be established to have the greatest influence on the participant throughout the course.

Graduated licensing programs have been shown to significantly reduce young driver accidents and fatalities (McKnight and Peck, 2002). While these programs don't necessarily improve the skills of young drivers, they do reduce their miles of driving and their exposure to peer pressure and hazardous driving conditions during their early driving years (Fohr, et al., 2005). During the 2005 legislative session, a form of graduated licensing was instituted for Montana. Since implementation begins in 2006, it is too early to determine whether the expected benefits will materialize.

4 METHODOLOGY AND PRODUCTS

4.1 Overview of Training

OPI scheduled Lewistown facilities and instructors for 18 one-day sessions during the summer of 2005. Each day, 12 young drivers were scheduled to take the training workshops in Lewistown. WTI contracted with school bus providers for the Great Falls and Billings school districts to provide transportation to and from Lewistown. Students from Harlem were bussed by their High School, which does not contract out its transportation services. Students from Lewistown and the surrounding communities provided their own transportation to the training facility.

At the training facility, the young drivers completed a subject consent form and a detailed questionnaire concerning their driving experience since completion of drivers' education classes. They then completed approximately 9 hours of instruction in the classroom setting and behind the wheel. At the completion of the day's training, each student received a tailored "report card" concerning their driving performance and exercises they could do on their own to improve it.

The half of the teen drivers who were not drawn to take part in the training workshops were mailed survey forms that were identical to those completed by the students at Lewistown and asked to complete and return them to WTI.

4.2 Preparation for Arrival of Students

Before the students arrived, the instructors shared the work of preparing the vehicles for instruction that day, this included: checking tires (air pressure, tightening lug nuts, etc.), putting air in the pressure tanks for the skid monster, washing and fueling vehicles as needed, sweeping parts of the pavement where needed, cleaning classroom, and checking vehicle fluid levels. The classroom instructor prepared for the instruction by supplying the classroom with pens, pencils, permissions slips, driving history sheets, name tags for student identification, and student packets for instructor in-vehicle grading.

4.3 Driving History Questionnaire

When the students arrived, the lead instructor would greet them on the bus and inform them about the upcoming day. Next the instructor assigned a letter to each student and handed out a grading packet followed by completing the pre-test before any instructing. The Pre-test included going into two skids with one of the instructors as well as demonstrating their vehicle positioning of front and side with another vehicle and instructor. After all students were finished, they proceeded to the classroom for opening classroom activities where they completed a subject consent form and the detailed young driver survey regarding their driving experience since completing their drivers' education class. Based upon cited teen crash data the questionnaire was tailored to ask those questions that correlate highly to teen crash involvement. Questions addressed included:

- The number of hours/week they usually drive,
- The number of passengers (and age classification) in vehicle and how often they have passengers in their car,
- Type of vehicle driven,
- Time of day they usually drive,
- History of legal citations,
- History of near miss crashes,
- History of single vehicle crashes, and
- History of multiple vehicle crashes.

4.4 Student Folder of Activity Schedule and Instructional Materials

After completion of the subject consent form and young driver survey, the teen drivers completed 9 hours of instruction in the classroom setting and behind the wheel. Upon arriving at the Montana D.R.I.V.E training facility in Lewistown each teen received a folder that included an activity schedule, pre and post in-car tests document, SkidMonster in-car document, and Buick/GMC in-car document, each are described in further detail below:

- Activity schedule – This document provided a schedule of the daily activities. Each student was assigned a letter identifying what activities each student was to perform during which half-hour block of the day. Each student was provided a name badge to record their assigned letter and list their first name.
- Pre and Post in-car tests – This document scored the students on in-vehicle activities they are requested to perform. Students are unaware of how to properly perform the in-vehicle activities. The purpose of the pre and post in-car tests are to assess if the student has any knowledge or experience with controlling skids and reference points of the vehicle. The pre-test is conducted prior to any instruction or training. Upon completing the 9 hours of instruction and training the same assessment is completed. This follow-up assessment is completed to understand if the students were able to transfer the skills and behaviors taught during the day to real-life driving challenges.
- SkidMonster in-car sheets– This document provides the objectives, teaching cues, and score sheets for the various daily Skid Monster in-vehicle instruction activities.
- Buick_GMC_sheets – This document provides the objectives, teaching cues, and score sheets for the reference point and off-road recovery in-vehicle instruction activities.
- Pre-test response sheet – This document was provided for students to provide their responses to the classroom E-book pre-test.

