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Fredrick Wayne Reuter

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Robert E. Gustafson
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THE EVALUATION OF A CURRICULUM ON ADVANCED DRIVER EDUCATION FOR EMERGENCY VEHICLE OPERATORS IN MISSOURI

By

Fredrick Wayne Reuter

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ABSTRACT

THE EVALUATION OF A CURRICULUM ON ADVANCED DRIVER EDUCATION FOR EMERGENCY VEHICLE OPERATORS IN MISSOURI

By

Fredrick Wayne Reuter

The purpose of this study was to evaluate a curriculum developed by the author on advanced driver education for emergency vehicle operators in Missouri.

The subjects for this study were 24 recruits of the Greater St. Louis Police Academy. The data were collected in March of 1975.

The subjects in the study were recruits in a regularly scheduled class of the Academy. Although not randomly selected, the subjects were believed by the Academy to be typical of Academy recruit classes. The 24 recruits were divided into two groups of 12 each. One group was designed the "trained group" and received both classroom and range instruction according to the curriculum. The other group was designated the "untrained group" and did not receive instruction according to the curriculum.

Pre-tests and post-tests of knowledge and of skill were administered and scores recorded for the trained group and the untrained group. The tests included pre-test and post-test scores on classroom knowledge, and pre-test and post-test scores on skill

as shown in five advanced driver education range exercises. Pre-test and post-test scores on the five range exercises were recorded at both low and increased speed.

Student's t-test for significance was used for the statistical analysis of the pre-test and post-test mean scores of knowledge and skill.

Three hypotheses were tested:

$H_0 1$: There is no difference in performance on pre-tests of knowledge, low speed skill, and increased speed skill between the trained group and the untrained group.

$H_0 2$: There is no difference in performance on post-tests of knowledge, low speed skill, and increased speed skill between the trained group and the untrained group.

$H_0 3$: There is no difference in learning between the trained group and the untrained group as measured by differences in pre-test and post-test knowledge, low speed skill, and increased speed skill achieved by persons in either group.

$H_0 1$ was rejected because a difference between groups did exist in the pre-tests. The study groups were not homogeneous.

$H_0 2$ was rejected because the trained group significantly improved their post-test scores as compared to the untrained group.

$H_0 3$ was generally rejected because the trained group showed a measured improvement in pre-test and post-test scores as compared to the untrained group pre-test and post-test scores. One exception was the pre-test and post-test low speed skill for the untrained group. The untrained group significantly improved their scores and this element of $H_0 3$ was accepted. Apparently, the untrained

group was able to learn sufficiently from the pre-test to improve on the post-test.

With the exception noted, the findings supported the projected results that the curriculum would improve the knowledge and skill in advanced driver education of the emergency vehicle operator.

DEDICATION

> The direction in which Education starts a man will determine his future life.
>
> --Plato

The parent of the child is the primary motivator toward the education of that child. This publication bears witness to the successful motivation and guidance that my parents gave to me.

To my parents I owe the beginning and continuation of good fortune in my life. It is by their enduring love and guidance, as exemplified by their deeds, that I arrive at this place in time.

This publication is therefore dedicated to my parents, Arthur and Louise Farber Reuter.

ACKNOWLEDGMENTS

To Dr. Robert E. Gustafson, Chairman of my guidance committee, for his professional assistance.

To the guidance committee members. Dr. Donald L. Smith, Dr. Adrian Koert, and Dr. George Myers, for their suggestions.

To Mr. James P. Foley, Kansas City Police Department, for his technical advice.

To the numerous colleagues who assessed, contributed, and encouraged the completion of this study.

To my wife Mary Ann, without whose understanding this task could not have been completed.

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CHAPTER I

THE PROBLEM

Due to the demands made on the driving skills of emergency vehicle operators, a need existed in Missouri for a comprehensive advanced driver education course applicable to state and local emergency vehicle operators. Previously, two federally funded projects had been developed by the Missouri Safety Center[1] that attempted to meet this need.

Examination of these studies showed:

1. Data collected was insufficient for an intensive statistical treatment.
2. Driver education simulation was used, disregarding the point that this simulation was designed for beginning drivers (and thus was dissimilar to the study group).
3. The length of time allotted classroom and range instruction varied, but in general each was longer than that proposed in this study.
4. These courses were designed specifically for police officers.
5. The course offering was geographically limited by the availability of special teaching equipment.

Apparently, since neither project was adopted on a continuing basis, the essential components of a comprehensive advanced

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[1]Missouri Safety Center, "The Missouri Highway Patrol Police Driving Techniques Workshop Program," unpublished report (Warrensburg: Central Missouri State University, July, 1971).

driver education course had not been identified. The selective allocation of federal funds had encouraged the continued search for a cost-effective program using current state-of-the-art methods.

During 1972, data from the second study indicated that 806 police vehicles were involved in 779 automobile accidents of various causes. This resulted in 141 injured officers and a work loss time totaling 693 man-days. This represented a loss of $27,720 in salaries alone to the department.[2] From these statistics, an indication for the need to reduce losses in men, dollars, and equipment became apparent.

Two key recommendations from these projects were significant and indicated that further research would be beneficial.[3] The recommendations were:

1. Curriculum modifications should be initiated to provide vehicle operation at higher speeds than was previously used, based on specialized high speed driving techniques.

2. A driver education program with special emphasis on safe emergency vehicle operation should be required for state law enforcement personnel.

The current study continued these efforts to provide effective education for emergency vehicle operators and did specifically develop a program in advanced driver education techniques.

This program was pilot tested by the Greater St. Louis Police Training Academy. After successful testing, a comprehensive

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[2]Ibid.

[3]Ibid.

course of study to meet the needs of all local and state emergency vehicle operators will be available in Missouri.

Importance of the Study

The operators of emergency vehicles are subject to a different type of driving experience than the average driver. Operation of a vehicle under emergency conditions contrasts greatly to the normal driving situation of the average automobile operator.

Motor Transportation Accident Rates (accidents per 1,000,000 vehicle miles) during 1971-1973, as reported to the National Safety Council, Fleet Safety Contest, showed an accident rate of 31.33 for police municipal patrol cars. This compared to an accident rate of 8.32 for passenger cars in non-police fleet usage reporting group. The average rate for all vehicles in fleet usage (trucks, buses, passenger cars, police vehicles) was 11.74.[4]

According to a study by the Vehicle Dynamics Laboratory at the General Motors Proving Grounds, a significant reduction in accidents and average cost per accident was shown for a trained group of police officers versus an untrained group. The trained group had a 50 percent reduction in accidents. The average cost per accident for the trained group was $289, while the untrained group had a cost of $1,474 per accident.[5] Although the preceding statistics applied only to the individual groups they represented,

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[4]National Safety Council, Accident Facts (Chicago: National Safety Council, 1974), p. 64.

[5]R. A. Whitworth, Development of an Advanced Driver Education Program (Milford, Michigan: General Motors Corporation, 1974).

inference from this information tends to support the high accident risk of police vehicle operation and the reduced accident involvement of trained police operators.

Purpose of the Study

The purpose of this study was to evaluate a curriculum of advanced driver education for emergency vehicle operators in Missouri.

Delimitations

This study was delimited in the following manner:

1. The curriculum was implemented with the St. Louis Metropolitan Police Department, Police Training Academy.
2. The control and experimental groups in this study were chosen from the St. Louis area by the driver training coordinator of the academy.
3. The subjects in the study groups were participants in this study as a regular part of their academy training.
4. Not all of the skill exercises in the original curriculum were able to be tested due to the physical character of the driving range facility available.

Limitations

This study was limited in the following manner:

1. The writer did not have the opportunity to randomly select the recruit class nor to assign the study groups.
2. It was the writer's intent to randomly select the recruit class from which the study groups were assigned. However, the academy driver training coordinator assumed this responsibility and did not randomly select or assign the recruit class.

3. Additional information on members of the study groups (i.e., age, length of employment, education, etc.) was not available.

4. During the four days of evaluation, interaction between the study groups could have occurred, regardless of specific instructions to the contrary.

5. The raters acted as evaluators and knew who the trained recruits and untrained recruits were.

6. Curriculum materials were given to the trained group after the pre-test of knowledge. This group was encouraged to study the materials.

The Hypotheses

The hypotheses to be tested in this study were:

$H_0 1$: There is no difference in performance on pre-tests of knowledge, low speed skill, and increased speed skill between the advanced driver education group and the control group, which does not receive advanced driver education.

$H_0 2$: There is no difference in performance on post-tests of knowledge, low speed skill, and increased speed skill between the advanced driver education group and the control group, which does not receive advanced driver education.

$H_0 3$: There is no difference in learning between groups receiving advanced driver education and not receiving advanced driver education as measured by differences in pre-test and post-test knowledge, low speed skill, and increased speed skill scores achieved by persons in either of the groups.

Definition of Terms

Advanced driver education: Instruction in knowledge and skill, related to defensive driving, perceptual ability, and evasive maneuvers for operators who are licensed and experienced drivers.

Defensive driving: A driver's positive attitude toward the driving environment which renders the driver accountable for his own action as well as the actions of those encountered in the driving environment.

Driver education program: A program specially designed to improve a driver's mental and physical abilities to operate a motor vehicle.

Emergency vehicle operator: An on-duty driver who acts as an operator of a motor vehicle in response to calls for immediate help related to fire, rescue, or law enforcement. Examples are drivers of fire equipment, ambulance drivers, and police officers.

Operator (or driver): The individual behind the steering wheel in actual control of a motor vehicle. For the purpose of this study, the terms operator and driver are synonymous.

Evasive maneuver: Actions a driver may be required to perform involving special techniques in braking, steering, acceleration, or deceleration to control the vehicle in order to avoid a potential accident.

Perceptual skills: Awareness through the senses and the intellect that enable drivers to accurately assess the environment in which they operate, by using their mental and physical abilities.

Low speed skill: Skill in advanced driving techniques, demonstrated by the performance of evasive maneuvers at speeds assigned in each exercise ranging from 20 to 35 miles per hour.

Increased speed skill: Skill in advanced driving techniques, demonstrated by the performance of evasive maneuvers at speeds assigned in each exercise ranging from 28 to 45 miles per hour.

Organization of the Study

Chapter II presents a review of the literature important in constructing a curriculum of advanced driver education for police, fire, and emergency vehicle operators. Chapter III contains a record of the methods used in evaluation of the curriculum. Chapter IV is a report and analysis of the findings. Chapter V contains the summary, conclusions, recommendations, recommendations for further research, and a discussion.

CHAPTER II

REVIEW OF LITERATURE

> Most police departments spend time and money to train an officer to handle a gun, but they accept a man's word, and his driver's license, as evidence that he is "thoroughly qualified" to handle a police vehicle. This, of course, is not a safe and reliable practice.[6]

The above statement is most germane to this study. The theme was repeated throughout much of the available information on police department safety programs. A review of the literature revealed various other reasoning for the creation of a training program for emergency vehicle operators.

The type of vehicle used as an emergency vehicle varied widely. In the case of police agencies, the vehicle was more than likely one with exceptional speed capabilities. For example, one Detroit automobile manufacturer made available in 1977 a "Police Pursuit" vehicle capable of 126 miles per hour top speed. This four-door sedan, similar to a family car, had the ability to cover a quarter of a mile in 16.3 seconds. Two handling characteristics of this vehicle were its "heavy understeer limited cornering" on the skid pan and the loss of traction under conditions of hard braking or

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[6]John J. McCleverty, Police Driver Training, Bulletin (Washington, D.C.: FBI Law Enforcement Commission, May 1970), p. 4.

acceleration.[7] Considering the speed and handling requirements of the vehicle, it seemed wise to train individuals who operate it before releasing that responsibility into their hands. This remained an important point when consideration was given to all the various types of vehicles used by emergency vehicle operators.

Certainly these two points--lack of training of the operator, and physical characters of the vehicle--are two of the best justifications for an educational program for operators of emergency vehicles.

There are also ethical and legal responsibilities to be considered, as recognized in a suggested code of conduct and in part of a state statute. Apparently, the criminal justice profession considered the emergency vehicle operator to be ethically bound to the safe operation of the emergency vehicle, as seen in this "Model Pursuit Policy":[8]

> H. Discontinuing the Pursuit
>
> 1. Officers involved in a pursuit must continually question whether the seriousness of the violation reasonably warrants continuation of the pursuit.
>
> 2. A pursuit shall be discontinued where there is a clear danger to the pursuing officers or the public. Example: When the speeds dangerously exceed normal traffic flow or when pedestrians or vehicular traffic necessitates unsafe maneuvering of the vehicle.
>
> The pursuing officers must consider present danger, seriousness of the crime, length of pursuit and possibility of identifying the subject at a later time when determining whether or not to continue pursuit . . . .
>
> 4. All officers involved in a vehicle pursuit will be held accountable for the continuation of

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[7] "Dodge Monaco Police Pursuit," Car and Driver 23 (July 1977): 47-50.

[8] "Model Pursuit Policy," Bulletin of the International Association of Chiefs of Police, 1973, p. 3.

> pursuit when the circumstances indicate the pursuit should be discontinued. Since the driver officer is primarily concerned with the safe operation of the police vehicle, the passenger officer is particularly responsible for advising the driver officer when he feels the pursuit is exceeding reasonable limits.

The revised statutes of Missouri concerning Emergency Vehicle Operation stated:

> 5. The driver of an emergency vehicle may: . . .
> 2. proceed past a red or stop signal or a stop sign but only after slowing down as may be necessary for safe operation
> 3. exceed the prima facie speed limit as long as he does not endanger life or property.

The writer believes these were significant responsibilities to be brought to the attention of those concerned with training emergency vehicle operators.

Motor vehicle accidents continue to be the most common cause of injury and damage in police department operations.[9] However, it seems that police vehicles involved in high speed pursuit and emergency runs were not the principal cause of this poor injury and damage record. In fact, this type of vehicle activity accounted for only a small percentage of the accident record. The following study gave an example of this.

A study of the accident records of the Missouri Highway Patrol for a six-year period (1970-1975) indicated an average of 195 accidents per year. Of that number, an average of 21 accidents per year occurred under conditions of emergency response driving (i.e., high speed with red lights and/or siren). This represented

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[9]National Safety Council, Public Employee Safety Guide (Chicago: National Safety Council, 1974), p. 6.

only 11 percent of the total number. Similar statistical information has been reported both nationally and by local police agencies.

The low incidence of accidents and injuries in pursuit driving apparently occurred because the occasion for emergency response was required for a small part of the work day. Also, the operator was more alert during this type of driving. However, it was generally agreed that the potential for accident causation was higher during this phase of vehicle operation due to higher speed, traffic flow, and other unpredictable environmental factors.

The question arises: What type of training will bring the desired result of lower accident rates among emergency vehicle operators? Some practices have been associated with accident reduction and some have not. Defensive driver training programs that included behind-the-wheel driving seemed to be more effective than programs that omitted this experience. However, it has been shown that the type of training given to drivers is not significant, whereas the manner in which the training was carried out was significant. This suggested that program effectiveness is judged by results, and not necessarily by content. Generally, departments with programs had less accidents than departments without programs.[10]

Information from a number of sources was gathered in order to give the writer some understanding of the types of programs that were being conducted. The following is a summary of these findings.

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[10]Ibid., p. 8.

The State Highway Patrol of North Carolina's publication entitled Police Pursuit Driving outlined a course of instruction consisting of 44 hours of training on a driving range.[11] Exercises included standard driver education procedures such as parallel parking and proper turning. Also, a number of exercises designed specifically for police procedures, such as stopping an errant motorist, were included. The publication's narrative description contained many safe operation tips on aspects of safe vehicle operation. This information seemed to be designed with the theory that techniques in the movements and operation of police vehicles were markedly different than standard driving. This was supported by the design of the exercises.

The Texas Transportation Institute, at Texas A & M University, developed two separate training programs.[12] One was a two-day program during which basic training was given on the range. These included operations with confined areas, braking, cornering, wet weather, and vehicle dynamics. The second program was a four-day training program that included all the information of the first, plus "exercises designed specifically to produce drivers capable of utilizing the vehicle to its fullest extent."[13] Examination of the exercises showed a great deal of similarity to the General Motors

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[11] E. W. Jones, Police Pursuit Driving (Raleigh, N.C.: North Carolina Department of Motor Vehicles, 1974).

[12] M. L. Edwards and R. Q. Brackett, "Development of a High Performance Driver Training Program," unpublished report (College Station: Texas A & M University, 1975).

[13] Ibid., p. 2.

Advanced Driving Techniques. The training exercises were designed on the basis of identification of the accident experience of five police agencies in Texas. Four categories of accident causation were identified. The fourth category--failure to keep a proper lookout--accounted for causation of 25 percent of all accidents. This study was based on research and sound educational principles.

Driver Training and Evaluation was a study prepared for the United States Department of Transportation with two major objectives: (1) to determine whether or not driver training programs do reduce driver errors, accidents, and therefore improve driving efficiency; and (2) to identify which training methods or combination of training methods were most effective.[14] The findings in this study indicated that training did in fact improve driving behavior and led to a reduction in both accidents and injuries. Further, comparisons indicated that the combined classroom and range training method was superior to either classroom or range training alone. With the exception of the methods of training and their procedures (i.e., various models), the training program itself used information already available.

A study by the California Highway Patrol offered an alternative to the educational method of reducing accidents.[15] In this

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[14]John A. Whittenburg et al., Driver Training and Evaluation (Washington, D.C.: U.S. Department of Transportation, June, 1974), p. i.

[15]R. A. Bieber and D. H. Margroff, "The Measurement of Drivers' Performance in Stressful Driving Situations," unpublished report (Sacramento: Department of California Highway Patrol, 1973).

study, a group of traffic officers who previously had preventable accidents during pursuits were matched with a similar group of officers who were accident-free. Both groups drove an instrumented vehicle at high speeds on a closed track, during which physiological and vehicle control data were recorded. Differences in skill, judgment, and heart-rate profiles under stress were observed to show a difference between the two groups.

Seven variables were found which distinguished between the groups and correctly classified 19 of the 20 drivers as "accident" and 17 of the 18 drivers as "non-accident" by their actions and reactions without the use of their driving records. The authors stated that the strength of the high correlation in their study was due to the fact that the subjects were exposed to genuine stresses and dangers. This was accomplished by the nature of the testing situation of range maneuvers under stressful circumstances. The subjects were performing at the limits of their ability and under severe stress. A discussion of "additional training" versus "screening method" weighed the values and drawbacks of each with a natural bias toward the latter. It was the writer's belief that several points must be considered. Systems of instrumented training and testing have been offered as a panacea to educational tasks in the past with only minimal final acceptance. While the study potentially could offer some future state of the art, additional studies will be needed to verify the primary experience. Finally, the environment of technical electronic equipment poses unanswered questions of cost, maintenance and reliability.

In 1969-1970, a project funded through the Missouri Division of Highway Safety and by contract with the Missouri Highway Patrol was given the Missouri Safety Center at Central Missouri State University. This pilot project was aimed at pre-service and remedial driver training for police.[16] A total of 180 participants were trained in the 10 workshop sessions. Each workshop involved 24 hours of instruction that included classroom instruction, driving simulation, and driving range activities.

A continuation of this project in 1970-1971 authorized another 23 workshops. An additional 297 were trained and the 24-hour format continued, with additions to the curriculum of new instructional techniques such as (1) selected subject matter in the classroom, (2) General Motors Advanced Driving Techniques exercises on the range, and (3) range exercises conducted at night.[17]

Of the 294 trainee evaluation forms actually received, the following information was noted:

1. In response to checking the most appropriate value (MUCH, SOME, LITTLE, NONE) received for the 4 phases of the curriculum (multi-media, simulation, range, classroom) the trainees ranked them as follows:
   (1) range
   (2) classroom
   (3) multi-media
   (4) simulation
2. In response to the question, "Would you have preferred to have more time in a particular teaching procedure?" the trainees' overwhelming answer was "Yes." 60% of the trainees indicated a desire for more range experience.

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[16]Missouri Safety Center, unpublished report, p. 1.

[17]Ibid., p. 1.

3. Approximately 45% of the trainees felt that the simulator experience had little or no value.
4. Of 277 responses, 56% indicated that they had not taken a high school driver education course. (This compared with the 1969-1970 project in which 70% of the trainees indicated that they had not taken a previous formal driver course.)[18]

Among the recommendations made in the summary of the above report, item 2 was identified as of particular significance:

2. To enhance trainee workshop participation curriculum modification should be initiated that will provide experience in:
   a. evasive/emergency vehicle operation at higher speeds to include the possibility of specialized high speed driving techniques;
   b. experimentation with pre-post written tests and driving evaluation should be continued;
   c. more research should be conducted in night vehicle operation, especially as it pertains to skid recovery and evasive/emergency maneuvers.[19]

The National Safety Council publication Public Employee Safety Guide (cited earlier in this review) offers a table summarizing suggested curriculum subjects for use in municipal police injury and damage reduction programs of driver training.[20] A list of 33 subjects were suggested under four titles: defensive driving, vehicle control at city speeds, vehicle control at expressway speeds, and special topics (i.e., techniques for stopping motorists). Thirty-two of the subjects were suitable for lecture training methods and 18 were suitable for range training methods. Concepts for this table were taken from nine existing training

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[18] Ibid., pp. 11-13.

[19] Ibid., p. 27.

[20] National Safety Council, Public Employee Safety Guide, p. 7.

programs across the nation. All of these sources are listed in the bibliography.

In a study for General Motors, Whitworth identified three basic causation factors in accidents. They were (1) impaired judgment due to alcohol, (2) misinterpretation of the driving task, and (3) improper control of emergency situations. While the effect of alcohol on driving was well-documented, it presented a social problem beyond the scope of the study. However, the misinterpretation of the driving task and improper control of emergencies did suggest a practical training approach. Further identified were the driving emergencies with a high degree of occurrence. They were (1) skids, (2) improper evasive maneuvers, (3) improper off-road recovery, and (4) improper braking. In response to these specific problem situations, a series of six training exercises were developed to improve interpretation of the driving task and to improve required driver reaction. These exercises were:

1. off-road recovery
2. skids
3. evasive maneuvers
4. controlled braking
5. tire blowout
6. serpentine course

The entire General Motors Advanced Driving Program was designed to be conducted in a single 7-1/2 hour period with 1-1/2 hours devoted to two classroom sessions and the remaining six hours devoted to driving range experience.

In a General Motors Proving Ground study, conducted in October of 1972, with the Oakland County, Michigan Sheriff's

Department, the trained group showed a 50 percent reduction in accidents as compared with the untrained group.[21]

It is important to note that several examples existed for suggested organizational and administrative principles to promote successful safety training programs in fleet vehicle usage. Gill cited the principles of enlisting the aid of top administrative approval in establishing a workable safety program and getting the active participation of top administrators in the program. This participation of the administration was a means of expressing the value of the program to others. Six essential elements crucial to the success of a program were identified: (1) planning, (2) organization, (3) assignment of duties, (4) training, (5) implementation, and (6) statistical follow-up review with corrective action.[22]

Petersen discussed three reasons for the failure of management to deal effectively with fleet safety programs: (1) lack of effective communication between the safety professional and those directly responsible for fleet management, (2) lack of professional preparation on the part of the safety specialist in fleet safety management techniques, and (3) lack of supervision and difference in environment (when comparing vehicle operation and industrial

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[21]R. A. Whitworth, "Traffic Safety and Driver Improvement," 1974 National Safety Congress Transactions, papers presented in the Traffic Sessions of the 62nd National Safety Congress.

[22]Captain J. Paul Gill, "A Workable Safety Program for Police," unpublished paper, Traffic Division, Metropolitan Nashville Police Department, September 1970.

plant operation). Selection of and training of the driver was of paramount importance.[23]

Summary

An urgent need exists for the training of operators of emergency vehicles. While the driving task of these operators indicates some additional important responsibilities, it remains a task similar to the operation of other vehicles on the roadway.

Various programs across the nation addressed themselves to the training needs and prevention of accidents by emergency vehicle operators. Information upon which to create an educational training program was readily available.

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[23]Dan Petersen, Techniques of Safety Management (New York: McGraw-Hill Book Company, 1971), p. 130.

CHAPTER III

DESIGN AND METHODOLOGY

The purpose of this study was to evaluate a curriculum of advanced driver education for emergency vehicle operators in Missouri. The need for this experimental study has been clearly demonstrated by the accident statistics for emergency vehicle operation[24] and through other prior research.

The Curriculum

The Missouri Safety Center, in cooperation with the Missouri Division of Highway Safety, conducted a pilot project for the training of emergency vehicle operators in advanced driver education. The Greater St. Louis Police Training Academy agreed to provide subjects for this project.

A review of the literature indicated a wide variety of training programs being conducted across the nation for operators of police vehicles. Very few programs included the state of the art of today's driver and traffic safety education. Few programs were the product of a strong statistical analysis to insure continued program evaluation and development.

Curriculum information for this project was collected and reviewed over a four-month period. Contributions to the curriculum

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[24]National Safety Council, Accident Facts, p. 64.

came from research of the literature, and from suggestions by professionals in the field of driver and traffic safety education. The Missouri Safety Center provided invaluable assistance in light of its past experience. At the end of this period, the initial curriculum material had been selected. The major combination of elements selected for the curriculum were:

1. The National Safety Council's "Defensive Driving Course"
2. The Maryland State Department of Education's "System of Perceptual Driving"
3. The General Motors Proving Grounds' "Evasive Maneuvers Course"

In October, 1975, six officers of the Greater St. Louis Police Academy arrived at Central Missouri State University Driver Education Instructional Park for their instructor training. This training introduced these future instructors to the curriculum. The training also allowed the curriculum to be pilot-tested. Twenty-four hours of classroom and range study were given during the three-day session to serve as preparation for these trainee-instructors, to return to St. Louis where they would begin teaching police academy recruits.

Revision of the curriculum was based on the experiences gained from the training given the instructors. Because the instructors had taken driver training courses before and had experience in teaching recruits at the academy, the instructors were uniquely qualified to make suggestions for improving the curriculum. The curriculum began to take its final form:

1. A system approach to understanding the driving task

2. A visual perception system to improve the driver's visual habits

3. A series of advanced driver education range exercises to improve driver skills

This revised curriculum was examined for face validity by professionals in the field of driver and traffic safety education. Those professionals were:

Central Missouri State University
- Dr. Robert L. Baldwin
- Dr. James R. Counts
- Dr. Robert A. Ulrich

Eastern Carolina University
- Dr. Alfred J. King
- Mr. Raymond Ochs

General Motors Proving Grounds
- Mr. Richard Whitworth
- Mr. Russel Beadle
- Mr. William Moss

Michigan State University
- Dr. Robert O. Nolan
- Dr. Donald L. Smith

Upon the return of the curriculum materials, suggested changes and additions were evaluated and incorporated. However, because the curriculum was well received by the reviewers, revisions were of a minor nature.

The curriculum was printed and delivered to the Greater St. Louis Police Academy in late February, 1976. The format of the printed curriculum was:

1. Student Manual--Phase One--Classroom:
   6 hours of modular classroom study, with visuals (see Appendix A)

Student Manual--Phase Two--Range Experience: Performance objectives for knowledge and skill evaluations, 10 hours of advanced range activities (see Appendix A)

2. Instructor's Manual--a two-phase supplement to the Student Manual with pre-tests and post-tests for knowledge and skill (see Appendix B)

During the four months between instructor training and the delivery of the final curriculum, the academy began to train recruits in the program. This served to familiarize the instructors with the curriculum materials and was consistent with the training program that the instructors had received.

The Study Group

The study group consisted of 24 persons chosen from a group of 38 recruits in training during the months of March and April of 1976 in the Greater St. Louis Police Academy. A choice of groups was available according to the academy-scheduled time of training. This group of 24 was chosen because they appeared to represent a more heterogeneous cross section from the greater metropolitan area of St. Louis. The recruits were divided into the two groups of 12 by the academy driver training coordinator. One group was designated to remain untrained.

Pre-Tests and Post-Tests

Pre-tests and post-tests of knowledge and skill contained in the curriculum were composed in the following manner.

Thirty-five multiple choice questions were constructed by the writer from the classroom phase of the Operator's Manual. The

questions were chosen to represent the most important objectives of knowledge information contained in the classroom phase of the curriculum. A five-answer choice format was chosen to reduce the chance of guessing correctly. Estimated time for completion of the test was 20 minutes, based on pilot testing of the instrument in college safety classes. The same test instrument was used for pre-testing and post-testing of curriculum knowledge. (A sample of this test is in Appendix C.)

Individual skill rating sheets were constructed by the writer for each of the seven low speed range exercises. Separate individual skill rating sheets were constructed for the seven increased speed range exercises. The seven low speed rating sheets and the seven increased speed skill rating sheets were similar, with the exception of speed in executing the exercise. The composition of the skill rating sheets was based on the behavioral objectives in the range phase of the Operator's Manual. Total possible points for successful completion of a skill exercise was 50 points. Visual procedure and steering inputs were weighted by a score of 10 to emphasize a higher priority of importance. Hand position, speed, and other variables were valued at 5 points. Range safety procedure and pre-driving check were required before any exercise was allowed to begin. To add objectivity to the operator's task by their awareness of the evaluation instrument the skill exercise rating sheets were included in the Operator's Manual. (The 14-Skill-Test Rating Sheets are in Appendix D.)

Evaluation Team

One month after delivery of the curriculum, a teacher from the Missouri Safety Center conducted an evaluation in St. Louis. This evaluation took three days. The evaluation team consisted of:

Supervisor--Fredrick W. Reuter
Graduate Assistants--Michael Huddelston
Leslie Opat
David Pavel

An instructor from the academy driver training program taught the classroom phase of the curriculum. The evaluation team supervisor administered the pre-tests and post-tests of knowledge. The evaluation team members gave instruction to the trained group, between the pre-test and post-test of skill.

The three evaluation team members (i.e., primary raters) were responsible for administering the pre-tests and post-tests of skill. Their qualifications included:

1. college preparation as a driver education teacher
2. teaching experience in numerous advanced driving workshops at Central Missouri State University
3. practice use of the curriculum skill rating sheets prior to arrival in St. Louis

In addition, the evaluation team members were able to become familiar with the St. Louis range by driving each of the exercises. The team members assumed the "Primary Raters" position in the right front seat. "Secondary Raters" were instructors from the Academy Program who rode in the right rear seat position and used this opportunity to practice their ability in use of the evaluation instrument. Upon arrival in St. Louis, a period of time was

allotted for primary and secondary raters to practice the skill rating procedure.

The Data

Two types of data were gathered for evaluation of the curriculum: (1) data on knowledge and (2) data on skill.

Data on knowledge of the classroom phase of the curriculum was collected by means of the pre-tests and post-tests. Two sets of group scores were derived from these multiple choice questions:

1. from the study group before and after introduction to the curriculum (i.e., trained group)
2. from the control group that did not receive the curriculum materials (i.e., untrained group)

Data on the skill of the range phase of the curriculum was collected by means of pre-tests and post-tests. Due to the constraints of the particular range area, four skill exercises could not be conducted. Exercises 6 and 13 (off-road recovery) and exercises 5 and 12 (tire failure) were not used. Five skill exercises were conducted. They were:

1. serpentine
2. skid control
3. control braking
4. evasive maneuver
5. double lane change

Skill in each exercise was rated at two speeds: (1) low speed skill and (2) increased speed skill.

The trained group was given instruction according to the range curriculum between the pre-test and post-test ratings. The untrained group was given the pre-test and post-test without

practice, instruction, or explanation. Both groups received standard range instruction before entering the range exercise (see Appendix E). Since the classroom and range facilities were not at the same location, the trained group and the untrained group were not able to observe each other. (Primary raters and secondary raters scores are in Appendix F.)

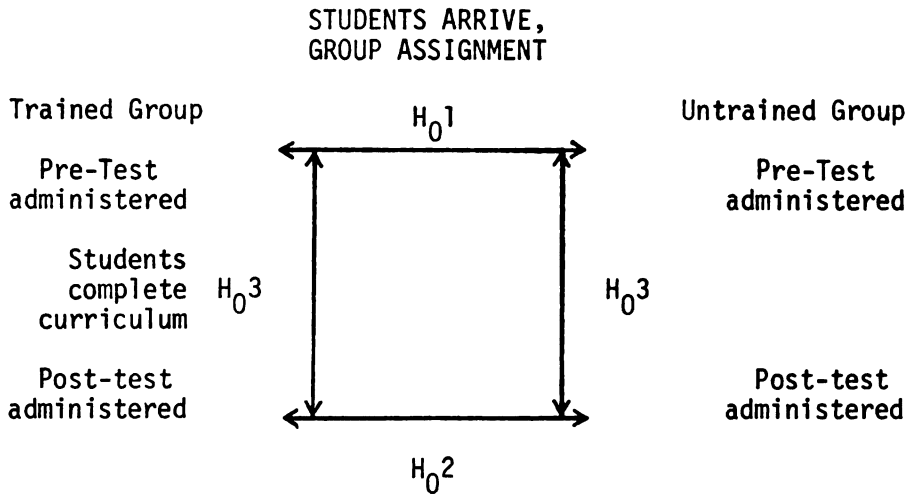
Procedure of Analysis

Pre-test and post-test scores of the knowledge test and skill test are presented in tabular form for direct comparison for the trained group and the untrained group. Each data set is presented graphically. The means of the scores were compared statistically via a t-test to determine if significant differences existed at the .05 level of significance. The following illustrates this procedure:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{s_{\bar{x}_1 - \bar{x}_2}}$$

$$\text{level of significance} = .05$$

The following is a diagrammatic indication of the experimental design:



ANALYSIS OF DATA

Hypotheses

The following are restatements of the hypotheses to be tested by this research:

$H_0$1: There is no difference in performance on pre-tests of knowledge, low speed skill, and increased speed skill between the advanced driver education group and the control group, which does not receive advanced driver education.

$H_0$2: There is no difference in performance on post-tests of knowledge, low speed skill, and increased speed skill between the advanced driver education group and the control group, which does not receive advanced driver education.

$H_0$3: There is no difference in learning between groups receiving advanced driver education and not receiving advanced driver education as measured by differences in pre-test and post-test knowledge, low speed skill, and increased speed skill scores achieved by persons in either of these groups.

Summary

The purpose of this study was to evaluate a curriculum on advanced driver education for emergency vehicle operators in Missouri.

The Missouri Safety Center conducted a pilot project for the training of emergency vehicle operators in advanced driver education. The Greater St. Louis Police Academy agreed to serve as the study for this project.

Curriculum materials were collected in October of 1975 and instructor training was held. Revision of the curriculum occurred during the next four months. Delivery of the curriculum to the Greater St. Louis Police Academy occurred in February of 1976.

A study group of 24 persons was chosen in April of 1976. This group was divided into two groups of 12 each. The trained group received the curriculum and instruction while the untrained group did not receive the materials or instruction. Pre-tests and post-tests of knowledge in the classroom and skill on the range were administered accordingly.

The means of the scores were compared statistically via a t-test to determine the significance of the test scores. The .05 level of significance was used in the statistical analysis of this study.

CHAPTER IV

ANALYSIS OF THE DATA RESULTS

This chapter presents the statistical evaluation of the curriculum. The raw data of the subjects' performance were obtained from tests administered before and after the administration of the curriculum (i.e., pre-tests and post-tests). The subjects for this study were a group of 24 recruits of the Greater St. Louis Police Academy. The subjects were divided into two groups: 12 subjects in the trained group, who received the curriculum and instruction, and 12 subjects in the untrained group, who did not receive the curriculum or instruction. All subjects were encouraged to do their best in each aspect of testing. Because of the participatory nature of the curriculum, cooperation from members of the trained group was excellent. All mean scores were tested for significant differences via Student's t-test. The .05 level of significance was used for all tests. The formula used was:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{s_{\bar{x}_1 - \bar{x}_2}}$$

Comparison of Pre-Test Mean Scores: Trained Group Versus Untrained Group

The following is a restatement of Hypothesis $H_0 1$: There is no difference in performance on pre-tests of knowledge, low speed

skill, and increased speed skill between the advanced driver education group and the control group which does not receive advanced driver education. Figures 1, 2, and 3 represent the data relative to the three elements of Hypothesis $H_0$1.

Figure 1 presents the pre-test knowledge mean scores for the trained group and the untrained group. The trained group had a mean score of 20.3, while the untrained group had a mean score of 17.25. The 3.05 difference of the means exceeded the critical value of 2.07 and was therefore significant at the .05 level. The first element of $H_0$1 is rejected (i.e., no difference exists in performance on pre-test knowledge between the study groups). A difference did exist in performance on pre-test knowledge between the trained group and the untrained group.

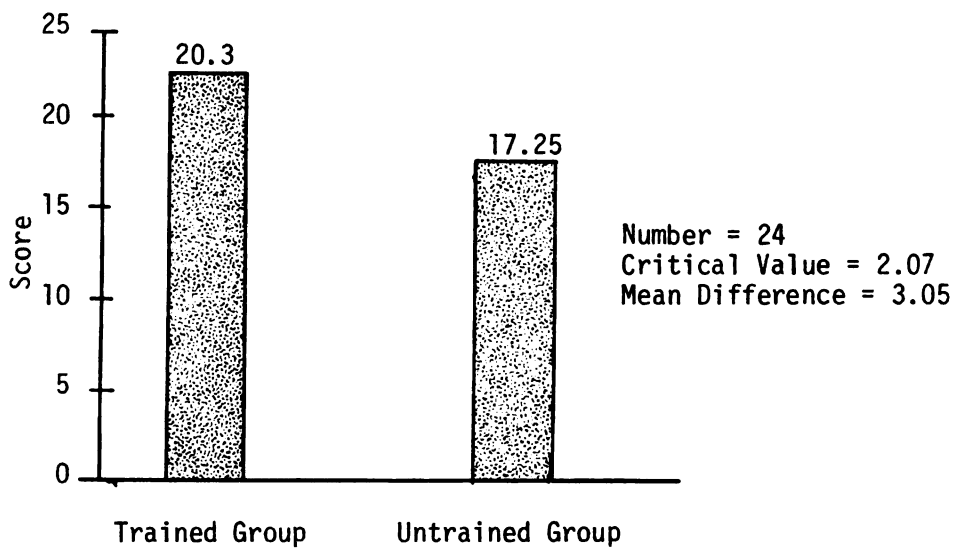


Figure 1.--Pre-Test Knowledge Mean Scores: Trained Group Versus Untrained Group.

Figure 2 presents the pre-test low speed skill mean scores for the trained group and the untrained group. The trained group had a mean score of 184.25, while the untrained group had a mean score of 145.25. The 39.0 difference of the means exceeded the critical value of 2.07 and therefore was significant at the .05 level. The second element of $H_0 1$ is rejected (i.e., no difference exists in performance on the pre-test low speed skill between study groups). A difference did exist in performance on pre-test low speed between the trained group and the untrained group. The trained group scored significantly higher.