Not included in the student folder, but provided in the classroom was the pre-test answers document which provided the correct responses to the classroom E-book pre-test.

4.5 Classroom Instruction

Upon completing the young driver survey and receiving the student folder of instructional materials, the students were then taken to the Montana D.R.I.V.E classroom training facility.

Here students received two classroom periods led by a classroom instructor. The first classroom period included following the in-vehicle pre-tests document; the second classroom period was conducted in the afternoon following lunch. Both the morning and afternoon classroom instruction included demonstrational PowerPoint presentations. The purpose of these presentations were to inform the students of driver readiness with reference to seat adjustment, mirrors, driver position use of the 'dead pedal', seat belts, balanced hand position on the wheel, and windows up.

The two presentations included a morning and afternoon classroom period as briefly described:

- Morning Classroom- "Montana Teen Class Phase I" presentation was provided to facilitate the lecture. Further demonstrations were provided with regards to the effects of high speeds on losing control of the vehicle. This included using a small "frisbee" type saucer and match box cars to demonstrate the effects of speed on friction of the vehicle's wheels. Example instructions provided to facilitator included "the cars will roll around the inside perimeter, but as you increase the incline of the "frisbee" and thereby increase the speed of the model car, the car will fly off the "frisbee", simulating what happens in a corner with too much speed". A slide by slide explanation of the Montana Teen Class Phase I PowerPoint presentation as lectured to the students has been provided in the Training Materials.
- Afternoon Classroom - "Montana Teen Class Phase II" presentation was provided to facilitate the lecture. No further demonstrations were provided. A slide by slide explanation of the Montana Teen Class Phase II PowerPoint presentation as lectured to the students has been provided in the Training Materials.

After the completion of the presentations the instructor demonstrated with a steering wheel correct hand positions of 9-3 and 8-4 along with hand-over-hand steering as well as push-pull steering. Students were then taken outside to practice the proper steering using a plastic steering wheel. Instructions provided to the instructors included:

> *The instructor stands in front of the students and asks if all can see him. If they can't, then tell them that their LOS/POT [vision] is blocked and should move so they can see. Holding up a target (Frisbee) have the students look at it while moving across the courtyard. Have them hold the wheel at a 9-3 position and turn their heads and find a target and then simulate steering in that direction. Have them turn their heads the other way and simulate turning that way. Ask them to face forward and tell them that they will be making a U-turn. Tell them what the target will be behind them and then ask them to keep looking to the right and simulate turning right and moving their body until lined up with the target. Ask them to do a U-turn to the left while looking left and steering moving left until they line up with the assigned target. Ask them to move off target to simulate a skid while keeping their eyes on the target and steering back to their intended target. Finally, ask the student to hold their right hand up to where the inside rear-view mirror would be and locate a target while turning their body slowly until the transition peg lines up with the target for a right turn. Do the same for a left turn by asking them to hold their left arm to where the left corner post would be for a left turn and transition peg. Inform them that these skills would be practiced in the vehicles throughout the day.*

Integrated with the PowerPoint presentations were two interactive sessions using E-book activities, one in the morning and the other in the afternoon. Within the two E-book periods were imbedded video clips demonstrating principles discussed. Provided in the E-book were interactive grids where students were to mark their answers of questions that were posed to them on principles discussed. Upon completion, students could check their answers with the provided answer sheets.

A picture of the classroom instruction portion at the Montana D.R.I.V.E training facility has been provided in Figure 2. The classroom used is a retired driver simulator trailer about 12' wide and 40' long. Three computers were set-up to deliver the e-book training. A fourth computer was used to deliver the PowerPoint. Students sat in inactive simulator stations during the classroom instruction.

Figure 2: Instructional classroom at Montana DR.I.V.E. training facility

Additional classroom instruction was completed outside at the Montana D.R.I.V.E training facility to allow students with more arm and leg room to practice maneuvers as instructed. Figure 3 shows students practicing proper hand positions on the steering wheel.

Figure 3: Proper steering instruction at DR.I.V.E. training facility

4.6 Behind-the-Wheel Instruction

Behind-the-wheel instruction utilized three sedans equipped with SkidMonsters, two sedans equipped with levers to activate rear brakes, a regular sedan, and a mid 1990s suburban. Figure 4 shows a vehicle equipped with the SkidMonster technology.

Figure 4: Student participating in SkidMonster behind-the-wheel instruction

The two lever equipped skid sedans were used in the pre and post skid assessments. The Buick and the Suburban were used to assess and teach reference points and off-road recovery. A total of three SkidMonster vehicles were used to teach behaviors and skills related to the 10 habits.

The driving track used was re-paved to include a “Monster Pad” that is 200’ by 600’. The parking staging area was redesigned to allow for an area 150’ by 700’. The track already had a sprinkler wet skid pad and an off-road recovery exercise area. The course layout for the Skid Monster is dictated in “Coach’s In-Car Guide” using a 200’ x 300’ layout for SkidMonster courses 1 and 2 and located in the “Monster Pad” and a 150’ X 300’ layout for course #3 located in the parking/staging area. The "All Set-Ups" layout at the end of the Coach’s Guide is the course set-up used, with the exception of using 200’ rather than 150’ for the two courses setup in the “Monster Pad”. In Figure 5, below, the respective areas are identified.

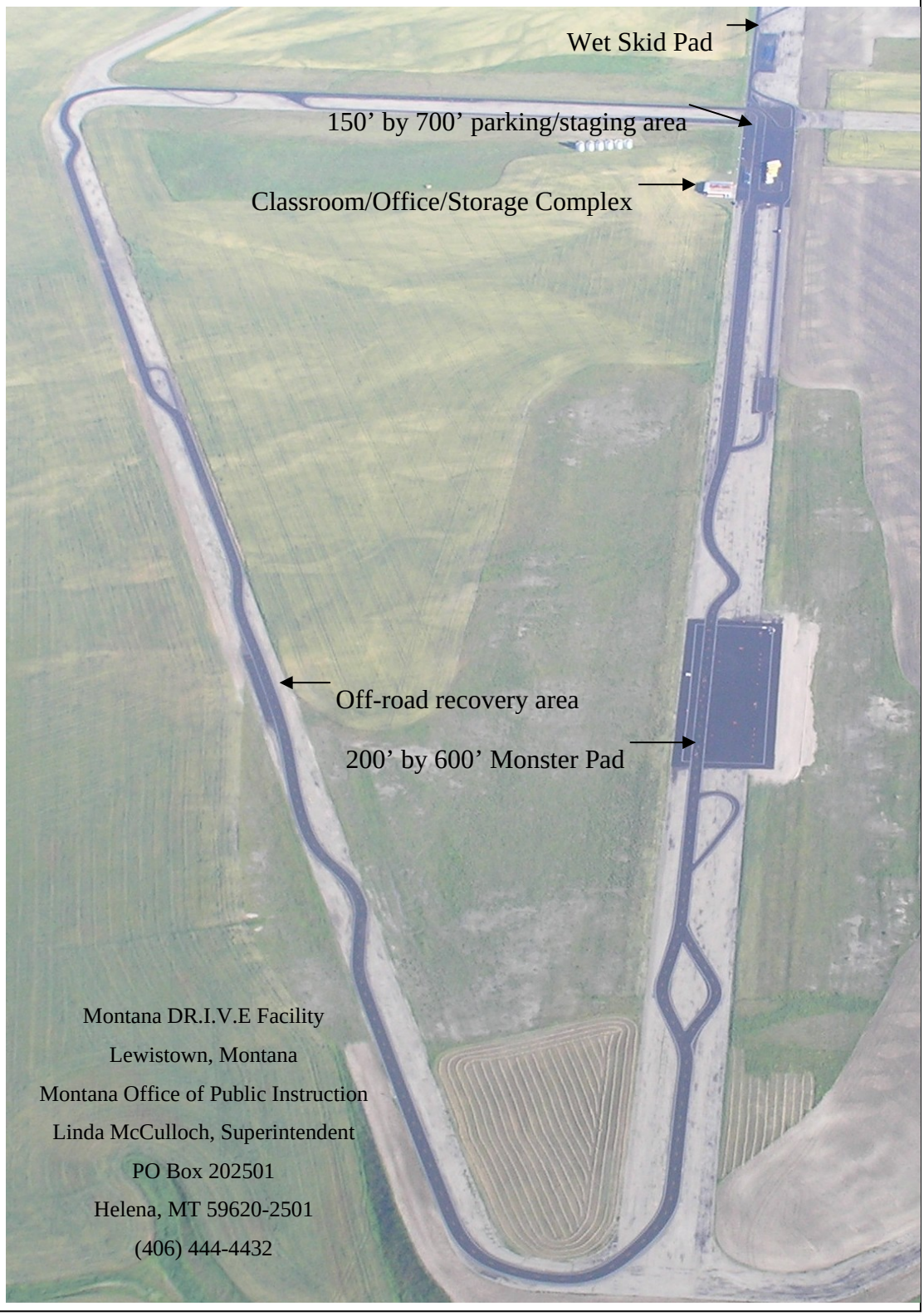

Figure 5 Montana D.R.I.V.E facility aerial view

During the behind-the-wheel instruction, instructors would take the students to the skid pad and divide the group into two teams. They would then have a 'road rally' with each team member driving through the course in a timed event that included all aspects of training covered throughout the day. Rules and separate grade sheets would be given beforehand so the drivers would know what to expect. Instructors not participating would stay in the work area and compile scores and print report cards.