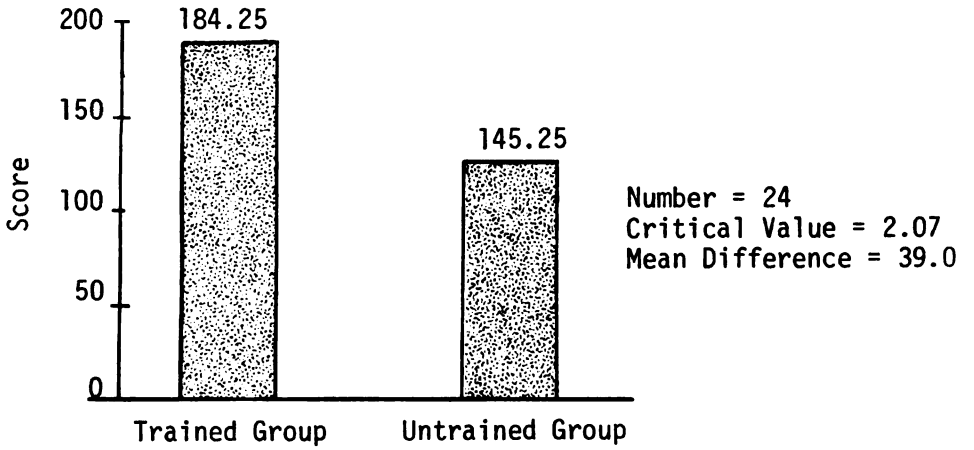


Figure 2.--Pre-Test Low Speed Skill Mean Scores: Trained Group Versus Untrained Group.

Figure 3 presents the pre-test increased speed skill mean scores for the trained group and the untrained group. The trained group had a mean score of 165.67, while the untrained group had a mean score of 136.67. The 29.0 difference of the means exceeded

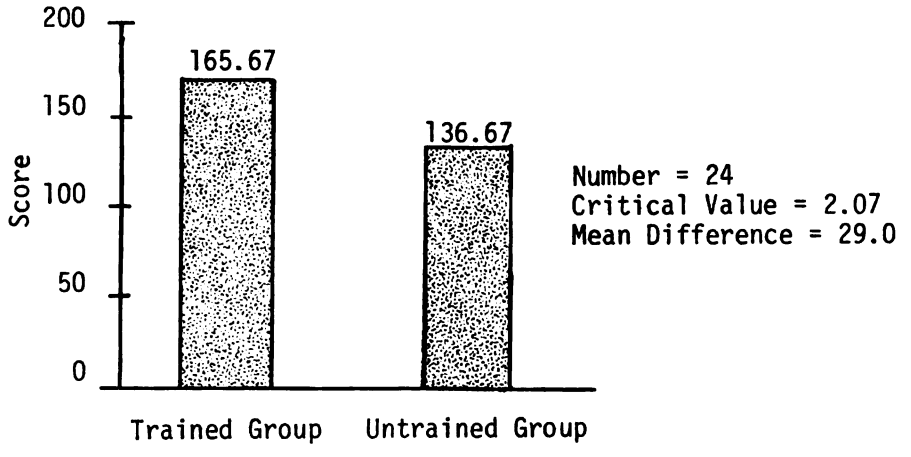


Figure 3.--Pre-Test Increased Speed Skill Mean Scores: Trained Group Versus Untrained Group.

the critical value of 2.07 and therefore was significant at the .05 level. The third element of $H_0 1$ is rejected (i.e., no difference exists in performance on the pre-test increased speed skill between the study groups). A difference did exist in performance on pre-test high speed skill between the trained group and untrained group. The trained group scored significantly higher.

On the basis of the scores presented in Figures 1, 2, and 3 (the comparison of pre-tests of knowledge, low speed skill, and increased speed skill mean scores for trained group and untrained group), $H_0 1$ is rejected. There was a significant difference via a t-test between the mean scores; thus, the study groups were not homogeneous before the curriculum was administered.

Comparison of Post-Test Mean Scores: Trained Group Versus Untrained Group

The following is a restatement of Hypothesis $H_0 2$: There is no difference in performance on post-tests of knowledge, low speed skill, and increased speed skill between the advanced driver education group and the control group which does not receive advanced driver education. Figures 4, 5, and 6 present data relative to the three elements of Hypothesis $H_0 2$.

Figure 4 presents the post-test knowledge mean scores of the trained group and of the untrained group. The mean score of the trained group was 25.67. The mean score of the untrained group was 19.56. The 6.11 difference of the means exceeded the critical value

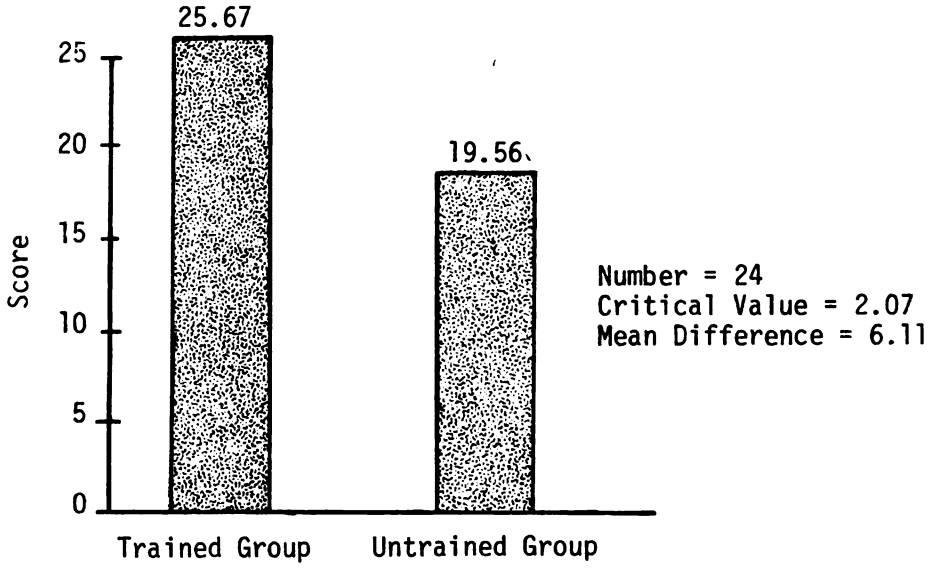


Figure 4.--Post-Test Knowledge Mean Scores: Trained Group Versus Untrained Group.

of 2.07 and therefore was significant at the .05 level. The first element of Hypothesis $H_0 2$ was rejected (i.e., there is no difference in performance on post-test knowledge between the groups). There was a significant difference in performance on post-test knowledge between the groups. The trained group scored significantly higher.

Figure 5 presents the post-test low speed skill mean scores of the trained group and the untrained group. The mean score of the trained group was 210.50. The mean score of the untrained group was 166.37. The 44.13 difference of the means exceeded the critical value of 2.07 and therefore was significant at the .05 level. The second element of Hypothesis $H_0 2$ is therefore rejected (i.e., there is no difference in performance in post-test low speed skill between

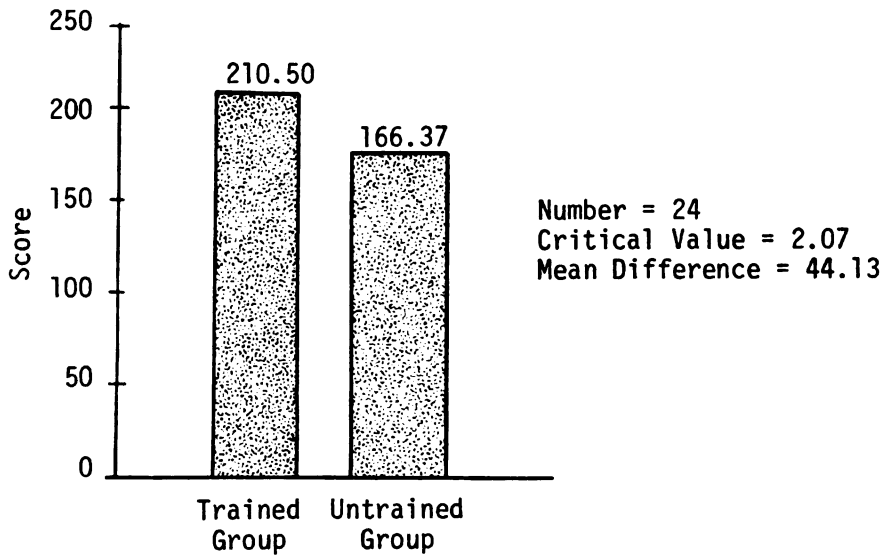


Figure 5.--Post-Test Low Speed Skill Mean Scores: Trained Group Versus Untrained Group.

the groups). The trained group significantly improved their scores.

Figure 6 presents the scores of post-test increased speed skill mean scores for the trained group and untrained group. The trained group had a mean score of 211.83, and the untrained group had a mean score of 149.0. The 62.83 difference of mean scores exceeded the critical value of 2.07 and therefore was significant at the .05 level. The third element of $H_0 2$ is rejected (i.e., there is no difference in performance on the post-test increased speed skills between the groups). The trained group significantly improved their scores.

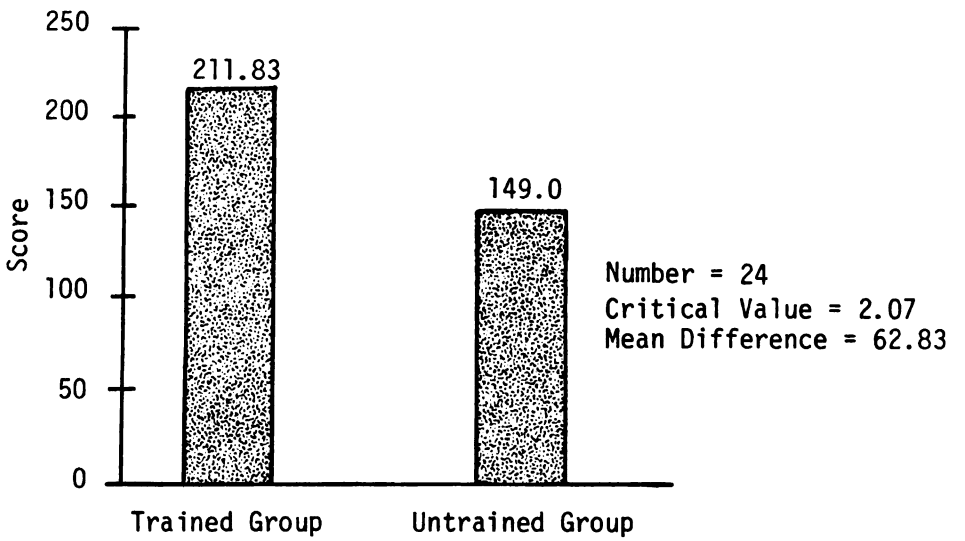


Figure 6.--Post-Test Increased Speed Skill Mean Scores: Trained Group Versus Untrained Group.

On the basis of the scores presented in Figures 4, 5, and 6 (the comparison of post-test knowledge, low speed skill, and increased speed skill for trained and untrained groups), Hypothesis $H_0 2$ is rejected. The trained group scored higher than the untrained group on each of the three elements of the post-tests.

Comparison of Trained Group Versus Untrained Group by Pre-Test and Post-Test Mean Scores

The following is a restatement of Hypothesis $H_0 3$: There is no difference in learning between groups receiving advanced driver education and those not receiving advanced driver education as measured by differences in pre-test and post-test knowledge, low speed skill, and increased speed skill scores achieved by persons in either of the groups. Figures 7, 8, 9, 10, 11, and 12 present data relative to the six elements of Hypothesis $H_0 3$.

Knowledge Test

Figure 7 presents the pre-test and post-test knowledge mean scores for the trained group. The trained group pre-test knowledge mean score was 20.33, and the post-test mean score was 25.67. A difference of the means of 3.34 indicates that the trained group did improve the score between the pre-test and the post-test on knowledge. A comparison of the mean scores via t-test indicates the following:

$$t = \frac{20.33 - 25.67}{1.0214} = -5.23$$

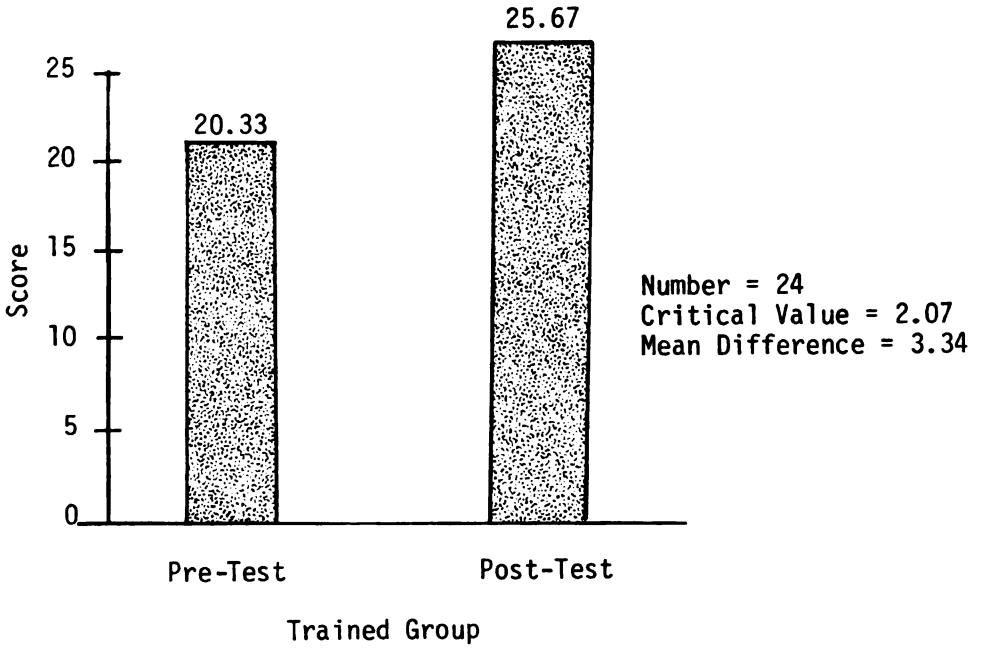


Figure 7.--Pre-Test and Post-Test Knowledge Mean Scores: Trained Group.

The t-test score of -5.23 is significant at the .05 level with a critical value of 2.07. Therefore, the first element of $H_0 3$ was rejected (i.e., there is no difference in learning for the trained group as measured by differences in pre-test and post-test knowledge scores). The trained group had a significant mean increase on the knowledge test.

Figure 8 presents the pre-test and post-test knowledge mean scores of the untrained group. The pre-test knowledge mean score was 17.25, and the post-test knowledge mean score was 19.56. The difference between these pre-test and post-test knowledge mean scores was 2.31. This indicated that the untrained group did raise their score between the pre-test and post-test application.

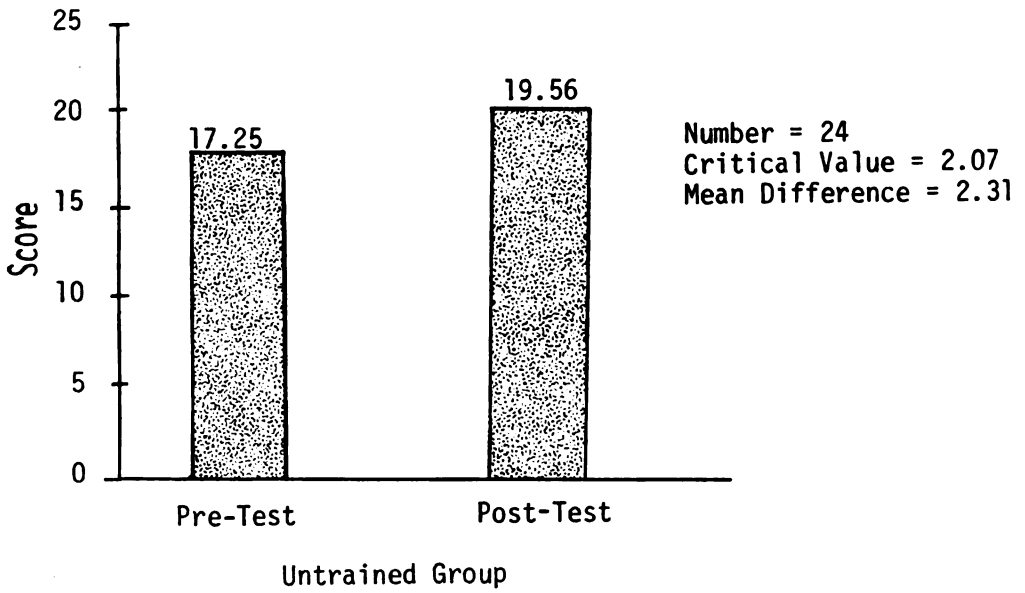


Figure 8.--Pre-Test and Post-Test Knowledge Mean Scores: Untrained Group.

However, a comparison of the mean scores via t-test indicates the following:

$$t = \frac{17.25 - 19.56}{1.4905} = -1.55$$

The t-test score of -1.55 was not significant at the .05 level, with a critical value of 2.07. The untrained group did not improve their pre-test and post-test knowledge scores significantly. The second element of $H_0 3$ was rejected (i.e., there is no difference in pre-test and post-test knowledge scores as achieved by persons in either of the groups. The trained group showed a significant improvement on the knowledge test, while the untrained group did not.

Low Speed Skill Test

Figure 9 presents the pre-test and post-test low speed skill mean scores for the trained group. The pre-test mean score was 184.25, and the post-test mean score was 210.50. The difference between the pre-test and post-test low speed skill mean scores was 26.25. The trained group did improve their mean score between the pre-test and post-test on the low speed skill tests. Comparison of the mean scores via t-test was as follows:

$$t = \frac{184.25 - 210.50}{5.7550} = -4.56$$

The t-test score of -4.56 was significant at the .05 level with a critical value of 2.07. The third element of $H_0 3$ was rejected (i.e., there is no difference in pre-test and post-test low speed skill

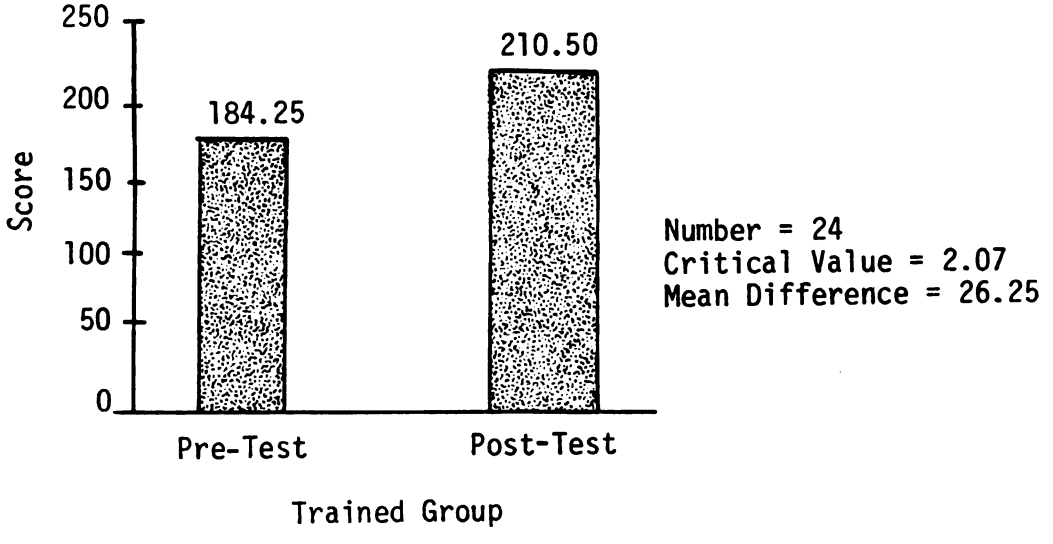


Figure 9.--Pre-Test and Post-Test Low Speed Skill Mean Scores: Trained Group.

mean scores of the trained group). The trained group did show significant improvement between their pre-test and post-test scores on low speed skill.