All of the in-car lessons were based on Mottola's SkidMonster Coach's In-Car Guide. This guide covers objectives, directions to be given, how to evaluate the student, coaching tips and techniques for vehicle control. This guide provided the opportunity for instructors to add additional information in order to match their own personal dialog, but the items in the coach's book was never compromised. Instructions were provided to the instructors in "period" format as shown below:

- Periods 4-5 (SkidMonster): This first in-car teaching lesson set the tone for the day as it covered all of the basics required for getting a vehicle ready, driver readiness, and basic use of vision. The use and control of vision, steering, and braking were really stressed. Instructors were encouraged to have the students experience failure so they could learn from it. This forced the student to use their vision in turns and control the speed of a vehicle before a turn. Use of vision, targeting, transition pegs, and LOS/POT [vision] blockages were all explained and demonstrated in the opening classroom, are reinforced during this lesson. Braking technique is stressed (soft stop).
- Periods 6-7 (SkidMonster): Stops and turns should be stressed during this time frame. The use of the skid mode is used as an element of surprise at times as drivers tend to make a turn too fast. Again, it's suggested that the student experience failure so he/she can understand the importance of keeping the vehicle under control and in balance before and during a turn. Habits are reinforced through practice.
- Periods 4-7 (Regular vehicle): Students are to practice and learn how to use reference points for frontal limitations and side limitations. They practice, get out of the vehicle to check vehicle position, and practice again where to look and line a vehicle up with stop lines, fog lines, where to stop when behind another vehicle, and use vision correctly. After the student completes the exercise in a car, he/she shall practice alone in a larger vehicle (Suburban). Pictures of where the vehicle should be located for frontal and side limitation are on the front seat to assist the driver in positioning the vehicle.
- Periods 8-9 (SkidMonster): This driving segment is used to experience a continuous curve or a roundabout along with the effective means of controlling the vehicle in an intersection. The adjustment of speed for the four-second-danger zone is explained as well as how camber of the road can influence car handling. In the radius circle, students should learn how one to two mph more can cause a vehicle to be out of control. The importance of vision and targeting shall be reinforced.

- Periods 11-12 (SkidMonster): This instructional period is mainly a review period. Ask the students to do the various driving maneuvers that they learned earlier in the day.
- Periods 13-14 (SkidMonster): As explained in the Period 10-class, students shall learn the importance of keeping a good following distance. The instructor should stress the importance of being able to steer around an object quickly rather than trying to stop as one probably would not be able to stop in time. Students should be reminded that when they double their speed, they quadruple braking distance.
- Periods 11-14 (Regular vehicle): All students shall learn the safety technique of controlling a vehicle if it leaves the roadway (the same technique is taught to adults in the Montana DR.I.V.E. Program). The instructor should stress that one should rely on the steering and not on the gas or brake and keep the vehicle as balanced as possible. Explain where vehicle positioning should be when off the road along with the proper steering of up to ¼ of a turn when returning to the roadway. Vision is again stressed, as one needs to keep on the target.

Anecdotal reports from students stated that they felt more relaxed and confident about their driving ability. Instructors reported "they made great strides showing improvement in the post-test of front/side limitations and skids; and, they also understood the importance of controlling the four-second-danger zone and keeping the vehicle in balance". Overall, it is hoped that the students gained valuable knowledge and skills with regards to driving; therefore becoming more confident in their ability to handle various driving situations, however, not to the point of being overconfident.

4.7 Closing Remarks, Scoring Sheet, and Report Card Narrative

Instructors completed the classroom and behind-the-wheel instructional periods with an informal closing, with students complimented on a job well done. The students were reminded about the importance of keeping a vehicle in balance and controlling the immediate four seconds ahead of oneself when driving. They were also reminded about creating good driving habits and reinforcing what was covered throughout the day. Each student was given a 'report card' assessing their driving performance and a booklet (Mottola, 2003) for the 10 areas of safe driving behaviors. The students were then dismissed and asked to drive safely.