Figure 10 presents the pre-test and post-test low speed skill mean scores of the untrained group. The pre-test score was 145.25, and the post-test score was 166.37. A difference of the means of 21.12 existed between the pre-test and post-test mean scores. The untrained group did improve their scores significantly on the post-test low speed skill. A comparison of the scores via t-test indicated the following:

$$t = \frac{145.25 - 166.37}{9.4238} = -2.24$$

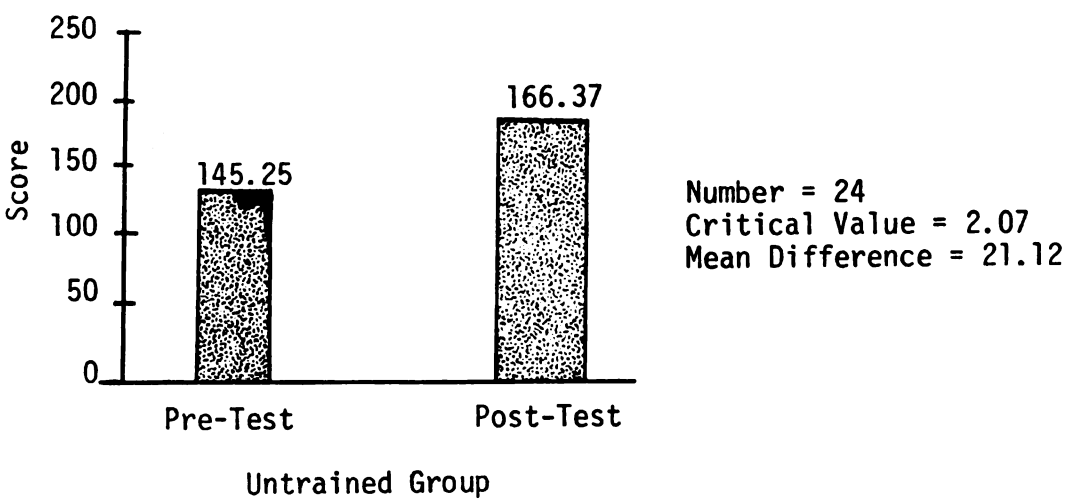


Figure 10.--Pre-Test and Post-Test Low Speed Skill Mean Scores: Untrained Group.

This t-test score of -2.24 was significant at the .05 level with a critical value of 2.07. Thus, the fourth element of $H_0 3$ was accepted (i.e., there is no difference in pre-test and post-test low speed skill mean scores of the untrained group). The untrained group showed an improvement on their mean scores pre-test and post-test low speed skill.

Increased Speed Skill Test

The pre-test and post-test high speed skill mean scores for the trained group are shown in Figure 11. The pre-test mean score was 165.67, and the post-test mean score was 211.83. The difference between these pre-test and post-test mean scores was 46.16. A comparison of t-test scores was as follows:

$$t = \frac{165.67 - 211.83}{6.7610} = -6.83$$

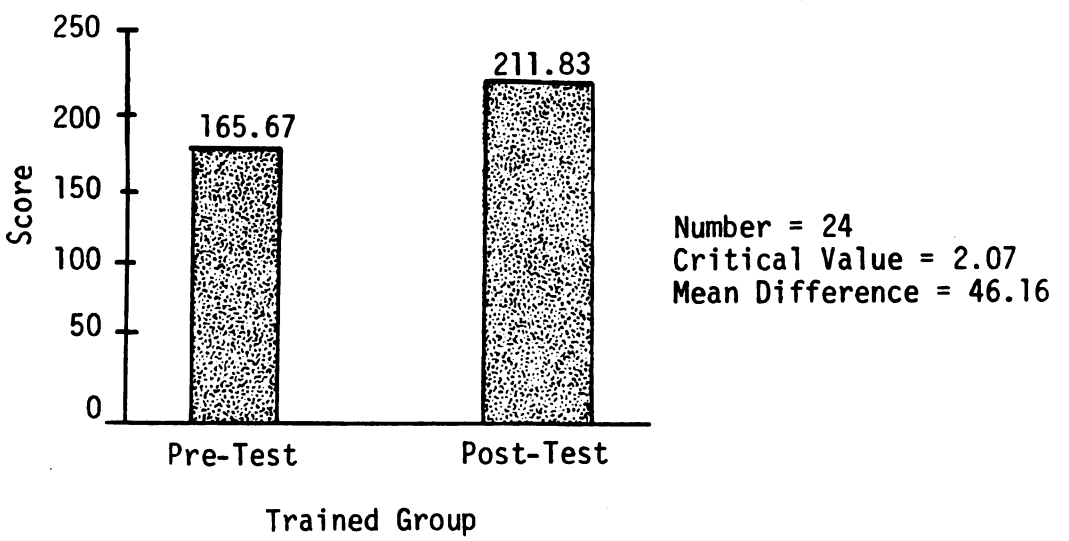


Figure 11.--Pre-Test and Post-Test Increased Speed Skill Mean Scores: Trained Group.

The t-test score of -6.83 was significant at the .05 level with a critical value of 2.07. The fifth element of $H_0 3$ was rejected (i.e., there is no difference in pre-test and post-test increased speed skill scores of the trained group). The trained group significantly improved their mean scores between pre-test and post-test on increased speed skill.

Figure 12 presents the pre-test and post-test increased incr speed skill mean scores for the untrained group. The pre-test score was 136.67, and the post-test score was 149.0. The difference between pre-test and post-test increased speed skill mean scores was 12.33. While this was a slight improvement in mean scores, a comparison of mean scores via t-test showed the following:

$$t = \frac{136.67 - 149.0}{9.4238} = -1.30$$

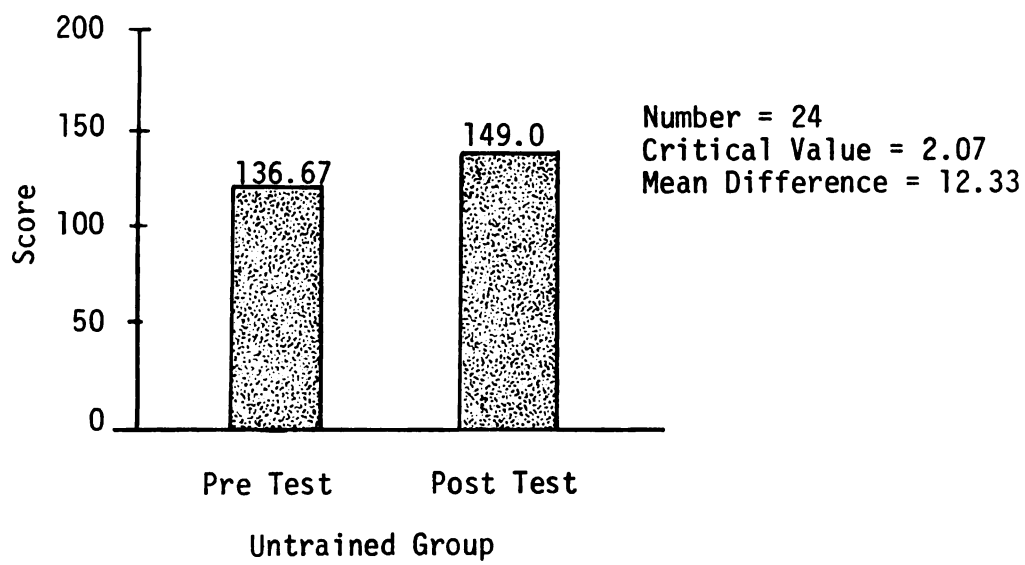


Figure 12.--Pre-Test and Post-Test Mean Scores Increased Speed Skill: Untrained Group.

The t-test score of -1.30 is not significant at the .05 level with a critical value of 2.07. The difference between the groups on increased speed skill test mean scores as indicated in the sixth element of $H_0 3$ was rejected (i.e., there is no difference in pre-test and post-test mean scores of increased speed skill of the untrained group).

On the basis of the scores presented in Figures 7 through 12 (i.e., the comparison of pre-test and post-test mean scores for the trained group and the untrained group), two elements of Hypothesis $H_0 3$ were rejected. There was a difference in learning between the group receiving advanced driver education and the group not receiving advanced driver education, as measured by the differences in the pre-test and post-test knowledge and increased speed skill scores as achieved by persons in either of the groups. However, the low speed skill test did not differentiate between the groups. It is important to note that as the degree of difficulty increased in the skill exercises that the untrained group failed to show significant improvement. No significant improvement was shown between the pre-test and post-tests by the untrained group in either tests of knowledge or increased speed skill.

Summary

The information presented in Chapter IV is an analysis of the data for pre-test and post-test on knowledge and skill as scored by the trained group and by the untrained group of the

study. These data received statistical treatment via a t-test and the results compared to Hypotheses $H_0 1$, $H_0 2$, and $H_0 3$.

Hypothesis $H_0 1$ stated that no difference would exist between the groups in scores on pre-tests of knowledge, low speed skill, and increased speed skill. Differences did exist in each of the three elements of this hypothesis; therefore, the Hypothesis $H_0 1$ was rejected. The trained group and the untrained group were not homogeneous.

Hypothesis $H_0 2$ stated that there would be no difference between the groups in performance on post-tests of knowledge, low speed skill, and increased speed skill. These differences did exist in each of the three elements of this hypothesis; therefore, Hypothesis $H_0 2$ was rejected.

Finally, Hypothesis $H_0 3$ stated that there would be no differences in learning within groups as measured by differences in pre-test and post-test scores of knowledge and skill. Two of the three differences did exist, and Hypothesis $H_0 3$ was partially rejected. On two of the elements involving pre-test and post-test scores of knowledge and increased speed skill, the trained group significantly improved their scores, whereas the untrained group did not. On the third element comparing pre-test and post-test scores of low speed skill, both the trained group and the untrained group improved their scores significantly. This improvement by the untrained group caused this element of $H_0 3$ to be accepted.

CHAPTER V

SUMMARY, CONCLUSIONS, RECOMMENDATIONS, AND DISCUSSION

The final chapter of the study contains the following sections: (1) a summation of this study including a summary of the major findings; (2) the conclusions these data warrant; (3) recommendations; (4) the recommendations for future research; and (5) a discussion.

Summary

The primary purpose of this study was to evaluate a curriculum in advanced driver education for emergency vehicle operators in Missouri. A curriculum was developed based on research of current and past training programs for emergency vehicle operators. Professionals in the field of driver and traffic safety education reviewed the curriculum and appropriate modifications were made.

The evaluation of this curriculum involved 24 recruits from the Greater St. Louis Police Academy. Pre-tests and post-tests of knowledge and of skill were administered to 12 recruits who received the curriculum (i.e., the trained group), and to 12 recruits who did not receive the curriculum (i.e., the untrained group). These data were collected in March of 1975.

The means of the test scores were compared statistically via t-test to determine if a significant difference existed at the .05 level of significance. Three hypotheses were tested using this method. The following is a summary of the major findings:

1. $H_0$1 stated "there is no difference in performance on pre-tests of knowledge, low speed skill, and increased speed skill between the advanced driver education group and the control group which did not receive advanced driver education." This hypothesis was rejected because in each pre-test (knowledge, low speed, and increased speed) the data showed a significant difference between the groups. The data showed a difference did exist between the trained group and the untrained group before the study began.

2. $H_0$2 stated that "there is no difference in performance on post-test of knowledge, low speed skill, and increased speed skill between the advanced driver education group and the control group which does not receive advanced driver education." This hypothesis was rejected because the data showed a significant difference existed in performance between the trained group and the untrained group on post-test scores of knowledge, low speed skill, and increased speed skill. The trained group had received the curriculum materials before the post-test, while the untrained group had not.

3. $H_0$3 stated "there is no difference in learning between the group receiving advanced driver education and the control group which did not receive advanced driver education, as measured by differences in pre-test and post-test knowledge, low speed skill,

and increased speed skill scores achieved by persons in either group." This hypothesis was rejected because there was a significant difference in learning between the trained group and the untrained group as measured by the differences in pre-test and post-test scores on knowledge and increased speed skill tests. The trained group significantly improved their pre-test and post-test scores on the knowledge test, while the untrained group showed no significant improvement on these scores.

The trained group and the untrained group both significantly improved their pre-test and post-test scores on low speed skill. The hypothesized difference between the groups was shown by the difference in the scores on low speed skill tests.

The trained group significantly improved their scores on pre-test and post-tests on increased speed skill. The untrained group showed no significant improvement in these scores.

Conclusions

The following are the conclusions warranted by the data gathered in this study:

1. The subjects were not homogeneous before the study began. Selection of recruits for this study was not done randomly. Therefore, the results can be applied only to study groups.

2. The untrained group was apparently able to significantly increase their test scores on low speed skill by skills learned in the performance of the pre-test.

3. The untrained group was not able in most cases to significantly improve their test scores in knowledge and skill. This was most apparent in post-test increased speed skill, where the greatest difference in mean scores was shown.

4. The trained group was able to improve their scores as measured by the differences between pre-test and post-tests on knowledge and skill. This is most apparent on the post-test increased speed skill. The degree of difficulty was highest on this skill, and the trained group showed significant improvement on this skill.

5. The curriculum was considered successful because the trained group significantly increased their post-test mean scores, while the untrained group did not (with the exception of the low speed skill testing).

6. The development and evaluation of this curriculum is considered successfully accomplished.

Recommendations

Because of the experience gained by the development and evaluation of this curriculum for advanced driver education for emergency vehicle operators, the following recommendations are made:

1. Urban police, fire, and rescue vehicle operators throughout the state of Missouri should be given the opportunity to be trained in this curriculum.

2. Rural police, fire, and rescue vehicle operators throughout the state of Missouri should be given the opportunity to be trained in this curriculum.

3. The Missouri State Highway Patrol should give each of its patrol officers the opportunity to be trained in this curriculum as part of their basic training program.

4. A task analysis for police officers on patrol should be developed in order to identify the interrelationships of driving and patrol duties (i.e., surveillance, radio operation, etc.).

5. More emphasis should be placed on the "perceptual skills" part of the classroom information as it relates to driving in the skill exercises.

6. As this curriculum is used, it should be continuously evaluated and judiciously abridged when needed.

Recommendations for Future Research

The following recommendations for future research are made:

1. In order to insure homogeneity of the subjects in each group, there should be random selection of subjects for both the study and control groups.

2. Further research needs to be conducted to establish validity and reliability for the study's evaluation instruments. Special attention should be given to the low speed skill test so that an instrument capable of discrimination can be developed despite the elementary level of skills involved.

3. A follow-up study comparing accident records of the two groups should be conducted to determine if the curriculum had any long-range effect on accident rate in the study group members.

4. Further statistical analysis of the study group through accident records should be conducted and compared against the results of this present study.

5. The need for adequate driving range facility should be recognized so that a complete program can be conducted (including all exercises provided for in the curriculum).

6. All future instructors of this curriculum should be trained in the same manner as in this study, in order to insure a consistently high program level.

7. The need for adequate funding for classroom and range facilities should be recognized in advance of implementation of the curriculum program so that a complete and comprehensive application of the curriculum may be made.

Discussion

Although the accepted method of randomization was not used for the selection of the study group, it was the writer's observation that the study groups were not visibly different.

By the same observation, the evaluation procedure in skill exercises was considered to be a necessarily fatiguing experience for the raters. Consideration should be given to providing a longer time period in which to complete these skill exercise evaluations. Some raters, including secondary raters, became ill due to the rough maneuvers required.

One of the strong features of this curriculum which was not measured by the evaluation was the enthusiasm of the subjects in the trained group for both the classroom and the range programs. The prospect of the challenge in actual behind-the-wheel experience

at skill exercises seemed to gain the interest of the most skeptical participant.

Unsolicited responses from the subjects who had completed the curriculum indicated numerous opportunities for practical application of the curriculum information. In these cases, the subjects expressed the opinion that their training had resulted in an improved ability in accident avoidance.

The reason for the untrained group's significant improvement on low speed skill post-test scores is difficult to identify. One should consider that the basic level of skill required and the speed used is low enough that the testing procedure alone could cause enough increase in learning to allow a significant improvement in post-test scores. It should be noted that when a higher order of skill and speed were needed, as in the increased speed skill exercises, the trained group showed a large and significant improvement while the untrained group showed only slight improvement.

APPENDICES

APPENDIX A

OPERATOR'S MANUAL NUMBER ONE, PHASE I: CLASSROOM

OPERATOR's MANUAL NUMBER TWO, PHASE II: RANGE ACCIDENT AVOIDANCE EXERCISES

OPERATOR MANUAL NUMBER ONE

ADVANCED
DRIVER EDUCATION
FOR
EMERGENCY VEHICLE OPERATORS

PHASE I: CLASSROOM

TABLE OF CONTENTS

PREFACE

The materials in this course are designed for presentation to operators of emergency vehicles.

The term "Advanced" driver education refers to education of the driver in advanced techniques of steering, braking, acceleration, and general vehicle control. Training of this type is not generally available to the average vehicle operator.

The term "Driver Education" refers to the learning experience given to the driver in both the areas of knowledge and skill. It is for a more complete education of the driver that both of these learning activities are included in this curriculum.

Persons acting as instructors for this course will be limited to those who have completed a training course given by the Driver Education Research Group, General Motors Proving Grounds, or given by a college or university safety center staff who have completed the General Motors Training Course, such as the Missouri Safety Center at Central Missouri State University.

INTRODUCTION

This curriculum consists of two phases: Phase I - Classroom, and Phase II - Range. The classroom instruction time is six hours. The range instruction time is ten hours of actual behind-the-wheel experience in special accident-avoidance exercises.

Materials collected for inclusion in the curriculum are from many sources; however, three of these sources are acknowledged for their large contribution to the curriculum. They are:

1. General Motors Proving Grounds
2. Maryland Department of Education
3. National Safety Council

In view of today's accident causation research, two important contributing factors to collision have been identified as:

1. Misinterpretation of the driving task.
2. Improper response to emergency situations.

Phase I and Phase II of this curriculum address themselves directly to these two factors.

DRIVING CONCEPT

The driving task that is a common goal to all emergency vehicle operators is getting from Point A to Point B without an accident. While it is true that time and speed are important factors, the fastest driver does not always arrive on the scene first. In those cases where he does, the question arises if the added speed is worth the risk involved to himself, to the vehicle, and to the life and property of those around him.

The concept behind this project is that the most effective form of driving uses moderate vehicle speeds and superior driving skills. The objective is to put the operator and vehicle at the scene in the minimum amount of time with the minimum number of conflicts on the way.

You will see a film entitled "Police Pursuit." There are many good points in the film. Please note the officer's use of seat and shoulder belts and his attention to the driving task. The comparison between his firearm and his vehicle is appropriate. The respect, attention, and sense of responsibility that an individual gives to safely handling a firearm is also the least he must give to safely operating the vehicle.