4.7.1 Scoring Sheet

The student packets included a scoring sheet for each of the in-car lessons and the grid for the morning e-book session. Each scoring sheet equipped the instructor with the basic driving skills the students should learn. Each basic driving skill had corresponding boxes for assessment grading. These boxes coincided with the ten driving habits in the booklets handed out at the end of the day. If a student performed a habit satisfactorily, then the instructor would check the box. If the student did not and needed more practice, then an X would be placed in the box. Each group of boxes and items would support the habit stated.

4.7.2 Report Card

The report card provided was an individually generated, color prescriptive report card that is linked to a document titled, "Advanced Driver Training Workshop IN-CAR LESSONS FOR THE 10 AREAS OF SAFE DRIVING BEHAVIORS." This document is color coded to match the colors associated with the 10 habits assessed in the prescriptive report card. The primary purpose of the report cards was to develop a reporting system that accurately assessed the student's driving skills at the end of the day of instruction and to report it in a manner that would be read and used by the student and parents. Using Microsoft Access a database "report card" was developed on which the instructor would enter the student's name, record scores for 10 driving habits based upon the day's in-vehicle assessments. A tailored color report card on high quality paper that provides three levels of assessment for each of the 10 habits addressed during the day's instruction was distributed to all participants. The student is assessed twice on each activity—once in the morning and once in the afternoon. The prescriptive report card is based upon the latter of the two assessments for each in-vehicle activity, reflecting their driving skills after benefit of instruction and practice.

In addition to the prescriptive report card and the in-car lessons booklet, the student was also provided Mottola's (2003) booklet titled, "Your Car is a Monster; Ten Habits Will Keep It Caged". All three items are provided to the student at the end of the day, just before they leave the workshop facility. The students are encouraged to share the information with their parents or guardians.

5 CONCLUSIONS AND RECOMMENDATIONS

This report describes Phase 2 of a planned three-phase effort. Phase 1 involved development of training plans and recruitment of a sample of students who had completed high school driver education classes during June through December 2004. Phase 3 will involve following the driving histories of the recruited students at one-year intervals for a period of four years.

During Phase 2, a one day advanced defensive driving training workshop was prepared and presented to a group of approximately 180 teenaged drivers from central Montana. Facilities and instructors at the Montana D.R.I.V.E facility were provided by the Office of Public Instruction. The curriculum included multimedia classroom instruction and in-vehicle exercises.

While logistics of coordinating the students and the instruction was a continuing challenge throughout the training period, the instruction, itself, was completely successful. While subjects to be trained were telephoned with a reminder in the evening before their scheduled training, each day there was an average of one no-show. OPI has found that this is typical of their adult students as well. For any future training, it may be wise to slightly overbook the training calendar.

During the training, central Montana experienced several days of unusually high temperatures. We arranged to have a supply of ice and ice-water on the buses used to transport the students to Lewistown. One parent called to complain about the heat. Another parent complained that her student had not returned home until several hours after the bus was scheduled to arrive back in Billings and had reported that the bus had broken down. Our investigation found that the bus had arrived on schedule and that the student had apparently found other activities to occupy him after his return to Billings. We concluded that, when dealing with young subjects, extra time needs to be allowed for these various kinds of logistical issues.

Initially, the cadre of instructors was a little dubious about the changes made by Mottola to their normal training curriculum. As they saw the students progressing, they began to value the new equipment and procedures. At the end of the program, the instructors were recommending that many of the training procedures be adapted for use in the adult training courses. This will be done for the summer of 2006. Because of the success of the SkidMonster devices, OPI and Montana State University-Northern will be procuring some of the SkidMonsters for use in their programs.

OPI has seen the training program as a success on the basis of observing the skills improvement of the young drivers. It is planned to offer this course to teen drivers at the Lewistown facility as part of the defensive driving workshops during 2006 at the normal cost.

The remaining phase of this research effort is to track the driving records of the approximately 180 young drivers who took part in the training and the approximately 180 young drivers who form the control group. It is planned to examine the DOJ driving records for these students in September 2006, 2007, 2008, and 2009 to determine the frequency and severity of accidents and the number of violations committed by each subject.

In addition, questionnaires will be mailed to each of the subjects to determine the frequency of accidents that were not reported to DOJ for whatever reason. Reports by subjects during training identified a relatively high frequency of minor parking lot crashes or run-off-road accidents in which there was only a small amount of damage and no reports filed. To obtain a complete picture of the safety records of the teens, these minor crashes need to be documented.

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