I. Lesson 1 - A Systems Approach to Driving

A. Lesson Objectives -

1. The operator will identify how the capabilities and limitations of the driver, the vehicle, and the environment affect driving a vehicle.

2. The operator will identify what elements make up the driving task.

B. Lesson Activities -

The operator will:

1. Read Lesson 1, Part D, Information, pages 4 to 8.

2. Participate in an instructor lead discussion on the material in this lesson.

C. Lesson Evaluation - The following questions from Lesson 1 are examples of the form and information for classroom evaluation.

1. The reason for using a system approach to understanding the driving task is best explained by which of the following answers?

   a. Only one component is of real importance.
   b. All of the components are given appropriate consideration.
   c. The driving task is simple to explain.
   d. The driving task is made up of less than 1000 components.

2. The goal of the driving task is best described by which of the following answers?

   a. To guarantee accidents will never happen.
   b. To get from point "A" to point "B" as fast as possible.
   c. Dictated by the vehicle and environment.
   d. To get from point "A" to point "B" safely.

3. The minimum driving task requirement is best defined by which of the following answers:

   a. Whatever it takes to get you there.
   b. Totally dependent on the skill of the driver.
   c. The sum of the capacities of the system components.
   d. The goal, minus the task and the components.

D. Information

WHAT IS A SYSTEMS APPROACH?

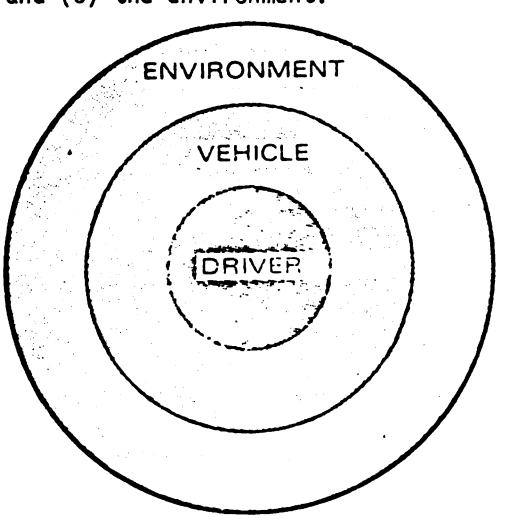
To answer that question, we must first define a system. The definition of a system is: "An orderly arrangement of components which are interrelated and which act and interact to perform some task or function in a particular environment."[1]

Two points are important to remember about this definition. First, that a system is defined in terms of a task or function --- thus, it is task-oriented. Second, that the components of a system are interrelated --- thus, each part affects the others.

A system, therefore, is an orderly means of identifying a set of components, discovering their interrelationships, and defining the tasks or functions which they perform. In this program, our concern is for "The Driving System."

WHAT IS "THE DRIVING SYSTEM?"

The Driving System is composed of: (1) the driver; (2) the vehicle; and (3) the environment.



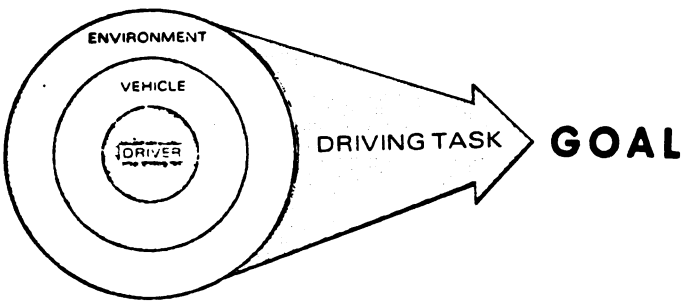
THE DRIVING SYSTEM 4

WHY MUST WE DISCUSS A DRIVING SYSTEM?

Many operators seem to believe that the Driver is the most important component. While the driver is of vital importance, there are other vital components. The Vehicle and the Environment are equally important. The driver is the controller of the system, but the vehicle and the environment influence the proficiency required of the driver to successfully perform the selected task.

WHAT IS THE FUNCTION OF THE DRIVING SYSTEM?

The function of the Driving System is to perform "The Driving Task."



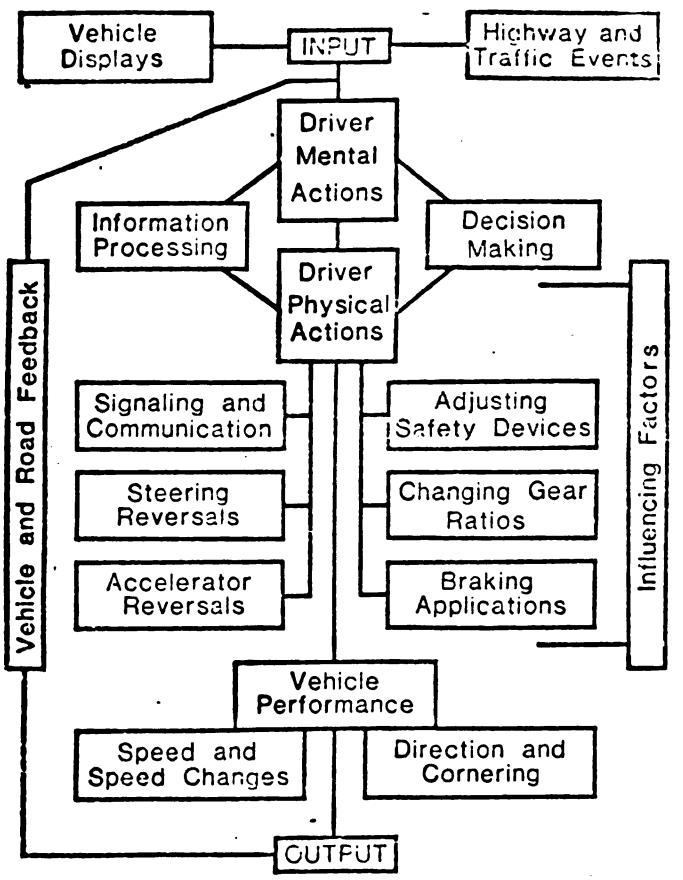
THE DRIVING SYSTEM

The Driving Task is whatever the driver has predetermined as his objective. As an example, the driver may have chosen to make a trip from point "A" to point "B." It is the function of the Driving System to successfully complete the Driving Task in order to reach the desired goal (in the example, point "B").

WHAT FACTORS MAKE UP THE DRIVING TASK?

Actually, there are 2300 factors that have been identified and catalogued by the Human Resources Research Organization in the HumRRO Task Analysis.[2] That represents more than most people worry about on their state driving examination.

For practical consideration, let us examine some major contributing factors to the Driving Task. By the model below, we can have a working understanding of the basics of the Driving Task.

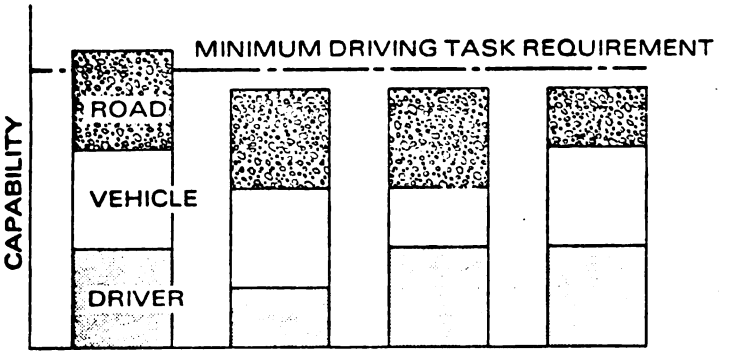


DRIVING TASK MODEL [3]

WHAT ARE THE MINIMUM DRIVING TASK REQUIREMENTS?

To illustrate, assume an imaginary driving task, such as avoiding a pedestrian who has unexpectedly stepped into the path of your vehicle. In the figure below, an arbitrarily assigned capability has been given each of the three system components. If the sum of these capabilities is greater than the minimum driving task requirement, the probability of avoiding the pedestrian is very high.

However, if the driver is alcohol-impaired (as the second column represents) or if the vehicle has worn tires (as the third column represents) or the environmental conditions are ice on the pavement (as represented in the fourth column), then the total capacity of the system components will not sum to the minimum driving task requirements, and the probability of avoiding the pedestrian is very low.



SYSTEM CAPABILITY VS MINIMUM TASK REQUIREMENTS

In this drawing, each column represents the same imaginary driving task of "avoiding the pedestrian."[4]

Thus, the minimum driving task requirements are those capabilities of the components of the system that, when added together, meet the minimum required to perform the task successfully,

As the example has shown, the capabilities of the components of the system are variable. If one is deficient, are the others capable of overcoming the problem and avoiding a conflict? For example, does the driver have the experience and ability to control the vehicle? Is an environment present which allows best traction surface for stopping or quick vehicle maneuvering? Has the operator made use of the vehicle protection devices (door locks, head support, seat and shoulder belts)?

The combination of capability of components, minimum task requirements, and the success with which each are met is infinite. However, each situation can be related to these three basic elements for better understanding of their contribution to obtaining the goal -- arriving at Point B safely.

II. Lesson 2 - The System Components; Stabilizing the Variables

A. Lesson Objectives -

1. The operator will identify problem-solving techniques for the Driving System components.

2. The operator will make application of these techniques to the Driving Tasks.

B. Lesson Activities -

1. Read Lesson 2, Part D, Information, pages 10 to 19.

2. Participate in an instructor lead discussion on the material in this lesson.

C. Lesson Evaluation - The following questions from Lesson 2 are examples of the form and information for classroom evaluation.

1. What is the single, most basic cause of accidents?

a. A combination of unsafe acts and unsafe conditions.
b. An unsafe act.
c. Those events which lead to unsafe conditions.
d. An unsafe condition.

2. The definition of a "preventable accident" questions the accountability of what individual?

a. The other operator who you hit.
b. Both operators.
c. The operator involved.
d. All operators and passengers involved.

3. The "S" in the acronym "SIPDE" stands for:

a. Service
b. Safety
c. Survey
d. Search

7. Double Lane Change - The purpose of this exercise is to demonstrate to the operator the maximum cornering capabilities of the vehicle under ideal conditions. Increased distances and speeds enable the operator to put his skill to a complete test. The vehicle dynamic most involved is cornering traction.

D. Information -

WHAT SPECIAL TECHNIQUES ARE AVAILABLE TO THE OPERATOR FOR SOLVING PROBLEMS IN DRIVING?

Because the driver has the most immediate control over each component in the driving system and the driving task, it is important to identify those actions which can best assist him. Those areas of discussion to follow are:

System Components	=	Action or Technique
Lesson 2 - The Driver	=	Physically
		1. Impairments
	=	Mentally
		1. Attitude
		2. Defensive Driving
		3. SIPDE System
Lesson 3 - The Vehicle	=	Mechanics
		1. Maintenance
	=	Protection
		1. Preparing to Drive
	=	Motion
		1. Vehicle Dynamics

WHAT POINT ABOUT HIS PHYSICAL AND MENTAL MAKE-UP SHOULD THE DRIVER RECOGNIZE?

Physically

There are five areas of concern for physical impairment. They are:

1. Alcohol

At the present time, there is a growing indication that some individuals use alcohol as an escape from the frustrations

of their job situation. An individual who has alcohol-related problems, either on or off the job, creates a special hazard for himself and those around him. Special help is available to those individuals. The earlier the problem is identified, the easier it can be solved.

2. Drugs

Of particular interest are the more common drugs available with or without a prescription. How many times have you asked the doctor or druggist if the medicines you have been given contain ingredients that could impair your driving? Impaired judgment, delayed reaction time, and blurred vision can be symptoms of undesired reactions. How do aspirin, antihistamines, or a high caffeine product affect you?

3. Fatigue

One of the certainties of life is that the body needs rest. It cannot work for indefinite periods of time without physical breakdown. That breakdown is a gradual process in reduced coordination, reduced visual acuity, and reduced mental alertness. It is for this very reason that many job descriptions limit the number of continuous hours a person may work. You will have to be your own judge, so think of the consequences if you should overextend yourself.

4. Illness

No one likes to be sick or to admit they are sick. You should consider the reduced efficiency and possibility of spreading the illness among fellow-workers. It is wise to take positive measure for recovery from the illness.

5. Impairment

Regardless of age, all individuals are subject to impairments in hearing and sight, either temporary or permanent. Professional help is the best answer for identification of the problem and the method of correction or compensation.

Individually or collectively, any one of these five areas could keep your physical performance from meeting its full capability. Keeping yourself in the best possible physical condition contributes directly to the skill necessary to perform as a driver.

MENTALLY

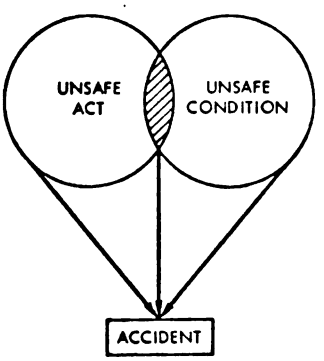
WHAT IS THE MOST IMPORTANT MENTAL ASPECT OF DRIVING?

One of the most important aspects of the driver is attitude. Attitude is defined as a "response favorable or unfavorable to a person, group, idea, or situation" or as a "predisposition to act." In relation to attitude and driving, it has been said that proper attitudes toward safety make the behavior of people more predictable, and undesirable attitudes cause unpredictable, erratic, and unsafe behavior in driving situations.[5]

Each of the above definitions has important implications with regard to the attitudes that the driver may possess. The foundation of these attitudes depends upon the individual's education and experience. Because of this, the following information is presented as a basis to a broader understanding of accidents and why they occur and how they can be prevented.

WHAT CAUSES AN ACCIDENT?

There are two basic causes for most accidents: (1) unsafe acts or (2) unsafe conditions. A third possibility might be added: (3) The combination of an unsafe act and an unsafe condition.[7]



There is an infinite number of variables in each of these areas. The ability to identify those variables, individually or grouped together, is the key to preventing the sequence from reaching the accident-producing stages.

WHAT TYPE OF ATTITUDE ABOUT DRIVING WOULD HELP PREVENT ACCIDENTS?

The most widely-accepted attitude adopted by successful drivers is one of "defensive driving." The definition for defensive driving is "driving to prevent accidents in spite of the incorrect actions of others and/or adverse conditions."[8] This definition shows recognition of the fact that the driving environment is far from perfect. In fact, there are some rather imperfect qualities.

Further, it shows a willingness on the part of the individual who adopts this code to do everything in his power, including avoiding the dangerous acts they expect other drivers and pedestrians to make. This attitude indicates an awareness of how accidents happen and a positive solution for preventing future accidents.

WHEN ARE ACCIDENTS CONSIDERED TO BE PREVENTABLE?

The immediate answer to that is "most of the time." A very high percentage of accidents are caused by human error. There is a philosophy regarding preventability that is adopted for use in fleet vehicle programs. Because of the high accident rate of this type of vehicular program, accountability is particularly important; therefore, the question often asked after an accident is: "Did you do everything you reasonably could have done to prevent the accident?"[9] Most of the time the answer is "No," because there usually was something that the driver failed to do to prevent the accident.

While this is after-the-fact type of information, it can be helpful in the operator's approach to future driving. Your own responsibility and accountability depend on your being able to answer "Yes, I did everything I could reasonably have done to avoid the accident." The hoped-for answer would surely be "In fact, I did avoid the accident."

WHAT VISUAL TECHNIQUE CAN HELP PREVENT ACCIDENTS?

(This portion has an accompanying slide presentation.)

The answer to this question is: "A sound Visual Perception System." Of all the senses we use in driving, vision gives us the

most information. It is upon this information that we make decisions and judgments critical to the driving task.

It seems to be a human trait to take many things in life for granted. This is also true for vision. A group of slides shown by the instructor will demonstrate that we do not always see what we think we see. Our eyes can deceive us; but like other mental and physical abilities, our eyes can be trained to do a better job than they normally might.

WHAT SYSTEM IS USED TO IMPROVE PERCEPTUAL ABILITY WHILE DRIVING?

The system used extensively for improved perceptual ability while driving is "SIPDE"[10] (pronounced SIP-DE). The letters stand for the following:

SEARCH

IDENTIFY

PREDICT

DECIDE

EXECUTE

These words are the components of a visual system which is basic to driving ability. The system can further benefit drivers who are called upon to operate the vehicle under special stress conditions.

The following information tells how to accomplish the meaning of the key words.

SEARCH

This process denotes eye movement. These movements are left and right, near and far, and ahead and behind. It means the driver is aware of all the environment surrounding his vehicle. Commentary driving is used to teach a driver the process of searching his driving environment and then reporting on it.

A second meaning should be realized in regard to search. It is similar but applied a little differently. The environment must be searched for those known areas of driving hazards. An example would be a particularly dangerous intersection you frequently must travel. You know ahead of time that conditions there will be poor most of the time. Since a high percentage of accidents occur at intersections, your pattern of search is well thought out in advance. You will know the points of restricted vision and take special precautions in advance. Do not forget that as the speed of your vehicle increases, your ability to see details to the sides decreases, unless you compensate by quickly looking repeatedly into those side areas.

IDENTIFY

This means identify the hazard. The hazards may be in many forms. Usually the hazard will be in the form of vehicles, pedestrians, or fixed objects in the driving environment.

As a means of identifying the difference between those which represent a true hazard and those which do not, consider several facts: How close will they come to your vehicle? What speeds are involved? What alternate path do you have? If your identification of the hazard includes this type of information, then a definite problem is beginning to develop.

In order to aid the process of identifying, remember this additional point: vision is a mental process as well as a physical process. If you are looking at an object but you are thinking of something else, you won't see what you are looking at. To avoid this blank stare while driving, it is recommended that you shift your eyes every two seconds to another part of the driving environment (and about every five seconds to your rearview mirror). This will help in keeping you mentally alert and also aid in the identification of hazards.

PREDICT

Now that certain hazards have been identified, the driver must predict if the hazard will involve a conflict with his vehicle. The term "criticality of a hazard"[11] has been coined to express the degree to which the hazard is a potential conflict to you and your vehicle. This "criticality" is based on the nearness of the hazard to you, speed of your vehicle, and your best estimate of the probability of conflict.

The key to understanding this prediction step is that this process takes only fractions of a second. Most important, it happens in advance of the situation's becoming critical. This predictive nature and foresight in judgment is based on the driver's defensive attitudes and experience gained by practice of the principles involved.

DECIDE

This means decide how to avoid the hazards. The driver has three possibilities: (1) speed; (2) distance; and (3) time (a combination of one and two).[12] By maneuvering your vehicle, you may choose a path that allows for extra distance between your vehicle and the identified hazard. By acceleration or deceleration, you may arrive at the point of critical risk ahead of or after the prime moment of highest risk.

The task of deciding the order and amount of driver action becomes more difficult as the number of hazards in any one critical situation increase. It should be noted that the hazards usually appear in multiples because of the complexity of the driving environment.

With the practice exercises in the range portion of this course, you (the driver) will receive firsthand experience in the time-speed-distance relation.

EXECUTE

This is the final step and the one in which the driver acts to prevent the conflict with a hazard. Steering, braking, acceleration, or a combination of these actions are the decision the driver now executes.

How well you are able to execute the procedure to avoid the conflict depends on a number of items. Consider the following: (1) the type and condition of vehicle being driven; (2) the road conditions; (3) your driving ability.

SUMMARY

SIPDE is a system of visual perception that can bring positive results when the driver understands and practices each of the components. Each component relates to the others in the system.

While it takes extended time to read and study the system, it takes only fractions of a second to complete the actual mental and physical aspects of the system.

Finally, SIPDE is a process which continues as long as the driver is operating the vehicle. The degree to which the system is in operation may vary because of the degree of difficulty of the driving task. Nevertheless, the system operates repeatedly as the driving environment changes.

III. Lesson 3 - The Vehicle and Preparing to Drive

A. Lesson Objectives -

1. The operator will identify a vehicle maintenance and preparation procedure to increase the safe operation of his vehicle.
2. The operator will identify a driver preparation procedure to increase his personal safety in the vehicle.
3. The operator will identify vehicle dynamics factors important to increased safe operation of his vehicle.

B. Lesson Activities -

The operator will:

1. Read Lesson 3, Part D, Information, pages 21 through 31.
2. Participate in an instructor lead discussion on the material in this lesson.

C. Lesson Evaluation -

1. A key role in assuring that the maintenance of the vehicle is accomplished by the garage is played by _____.
   a. Management
   b. The operator
   c. The supervisor
   d. The garage
2. The best hand position on the steering wheel for maximum speed in steering reversals is _____.
   a. 10 and 2
   b. 12 and 3
   c. 9 and 3
   d. 12 and 6
3. One physical fact about traction and steering the vehicle is that _____.
   a. Only the front wheels steer the vehicle.
   b. All four wheels of the vehicle steer.
   c. Traction is not a function of steering.
   d. The physical laws of nature do not apply in a skid.

D. Information -

VEHICLE MAINTENANCE AND PREPARATION

HOW IS A MAINTENANCE PROGRAM ACCOMPLISHED?

A program of vehicle maintenance cannot be conducted by the operator alone. The highest cooperation between the operator and the mechanic is usually the result of a well-coordinated safety program. The leadership of a knowledgeable management system will be of great assistance in assuring that maintenance requirements are met.

A patrol car is subject to intensive use that few other vehicles are ever required to perform. Maintenance schedules must be accelerated to meet the demands that increased mileage makes on the vehicle.

WHAT IS THE OPERATOR'S RESPONSIBILITY IN PREPARATION TO DRIVE?

A patrol officer spends much of his working day in the vehicle. At times, his life will depend on the physical capabilities of this machine. Before starting a patrol day, the operator should make a quick inspection around his vehicle and under the hood. All systems inside the vehicle must also be checked. Items carried inside the vehicle should be stored or fastened down, so as not to become projectiles.

To assist the operator in a planned check of his vehicle, the following list is suggested.

Operator ID _____	Vehicle ID _____
Shift _____ Date Reported _____	OK = ✓ Repair = X Mileage _____

OUTSIDE THE VEHICLE

TIRES
Inflation ____
Checks ____
Cracks ____
Cuts ____
Tread Depth ____

WHEELS
Rim Damage ____
Valve Leak ____

VEHICLE BODY
Light Lenses ____
Body Dents ____

TRUNK COMPARTMENT
Spare and Jack Secured ____
Special Equipment Secured ____

ENGINE COMPARTMENT
Belts ____
Fluids: Oil ____ Coolant ____
Steering ____ Brake ____
Battery ____

REQUIRED REPAIR

INSIDE THE VEHICLE

DRIVER COMPARTMENT
Vehicle Lights ____
Emergency Lights ____
Brake Operation ____
Seat Adjustment ____
Gauges Operational ____
Communication System ____
Materials Secured ____
Belts Operational ____

REQUIRED REPAIR

No officer would go on patrol without checking the condition of his firearms. The components of the vehicle are more numerous and require more time to check. The importance of taking the time to make the checks compares to the short time it takes to check your gun.

DRIVER PREPARATION

WHAT STEPS SHOULD THE OPERATOR TAKE FOR HIS SAFETY BEHIND THE WHEEL?

In order for the driver to increase his personal safety and ability to handle the vehicle, the following suggestions are made.

Seat Adjust

Position the seat far enough back to allow maximum freedom of movement. The thighs should be resting on the seat and the knees

slightly flexed to aid in preventing fatigue. Be sure the seat has locked into the desired position.

Hand Position

Your hands should be placed at a 9 and 3 o'clock position on the steering wheel. This will allow a maximum 180 degree turn of the steering wheel in either direction. This is considered the shortest possible amount of time this movement can be made. For turning the wheel beyond 180 degrees, a hand-over-hand steering method should be used.

Lock Doors

The four doors are an integral part of the body structure of the vehicle. The door locks are designed to hold the doors shut during collision forces. For your protection in these circumstances, it is recommended that all doors be locked. It gives the vehicle body more structural integrity.

Mirrors

Rearview mirrors are a means of contacting the traffic situation behind you. Adjust the inside and outside mirrors before the vehicle moves so that the procedures will not be a distracting factor once you are moving.

Shoulder Belt Combination

Properly worn, seat and shoulder belts are basic survival tools to driving. The lap belt should fit you tightly. The shoulder belt may be adjusted to fit so that your fist can be placed between the belt and your chest. Belts aid the individual in good posture,

which is less fatiguing over a long period of time. In addition, it keeps the driver in position behind the steering wheel. You cannot steer if you are sliding around from the proper position.

Ventilation

The main reason for adjusting ventilation at this point is to do so before you get the vehicle moving. Windows which have to be rolled up or down are a distraction once you start moving.

Head Support

Adjust head support so the back of the head touches the support near the center. Its purpose is to prevent whiplash. If the support is left in the down position, it may do more harm than good.

These seven items take but a few moments to check and adjust when you get behind the wheel. Several are life saving safety features. Anyone can rationalize their way around not using them. A driver with a high regard for safety design features has established safety as a way of life, instead of chance.

VEHICLE DYNAMICS

WHAT ARE VEHICLE DYNAMICS?

Vehicle Dynamics refer to the study of the relationship between the motion of the vehicle and the forces affecting that motion. The following information gives some insight to this study.

WHAT IS THE MOST IMPORTANT VEHICLE COMPONENT?

The tires are the single most important component governing the handling and control performance of the vehicle.[13] The surface

area of the four tires contacting the road are responsible for transmitting the forces required for starting, stopping, and cornering the vehicle. This traction force is dependent on the tire's construction, rubber compound, and tread pattern. They are also dependent on the road surface and weather conditions.

These traction forces can further be defined as:

Driving Traction is the force the tires exert against the road surface to accelerate the vehicle forward.

Braking Traction is the force exerted by the tire against the road surface opposite to the vehicle motion to slow or stop the vehicle.

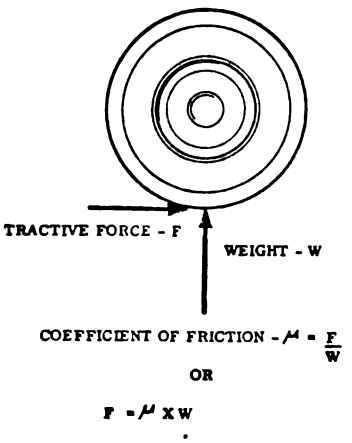
Cornering Traction is the force exerted laterally by the tire against the road surface to resist centrifugal force in vehicular movement.

In each case the higher the speed, the higher the demand for traction forces from the tire and road surface combination. This combination will produce these forces up to the physical limits of friction.

WHAT IS THE COEFFICIENT OF FRICTION?

The coefficient of friction is defined as: "The ratio between the amount of force used in moving one object over another and that forcing the objects together."[14]

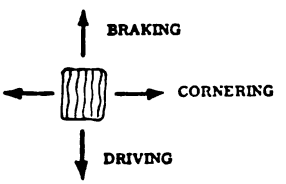
In the drawing on the next page, one can demonstrate how this affects a vehicle's performance. On ice with a coefficient of friction at 0.1, a maximum braking of 100 pounds per tire may be developed. With four wheels, the total braking force available is 400 pounds. Conversely, the driving force of two wheels under the same conditions is 200 pounds.[15]



To the driver this means that it will take four times more distance to stop on wet pavement than dry, and eight times more distance to stop on ice than on dry pavement.

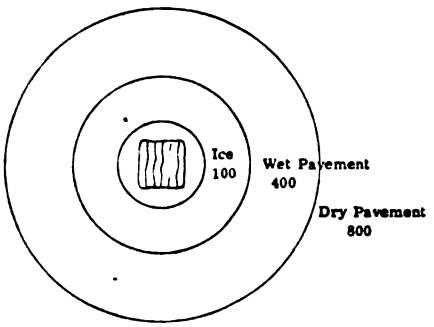
WHAT PART DO FRICTION FORCES PLAY IN VEHICLE DYNAMICS?

To help visualize friction forces, examine the drawing below. This is the "print" of the tire on the road surface. The arrows represent the different directions of the forces of cornering, braking, and driving.[16]



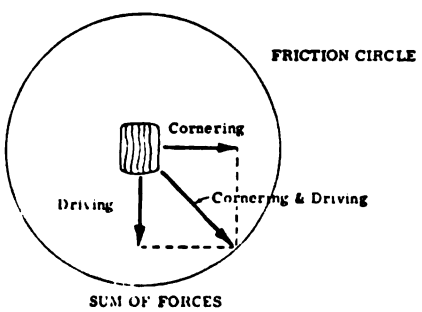
Imagine that as the force increases, the arrows lengthen. In the next drawing, on the next page, the "friction circles" indicate the limit the force can increase before the physics of friction is

exhausted.[17] What will happen to the tire when this limit is reached? The answer is that there will be loss of traction. When the force required exceeds the limits and force available, the vehicle cannot perform the required task.



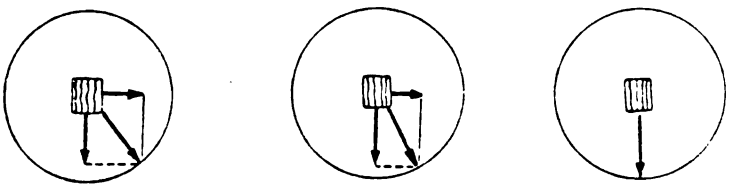
FRICTION CIRCLES

These friction forces act in combination to produce both desired and adverse effects. In the next drawing below, the sum of the arrows representing driving and cornering combine to give a larger arrow, "Cornering and Driving."[18] If the combination of these exceeds the friction limits, to produce tire spin or sideway slide, the available friction will be reduced.



SUM OF FORCES

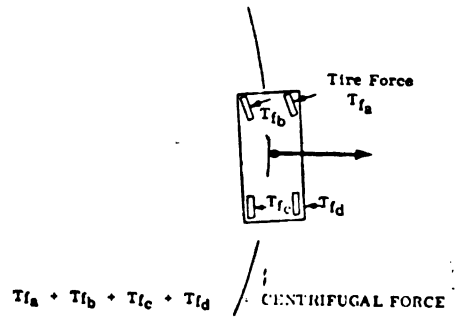
The purpose of these illustrations is to show that if braking and driving forces are demanded while cornering, the ability to produce cornering forces is lowered. If this is carried to the fullest so that the wheel and tire are locked (or spin), then cornering cannot be provided. This concept, "A locked or spinning tire cannot produce a cornering force," is a most important concept.[19] The implications will become apparent as you experience the range phase.



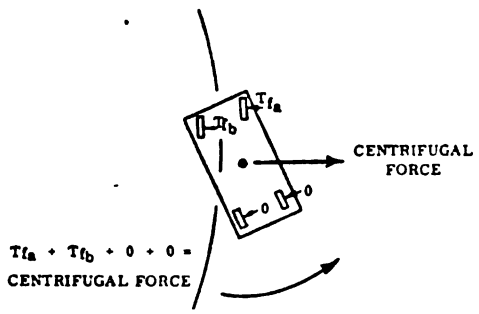
INCREASED DRIVING OR BRAKING - DECREASED CORNERING
LOCKED OR SPINNING WHEEL - NO CORNERING

HOW THEN IS STEERING AFFECTED?

A second important concept is that "All four wheels of a vehicle steer."[20] Although cornering is initiated by the steering of the front wheels, it requires the cornering force of all four wheels to control the vehicle and stay in the curve. In the figure below, the vehicle is going around a curve; however, centrifugal force is trying to push the vehicle out of the curve.



The four tires must produce the forces to resist the centrifugal force if the vehicle is to remain on the road. As shown below, if the rear wheels spin and lose their cornering force, the rear of the vehicle will swing out of control to the right. The effect would be the same if the wheels were locked.[21]



HOW DO THESE CONCEPTS APPLY TO THE EXERCISE IN THE RANGE PHASE?

They apply either directly or indirectly in almost every exercise. By briefly examining the purpose of each of the exercises, the application may be realized:

1. Serpentine - The purpose of the serpentine is to develop a sense of rhythm and timing in steering and coordination between hand and foot controls and judgment between the vehicle and fixed objects (the course cones). Control by steering and speed are key elements. The vehicle dynamic factor most involved is cornering traction.
2. Skid Control - A skid is a vehicle operating condition in which a driver no longer has control. This skid exercise simulates a power skid by rear wheel lock-up (rather than spinning wheels).

Immediate corrective actions by the driver will help; for the longer the driver waits to make corrections, the harder it is to recover from the skid. The vehicle dynamic most involved is cornering traction.

3. Controlled Braking - The purpose of this exercise is to teach the operator how to get maximum braking capability from a car, without losing the ability to steer. This is accomplished by learning to sense the point on the brake pedal before lock-up occurs. A key element is coordination of the braking action. The vehicle dynamic most involved is a combination of braking traction and cornering traction.
4. Evasive Maneuver - The purpose of this exercise is to demonstrate the evasive capability of the vehicle and how the operator can use that ability. A major point involved is the use of a 180 degree rapid turn of the steering wheel. Timing and steering are essential parts of the exercise. The vehicle dynamic most involved is cornering traction.
5. Tire Failure - The purpose of this exercise is to experience that a deflated tire will not corner; therefore, control of the vehicle is threatened. Further, it creates a drag, slowing the vehicle down. Driver recognition of the problem must be quick and positive in order to maintain control. Cornering traction is a factor.
6. Off-Road Recovery - The purpose of this exercise is to have the operator experience an advanced method for recovery (from being off the road), when there is only a minimum of time and space available. Precise steering movements are required. The vehicle dynamic most involved is cornering traction.

FOOTNOTES

[1]Wayne W. Worick. Safety Education: Man, His Machines, and His Environment. Prentice-Hall, Inc., New Jersey, 1975, pp. 30-31.

[2]A. James McKnight and Alan G. Hundt. Driver Education Task Analysis: Instructional Objectives. Human Resources Research Organization, Alexandria, Virginia, 1971.

[3]R. A. Whitworth. Speech before South Central Region of American Driver and Traffic Safety Education Association, Wichita, Kansas, 1972.

[4]General Motors Proving Grounds, Vehicle Dynamics Laboratory. The Driving Environment. Milford, Michigan, 1971, p. 2.

[5]Worick, p. 35.

[6]Ibid., p. 12.

[7]Ibid., p. 25.

[8]National Safety Council. D.D.C.: Defensive Driving Course. Instructor's Manual, Chicago, Illinois, 1965.

[9]National Safety Council. D.D.C.: Defensive Driving Course. Student Workbook, Chicago, Illinois, 1967, p. 4.

[10]Maryland State Department of Education, Driver Education Section. The IPDE System: A Classroom Program for Driver Education. Annapolis, Maryland, 1972.

[11]Ibid., p. 51, p. 254.

[12]Ibid., pp. 69-70.

[13]General Motors Proving Grounds, Vehicle Dynamics Laboratory. Advanced Driver Education Course Training Manual. Milford, Michigan, 1971, p. 14.

[14]Ibid.

[15]Ibid., p. 15.

[16]Ibid., p. 17.

[17]Ibid.

[18]Ibid.

[19]Ibid., p. 18.

[20]Ibid., p. 19.

[21]Ibid.

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OPERATOR MANUAL NUMBER TWO

ADVANCED
DRIVER EDUCATION
FOR
EMERGENCY VEHICLE OPERATORS

PHASE II: RANGE
ACCIDENT AVOIDANCE EXERCISES

TABLE OF CONTENTS

INTRODUCTION

Even the most competent operator will eventually face an emergency situation while driving. His accuracy in judgment will make the difference between a major disaster or a "close call." He will not have time to "think a response" in an emergency situation. Without conscious thought, he is required to get out of the situation the best way he knows how.

Unfortunately, few drivers have a chance to practice the techniques required to handle common emergency situations. Some may have read or have heard how to handle tire failures, skids, quick steering reversals or unexpected brake reactions; however, unapplied knowledge is no substitute for actual experience.

This actual experience is the experience you are about to receive; the sense or "feel" of a vehicle, as you, the operator, accurately respond to simulated emergency situations. Through a system of planned driver education exercises, it is possible to prepare a driver to accurately respond to some of the most common emergency situations.

GENERAL EXERCISE OBJECTIVES

The general objectives of Phase II: Range - Accident Avoidance Exercises, are:

The Operator will:

1. Demonstrate individual steering techniques for each of the accident avoidance exercises.
2. Demonstrate timing and coordination in vehicle operation in each of the accident avoidance exercises.
3. Demonstrate perceptual ability while operating in the range environment.
4. Demonstrate the vehicle's characteristic of braking or acceleration as required in the accident avoidance exercises.
5. Avoid traffic cones marking the exercises; these cones represent barriers, fixed objects, and lane lines. Touching or upsetting the cones represents an accident or an accident-producing situation.

GENERAL RANGE PROCEDURE

The operator will be responsible for his own safety and the safety of others as he operates in the range exercises.

The operator will:

1. Perform the pre-driving checklist upon entering the driver's position. This checklist will include:
   a. Lock all doors.
   b. Adjust seat.
   c. Fasten seat belt and shoulder harness.

d. Adjust mirrors.

e. Adjust head support

f. Adjust ventilation.

g. Don crash helmet.

2. Demonstrate caution for pedestrians and other vehicles in the range area by watching for their presence.
3. Demonstrate his accident avoidance ability only when a designated instructor is riding in the right front passenger position.
4. Perform each exercise at speeds designated for that exercise.
5. Demonstrate the acceptable performance level for one exercise before moving to the next exercise.
6. Demonstrate the acceptable performance level on all low speed exercises before attempting performance at an increased speed.
7. Stop the vehicle at the end of each exercise attempt and ask questions of the instructor.

DEGREE OF DIFFICULTY

In relation to speed of the vehicle through the accident avoidance exercises, two Degrees Of Difficulty will exist. "Degree One" will be "Low Speed;" and "Degree Two" will be "Increased Speed." The first seven exercises will use "Degree One-Low Speed" and the second seven exercises will use "Degree Two-Increased Speed."

According to the design of the range used in this program, the Low Speed will be 25-35 miles per hour and the Increased Speed will be 35-45 miles per hour. Since this varies from exercise to exercise, consult the exercise involved. Although there may be instructional reasons for varying the speed during any one "Degree Of Difficulty," it will not exceed these figures.

OPERATOR STUDY PROCEDURE

The information on the following pages has been organized into five parts common to each of the fourteen exercises. The parts are:

A. Exercise Objective: This explains what the operator is to accomplish in the exercise.

B. Performance Procedure: This explains how the operator is expected to accomplish the exercise.

C. Course Diagram: This is a visual explanation of the exercise for the operator.

D. Exercise Evaluation: This identifies common mistakes which may prevent the operator from reaching proficiency in the exercise.

E. Instructor's Evaluation: This is the evaluation method by which the operators' skills will be scored.

DEGREE ONE: LOW SPEED

I. Exercise 1 - Serpentine Course (Degree One: Low Speed)

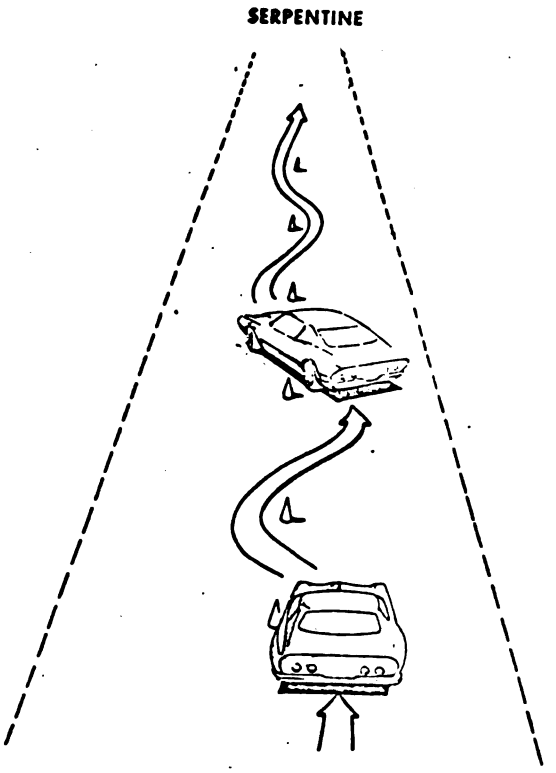
A. Exercise Objective - The purpose of this exercise is to develop in you the operator a basic sense of steering control and handling characteristics of the vehicle. In order to accomplish this, you must develop well-timed steering movements coordinated with the vehicle's position and relationship to the course cones.

B. Performance Procedure -

The operator will:

1. Assume a 9 and 3 hand position on the steering wheel for this exercise.
2. Align his vehicle to the right of the first cone.
3. Assume a speed of 20 mph. Note: Maintain this speed throughout the course.
4. Pass to the left of the second cone and continue a left-right weave through the remaining cones. Note: Two visual cues will assist the operator: (1) When the first cone reaches a point even with the vehicle front windshield, a 180 degree steer to the left will allow a clearance of the first cone; (2) Looking and thinking ahead to the second cone, sight the forward point of the vehicle right fender in line with the cone and steer 180 degrees to the right, setting the car parallel in the left lane. This 1-2 procedure will then be applied to the remaining cones.
5. Pass the vehicle as close to the cones as possible.
6. Repeat the course at an increased speed until he has successfully demonstrated smoothness throughout the run.

C. Course Diagram -



D. Exercise Evaluation - The following constitutes failure to complete the exercise proficiently.

If the operator:

1. Fails to use a 9 and 3 hand position to reverse the steering wheel 180 degrees.
2. Fails to approach as close as possible to the first cone. A wide approach sets vehicle in wrong position.
3. Fails to maintain a smooth continuous steering rhythm.
4. Steers too little, hitting the cones with front wheels.

5. Steers too much, resulting in wider and wider turns until last few cones can be negotiated.
6. Fails to maintain original speed.
7. Moves hands on steering wheel from 9 and 3 position.
8. Uses late or early steering movements.
9. Fails to use appropriate visual techniques.

E. Instructor's Evaluation Form - The following is an example of the form used by the range instructor for skill improvement evaluation of this exercise.

EXERCISE 1 - Serpentine - Low Speed			Operator ID _____	
Attempts: 1 2 3 4 5 6 7 8 9 10			Speed: 20	28
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
9-3 Hand Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Close Cone Approach	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Maintains Speed	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Steering Inputs	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Clear Right Side Vehicle	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clear Left Side Vehicle	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R *	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R *	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

II. Exercise 2 - Skid Control (Degree One: Low Speed)

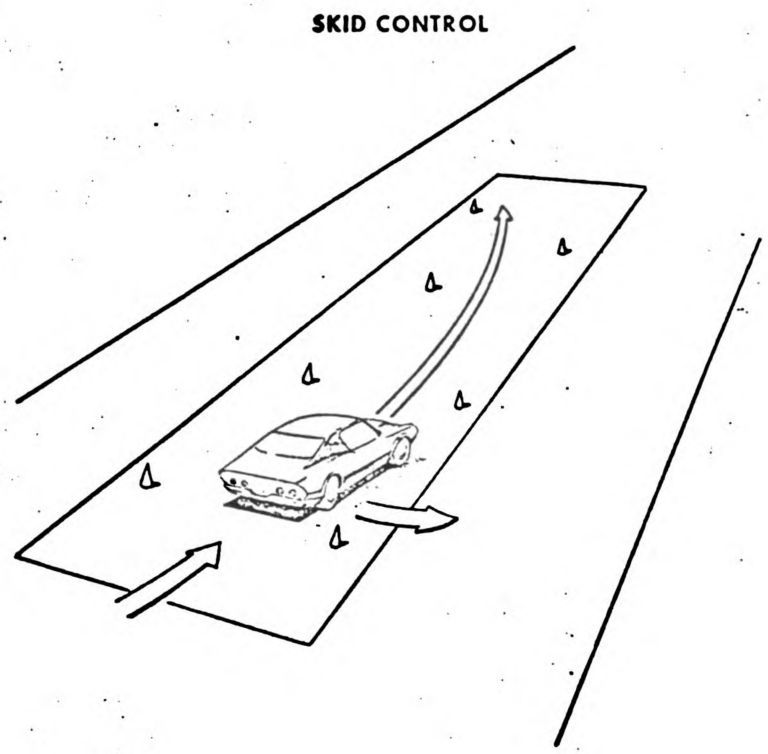
A. Exercise Objectives - The purpose of this exercise is to provide you as operator with a sense of feel for the vehicle's reaction to loss of traction on a slippery road surface and to learn the techniques required to regain control of the vehicle.

B. Performance Procedure -

The operator will:

1. Control the skid using only the steering wheel. Note: Braking or acceleration will be considered a fault.
2. Enter skid area on a curved path designated by cones.
3. Assume a speed on 25 miles per hour.
4. Respond after the instructor has initiated the vehicular skid. Note: For increased visual perception, the operator is encouraged to aim visually at a point in the center of the lane well ahead of the vehicle and steer to that imaginary point.
5. Release the accelerator immediately upon sensing a skid.
6. Steer the vehicle in the direction you want it to go.
7. Countersteer when the vehicle responds to the initial skid correction.
8. Be prepared for a second skid in the opposite direction.
9. Repeat the course, at an increased speed, until he has successfully demonstrated control of the vehicle.

C. Exercise Diagram –



D. Exercise Evaluation - The following constitutes failure to complete the exercise proficiently.

If the operator:

1. Locks wheels or power spins wheels.
2. Has a slow response which allows the skid to get ahead of preventive measures.
3. Oversteers on the first and cannot correct in time to catch the second skid.
4. Fails to read the vehicle's skid characteristics and he does not steer or steers incorrectly.
5. Panics and does nothing.

6. Exhibits improper hand control, such as palming or throwing the steering wheel.

7. Fails to use appropriate visual techniques.

E. Instructor's Evaluation Form - The following is an example of the form used by the range instructor for skill improvement evaluation of this exercise.

EXERCISE 2 - Skid Control - Low Speed			Operator ID _____	
Attempts: 1 2 3 4 5 6 7 8 9 10			Speed: 25	30
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
Controls Vehicle	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Maintains Course	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Response to Skid	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Steering Inputs	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Countersteer	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Hand Technique	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

III. Exercise 3 - Controlled Braking (Degree One: Low Speed)

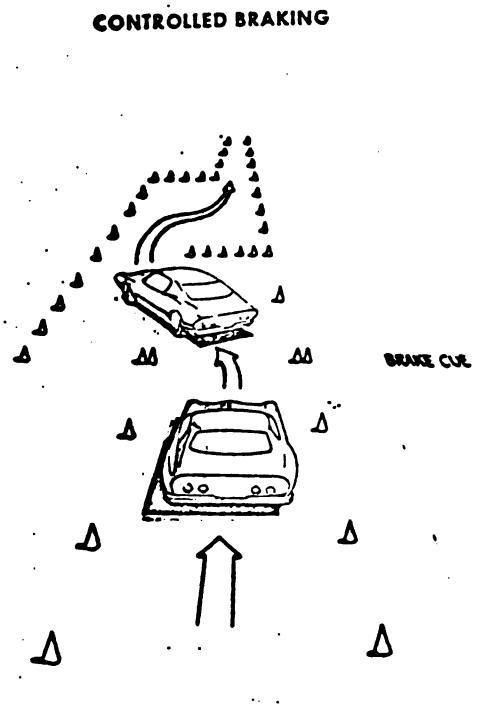
A. Exercise Objective - The purpose of the exercise is to provide you as operator with the experience of controlling the vehicle under conditions of maximum braking while maintaining steering ability. It is of primary concern to note that locked wheels do not provide cornering ability.

B. Performance Procedure -

The operator will:

1. Assume a 9 and 3 hand position on the steering wheel for this exercise. Note: Throughout this exercise, the operator is encouraged to make use of high aim visual scan to increase awareness of the exercise environment.
2. Approach the exercise at a speed of 30 miles per hour. Note: At a pre-determined point the operator will receive a verbal command. The command will be the word "NOW."
3. Respond to the command "NOW" by simultaneously braking and steering 180 degrees to the left, thus avoiding the barrier. Note: Pressure the brake just before the point of locking the wheels in order to keep the wheels rolling and thus provide steering and cornering ability for the vehicle. Ease up on the brake pressure as loss of steering or skidding is sensed.
4. Countersteer 180 degrees to straighten the vehicle in left lane.
5. Steer 180 degrees to the right, thus avoiding the second barrier.
6. Countersteer 180 degrees to straighten vehicle in the right lane.
7. Repeat the exercise, increasing the speed, until he has successfully demonstrated control in steering and braking of the vehicle.

C. Course Diagram –



D. Exercise Evaluation - The following constitutes failure to complete the exercise proficiently.

If the operator:

1. Fails to assume a 9 and 3 hand position on the steering wheel.
2. Locks brakes, causing vehicle to skid, and looses steering control.
3. Steers too much and cannot make return to the right in time to miss the second barrier.
4. Steers too little and hits first barrier.
5. Anticipates the cue and brakes too soon.
6. Does not come to a complete stop at the end of the course.

7. Fails to return to the right hand lane.

8. Fails to use appropriate visual techniques.

E. Instructor's Evaluation Form - The following is an example of the form used by the range instructor for skill improvement evaluation of this exercise.

EXERCISE 3 - Controlled Braking - Low Speed			Operator ID _____	
Attempts: 1 2 3 4 5 6 7 8 9 10			Speed: 30	38
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
9-3 Hand Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Response Time to Cue	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Braking Technique	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Steering Input	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Clears Barriers	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Stop At Course End	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

*Required

IV. Exercise 4 - Evasive Maneuver (Degree One: Low Speed)

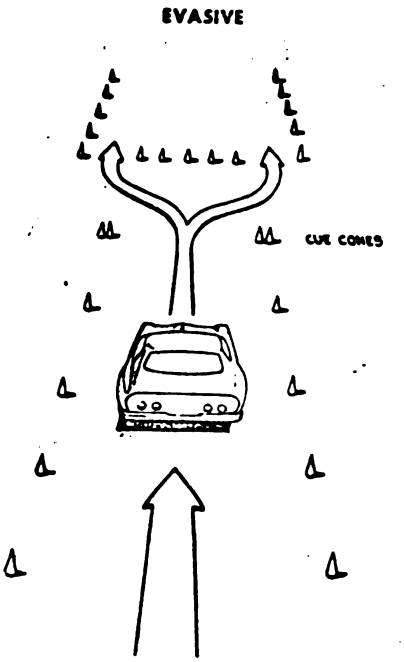
A. Exercise Objective - The purpose of the exercise is to provide you as operator with an understanding that a vehicle can avoid an object in a shorter distance than the vehicle can be panic braked. It is a primary concern that you understand the mechanics of this alternative rather than to resort to panic stops or locked braking.

B. Exercise Procedure -

The operator will:

1. Assume a 9 and 3 hand position on the steering wheel for the exercise. Note: The operator is encouraged to look and think well ahead and consider the total area in order to assist in making a judgment of the final lane choice.
2. Approach the exercise at a vehicle speed of 25 miles per hour. Note: Receive a verbal command from the instructor. This command will be the word "LEFT" or "RIGHT" and signifies the vehicle's path to the left or right lane of the exercise.
3. Receive the command "LEFT" or "RIGHT" and steer 180 degrees to that lane without decreasing speed.
4. Countersteer 180 degrees to straighten vehicle in lane.
5. Bring the vehicle to a stop in a straight line after clearing the exercise.
6. Repeat the exercise, increasing the speed, until he has successfully demonstrated vehicle control and handling.

C. Course Diagram -



D. Exercise Evaluation - The following constitute failure to complete the exercise proficiently.

If the operator:

1. Fails to use a 9 and 3 hand position in steering vehicle.
2. Accelerates or uses brake during this exercise.
3. Chooses wrong lane in response to the instructor's command.
4. Does not steer and hits barrier.
5. Anticipates command and begins steering before instructor gives verbal command.
6. Steers too wide to avoid barrier and leaves marked lanes or loses complete control.

7. Countersteers too much, violating marked lane lines or loses complete control.
8. Does not stop after finishing the exercise within the designated area.
9. Fails to use appropriate visual techniques.

E. Instructor's Evaluation Form - The following is an example of the form used by the range instructor for skill improvement evaluation of this exercise.

EXERCISE 4 - Evasive Maneuver - Low Speed			Operator ID _____	
Attempts: 1 2 3 4 5 6 7 8 9 10			Speed: 25	35
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
8-3 Hand Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Response Time to Cue	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Chooses Correct Lane	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Steering Inputs	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Timing On Countersteers	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears Barriers	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

V. Exercise 5 - Tire Failure (Right Front) (Degree One: Low Speed)

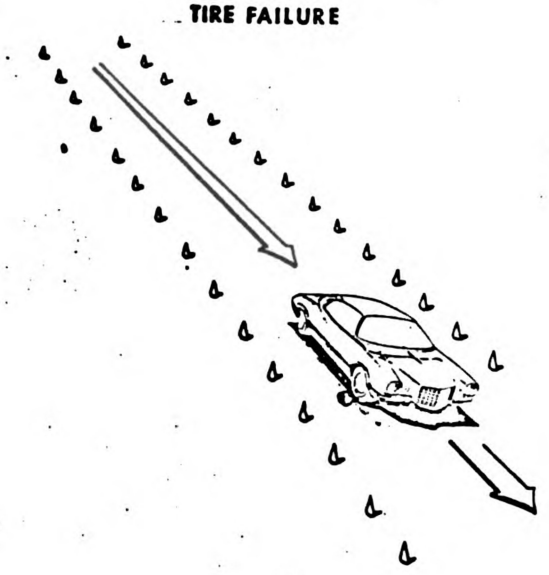
A. Exercise Objective - The purpose of the exercise is to provide you as operator with experience in vehicle control under the condition of tire failure. A primary concern is steering control and your reaction to this sudden event.

B. Performance Procedure -

The operator will:

1. Assume a 9 and 3 hand position on the steering wheel.
2. Approach the exercise area at a vehicle speed of 25 miles per hour. Note: Operator visual perception pattern should range from quick rearview checks to planning far enough ahead for a safe path for the disabled vehicle.
3. Respond to the right front tire failure, without braking, by taking his foot off the accelerator and steering to the left in order to maintain lane position.
4. Continue to slow down until the vehicle is under full control and then gently brake to a stop.
5. Repeat the exercise, increasing the speed, until he successfully demonstrates his ability to control the vehicle.

C. Course Diagram –



D. Exercise Evaluation - The following constitute failure to complete the exercise proficiently.

If the operator:

1. Fails to use a 9 and 3 hand position in steering.
2. Fails to countersteer left for right front tire failure and runs off the road on the right side.
3. Panic brakes and loses control of the vehicle.
4. Steers too much left, causing vehicle to cross center lane line, posing head-on crash potential.
5. Fails to detect tire failure and does not steer at all.
6. Fails to use appropriate visual techniques.

E. Instructor's Evaluation Form - The following is an example of the form used by the range instructor for skill improvement evaluation of this exercise.

EXERCISE 5 - Tire Failure (RF) - Low Speed			Operator ID _____	
Attempts: 1 2 3 4 5 6 7 8 9 10			Speed: 25 35	
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
9-3 Hand Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Correct Response To Emergency	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Response Time To Emergency	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Steering Inputs	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Maintains Lane Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Controls Vehicle	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

VI. Exercise 6 - Off Road Recovery (Degree One: Slow Speed)

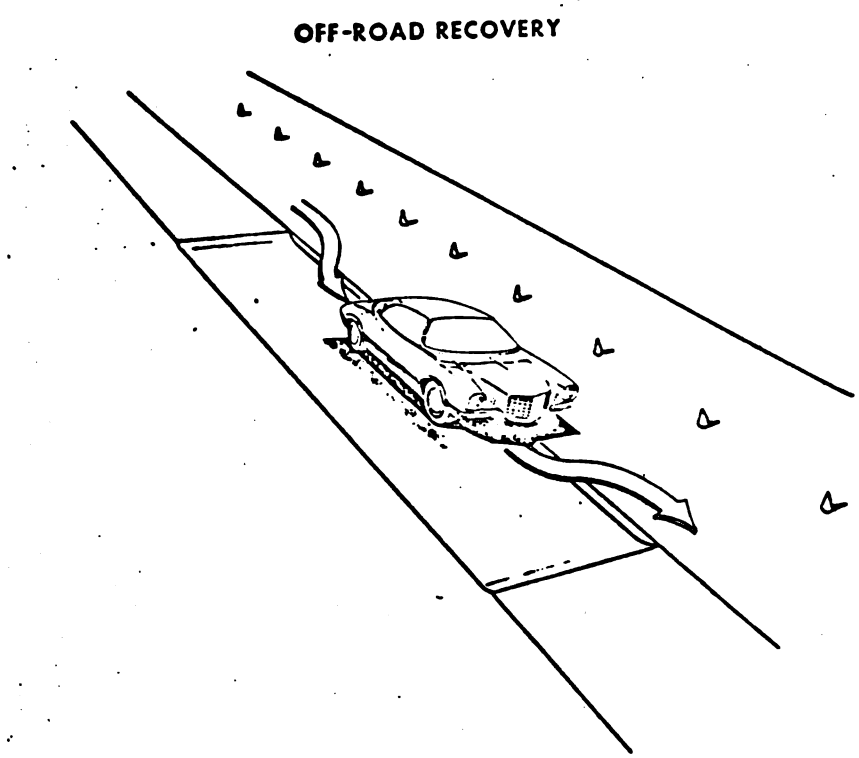
A. Exercise Objective - The purpose of the exercise is to provide you as operator with the skill of rejoining the road surface at a maintained speed. This should be considered an unusual situation. The average situation would only require that you reduce your speed and pull back onto the roadway. The difference is that one requires a high degree of skill than the other and therefore is more suitable in this exercise.

B. Performance Procedure -

The operator will:

1. Assume a 9 and 3 hand position on the steering wheel.
2. Accelerate down the cone-marked lane at a speed of 25 miles per hour. Note: This exercise requires visually perceptive action by the operator to align the vehicle for special steering movements within a limited lane area. Looking ahead will help plan ahead.
3. Drop the right wheels off the edge of the curb, while maintaining speed. Note: Straddle the curb with the vehicle.
4. Center the vehicle over the curb so the wheel and tire will have room to turn.
5. Midway down the curbing steer left 90 degrees. Note: Amount of steering depends on height of road edge and speed. Not more than 90 degrees is necessary.
6. As soon as the operator senses the right front tire hitting the curb, immediately steer 180 degrees back to the right, thus stabilizing the vehicle in the left lane.
7. Continue to a smooth stop in the left lane.
8. Repeat the exercise, increasing the speed, until he has demonstrated the coordination necessary to perform the maneuver successfully.

C. Course Diagram –



D. Exercise Evaluation - The following constitute failure to complete the exercise proficiently.

If the operator:

1. Fails to initiate the 9 and 3 hand position.
2. Maintain entry speed throughout exercise.
3. Fails to position the vehicle over the curbing, thus preventing the proper tire and wheel angle necessary to successfully come up and over the curb. Results will be the tire's scrubbing or hooking the curb.

4. Steers too slowly to the left, causing the tire to scrub the curb rather than hop the curb.
5. Waits too late to reverse steer to the right. This will cause the vehicle to cross the lane to the left (representing a potential head-on collision).
6. Steers too much in reversal to right, thus running off road to right.
7. Fails to use appropriate visual techniques.

E. Instructor's Evaluation Form - The following is an example of the form used by the range instructor for skill improvement evaluation of this exercise.

EXERCISE 6 - Off Road Recovery - Low Speed			Operator ID _____	
Attempts: 1 2 3 4 5 6 7 8 9 10			Speed: 25	35
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
9-3 Hand Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Maintains Speed	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Positions Vehicle Correctly	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Accurate Steering Input	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Controls Vehicle	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears Barrier	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

VII. Exercise 7 - Double Lane Change (Degree One: Low Speed)

A. Exercise Objective - The purpose of this exercise is to provide you as operator with the skill of steering the vehicle in a series of lane changes. This exercise requires twice the steering input of previous exercises.

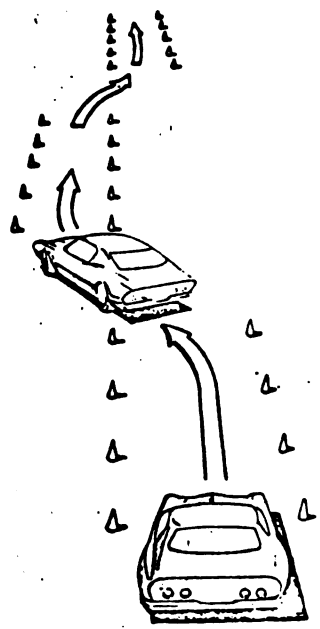
B. Performance Procedure -

The operator will:

1. Assume a 9 and 3 hand position on the steering wheel. Note: Because the exercise requires a series of moves, visual perception in looking and planning far enough ahead is especially important.
2. Approach the exercise at a speed of 25 miles per hour in the cone-marked right lane. Note: The initial speed must be maintained throughout the exercise.
3. Steer 180 degrees to the left cone-marked lane, maintaining lane position and speed. Note: No command will be given by the instructor. The operator must rely upon his own judgment in timing his steering movements.
4. Return the steering wheel to the straight ahead position to stabilize the vehicle in the left lane.
5. Steer 180 degrees right to the right lane, maintaining lane position and speed.
6. Return the steering wheel to the straight ahead position to stabilize the vehicle in the right lane.
7. Bring the vehicle to a smooth stop after clearing the exercise.
8. Repeat the exercise, increasing the speed, until he has demonstrated successful steering movements through the exercise.

C. Course Diagram

DOUBLE LANE CHANGE



D. Exercise Evaluation - The following constitute failure to complete the exercise proficiently.

If the operator:

1. Fails to use a 9 and 3 hand position for steering through the exercise.
2. Fails to maintain the assigned speed throughout the exercise.
3. Strikes cones, thus leaving marked lanes. This includes the cone barriers.
4. Steers too much or steers too little left or right, thus failing to stay within the lanes.

5. Steers early or late, thus misjudging time, speed, and distance of the vehicle-barrier relationship.
6. Fails to use appropriate visual techniques.

E. Instructor's Evaluation Form - The following is an example of the form used by the range instructor for skill improvement evaluation of this exercise.

EXERCISE 7 - Double Lane Change - Low Speed			Operator ID _____	
Attempts: 1 2 3 4 5 6 7 8 9 10			Speed: 25 - 35	
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
9-3 Hand Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Maintains Speed	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Times Vehicle Movement	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Steering Inputs	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Controls Vehicle	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears Barrier	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

DEGREE TWO: INCREASED SPEED

The operator has successfully completed seven exercises in vehicle handling and is now ready to proceed to the next level.

The following seven exercises are similar to those preceding; however, each of the exercises at "Degree Two: Increased Speed" have been modified both in speed and in design. A greater challenge to the operator's skill and judgment is called upon in these exercises.

Your responsibility is to conduct yourself and your vehicle with safe regard for all concerned. Make additional checks to be sure your area is clear of pedestrians and vehicles before beginning each exercise.

VIII. Exercise 8 - Serpentine Course (Degree Two: Increased Speed)

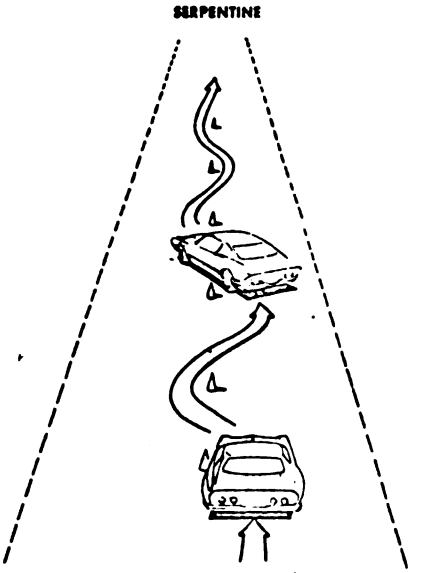
A. Exercise Objective - You as operator will develop well-timed steering movements coordinated between the vehicle and position of of the course cones. Your judgment must compensate for the increased distance between cones and vehicle speed which add to the difficulty.

B. Performance Procedure -

The operator will:

1. Use a 9 and 3 hand position.
2. Assume an increased speed. Maintain initial speed (suggested 28 mph).
3. Begin to the right of the first cone. Note: Cone clearance judgment will be increased by high aim eye movement, planning for upcoming cones.
4. Pass as closely as possible to the cones.
5. Repeat the course, at an increased speed, until he has demonstrated smoothness in steering and successfully completed the course run.

D. Course Diagram -



D. Exercise Evaluation - The following constitute failure to complete the exercise proficiently.

If the operator:

1. Does not use a 9 and 3 hand position.
2. Does not approach each cone as close as possible.
3. Fails to maintain smooth continuous steering rhythm.
4. Steers too little hitting cones with front wheels.
5. Steers too much resulting in wide turns.
6. Makes wide turns, thus missing last several cones.
7. Fails to maintain original speed.
8. Uses poor visual habits, such as low aim eye pattern with limited eye movement.

E. Instructor's Evaluation Form - The following is an example of the form used by the range instructor for skill improvement evaluation of this exercise.

EXERCISE 8 - Serpentine - Increased Speed			Operator ID _____	
Attempts: 1 2 3 4 5 6 7 8 9 10			Speed: 28 35	
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
9-3 Hand Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Close Cone Approach	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Maintains Speed	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Steering Rhythm	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Clears Right Side Vehicle	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears Left Side Vehicle	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

IX. Exercise 9 - Skid Control (Degree Two: Increased Speed)

A. Exercise Objective - You as operator will develop a sense of feel for the vehicle's reaction to loss of traction on a slippery road surface. A double curve and slight increase in speed add to the difficulty.

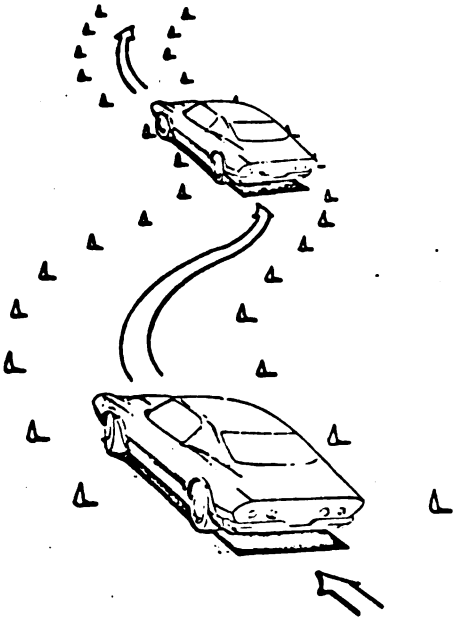
B. Performance Procedure -

The operator will:

1. Control the skid using only the steering wheel. Note: Braking or acceleration will be considered a fault.
2. Enter skid area on the curved path designated by cones. Note: Because of the speed increase and double turn path, awareness of vehicle path and control will be increased by operator's ability to look and plan ahead.
3. Assume a speed of 30 miles per hour.
4. Respond after the instructor has initiated the skid.
5. Release the accelerator immediately upon sensing the skid.
6. Steer in the direction you want the car to go.
7. Countersteer when the vehicle responds to the initial skid correction. Note: Beware of the possibility of a second skid.
8. Look far ahead in preparation for the second curve.
9. Again control the skid, using only the steering wheel.
10. Steer in the direction of the skid.
11. Countersteer as necessary.
12. Repeat the course, increasing speed until he has successfully demonstrated control of the vehicle.

C. Course Diagram -

SKID CONTROL



D. Exercise Evaluation - The following constitute failure to complete the exercise proficiently.

If the operator:

1. Uses the brake or the accelerator.
2. Responds too slow to the skid, allowing total loss of control.
3. Steers too much on the first skid, thus failing to countersteer in time on the second skid.
4. Reads the vehicle's skid incorrectly and fails to steer or error ir steering.

5. Exhibits improper steering hand control, thus allowing wheel to spin free.
6. Fails to make either curve at each respective speed trial.
7. Does not use eyes to best advantage for visual awareness.

E. Instructor's Evaluation Form - The following is an example of the form used by the range instructor for skill improvement evaluation of this exercise.

EXERCISE 9 - Skid Control - Increased Speed			Operator ID _____	
Attempts: 1 2 3 4 5 6 7 8 9 10			Speed: 30	35
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
Controls Vehicle: First Curve	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Controls Vehicle: Second Curve	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Response to Skid	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Steering Technique	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Countersteer	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Hand Technique	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

X. Exercise 10 - Controlled Braking (Degree Two: Increased Speed)

A. Exercise Objective - The purpose of the exercise is to provide you as operator with the experience of controlling the vehicle under conditions of maximum braking while maintaining steering ability. The speed has been increased and courses adjusted for this exercise.

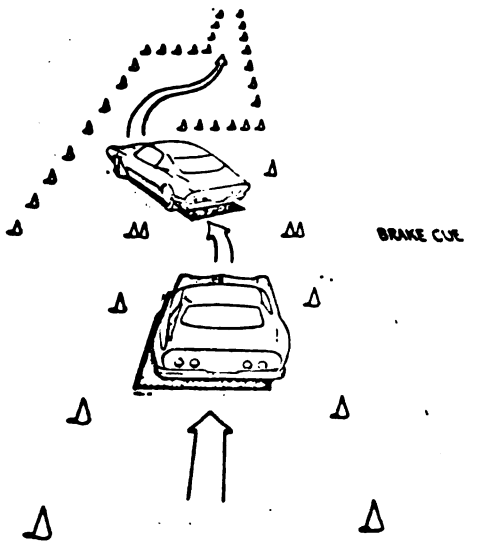
B. Performance Procedure -

The operator will:

1. Assume a 9 and 3 hand position for steering. Note: Increased awareness of time and distance between vehicle and barrier will occur if operator looks well ahead of vehicle.
2. Approach the exercise at a speed designated by the instructor. Note: The instructor will give the command "NOW" at a predetermined point.
3. Respond to the command "NOW" by simultaneously braking and steering left to avoid the barrier. Note: It is of prime importance to keep the wheels rolling in order to have steering and cornering ability. This may require you to ease braking pressure as you sense wheel lock or steering loss.
4. Countersteer 180 degrees to straighten vehicle in left lane.
5. Steer 180 degrees to the right, thus avoiding the second barrier.
6. Countersteer 180 degrees to straighten vehicle in the right lane.
7. Bring the vehicle to a stop in the shortest possible distance within the right lane.
8. Repeat the exercise, increasing the speed until he has successfully controlled the braking and steering throughout the exercise.

C. Course Diagram -

CONTROLLED BRAKING



D. Exercise Evaluation - The following constitute failure to complete the exercise proficiently.

If the operator:

1. Does not use a 9 and 3 hand position.
2. Locks brakes, causing a skid and loss of steering.
3. Steers too much left of steers too little, hitting barrier or lane markers.
4. Brakes before command "NOW."
5. Makes incomplete stop at end of course.
6. Locks wheels at end of course.
7. Violates right lane markers at end of course.
8. Looks short at ground near front of vehicle.

E. Instructor's Evaluation Form - The following is an example of the form used by the range instructor for skill improvement evaluation of this exercise.

EXERCISE 10 - Controlled Braking-Increased Speed		Operator ID _____		
Attempts: 1 2 3 4 5 6 7 8 9 10		Speed: 38		48
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
9-3 Hand Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Response To Cue	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Braking Technique	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Steering Inputs	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Clears Barrier	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Stop at Course End	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

XI. Exercise 11 - Evasive Maneuver (Degree Two: Increased Speed)

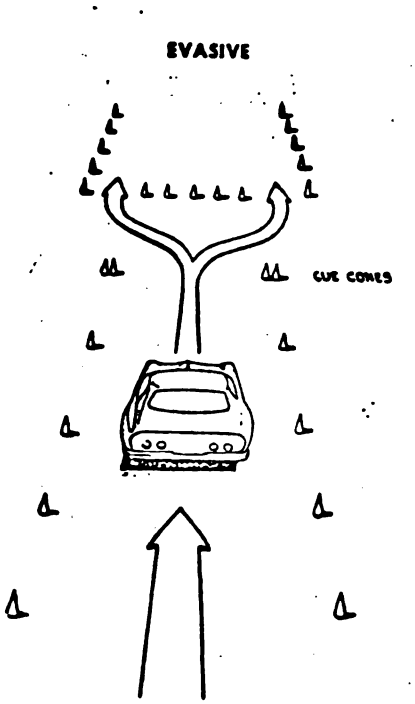
A. Exercise Objective - The purpose of the exercise is to provide you as operator with an understanding that a vehicle can avoid an object in a shorter distance than the vehicle can be panic braked. This exercise has been adjusted to require a quicker response at an increased speed.

B. Exercise Procedure -

The operator will:

1. Assume a 9 and 3 hand position for steering. Note: Peripheral vision will allow operator to watch the barrier and see both the left and right lanes. A choice will then be less difficult as judgment of time space and vehicle increase.
2. Approach the exercise at a speed of 35 miles per hour. Note: The operator will receive a command of either "LEFT" or "RIGHT" designating lane choice.
3. Receive the command "LEFT" or "RIGHT" and steer 180 degrees to that lane without decreasing speed.
4. Countersteer 180 degrees to straighten vehicle in lane.
5. Bring vehicle to a stop in a straight line after clearing the exercise.
6. Repeat the exercise, increasing the speed until he has successfully controlled the vehicle through the exercise.

C. Course Diagram -



D. Exercise Evaluation - The following constitute failure to complete the exercise proficiently.

If the operator:

1. Does not use a 9 and 3 hand position for steering.
2. Fails to maintain original speed throughout the exercise.
3. Chooses wrong lane in response to command.
4. Freezes and hits barrier.
5. Steers before command or anticipates command by guessing.
6. Steers too much or steers to little, causing loss of control and lane position or loses complete control.
7. Does not come to a stop to conclude the exercise.
8. Does not use appropriate visual technique.

E. Instructor's Evaluation Form - The following is an example of the form used by the range instructor for skill improvement evaluation of this exercise.

EXERCISE 11 - Evasive Maneuver-Increased Speed			Operator ID _____	
Attempts: 1 2 3 4 5 6 7 8 9 10			Speed: 35	45
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
9-3 Hand Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Response Time to Cue	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Chooses Correct Lane	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Steering Inputs	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Timing on Countersteer	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears Barrier	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

XII. Exercise 12 - Tire Failure (Right Front) (Degree Two: Increased Speed)

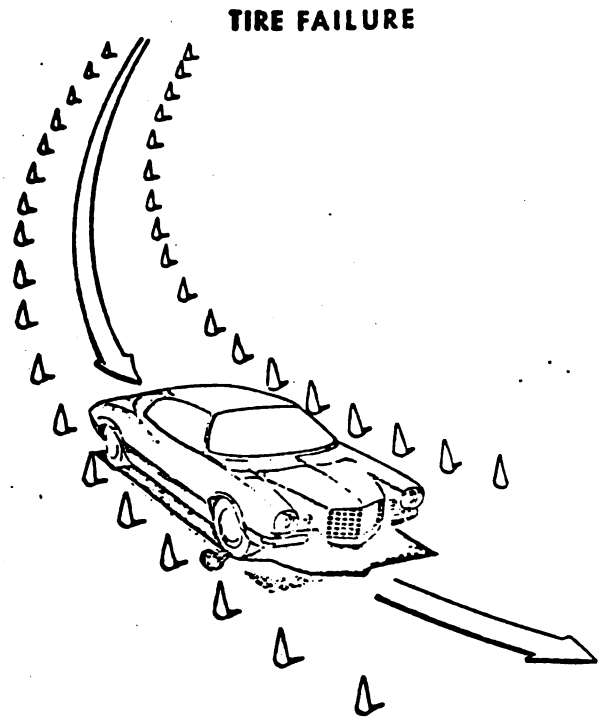
A. Exercise Objective - The purpose of the exercise is to provide you as operator with experience in vehicle control under the condition of tire failure. For this exercise, a slight curve and increased speed have been added.

B. Performance Procedure -

The operator will:

1. Use a 9 and 3 hand position to steer.
2. Assume a vehicle speed as designated by the instructor. Note: Because of the curve, control may become more difficult. Visual pattern should include eye movement clearing far ahead and to the rear of the vehicle in order to avoid potential dangers.
3. Respond to the right front tire failure by taking foot off the accelerator and steering to the left in order to maintain lane position. Note: Do not use brake.
4. Follow the lane curve to the left without striking lane cone markers.
5. Continue to slow down until the vehicle is under full control.
6. Brake to a gentle stop.
7. Repeat the exercise, increasing the speed until he successfully controls the vehicle.

C. Course Diagram -



D. Exercise Evaluation - The following constitute failure to complete the exercise proficiently.

If the operator:

1. Fails to use a 9 and 3 hand position to steer.
2. Does not countersteer left for right front tire failure.
3. Runs out of the lane, striking cones on right or left side.
4. Panic brakes and loses control of the vehicle.
5. Steers too much left or right, causing loss of control or lane violation.
6. Does not detect tire failure and fails to steer in response to the need.
7. Fails to clear visually to rear and ahead.

E. Instructor's Evaluation Form - The following is an example of the form used by the range instructor for skill improvement evaluation of this exercise.

EXERCISE 12 - Tire Failure (RF)-Increased Speed		Operator ID _____		
Attempts: 1 2 3 4 5 6 7 8 9 10		Speed: 30		40
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
9-3 Hand Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Correct Response To Emergency	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Response Time To Emergency	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Steering Inputs	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Maintains Lane Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Controls Vehicle	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

XIII. Exercise 13 - Off Road Recovery (Degree Two: Increased Speed)

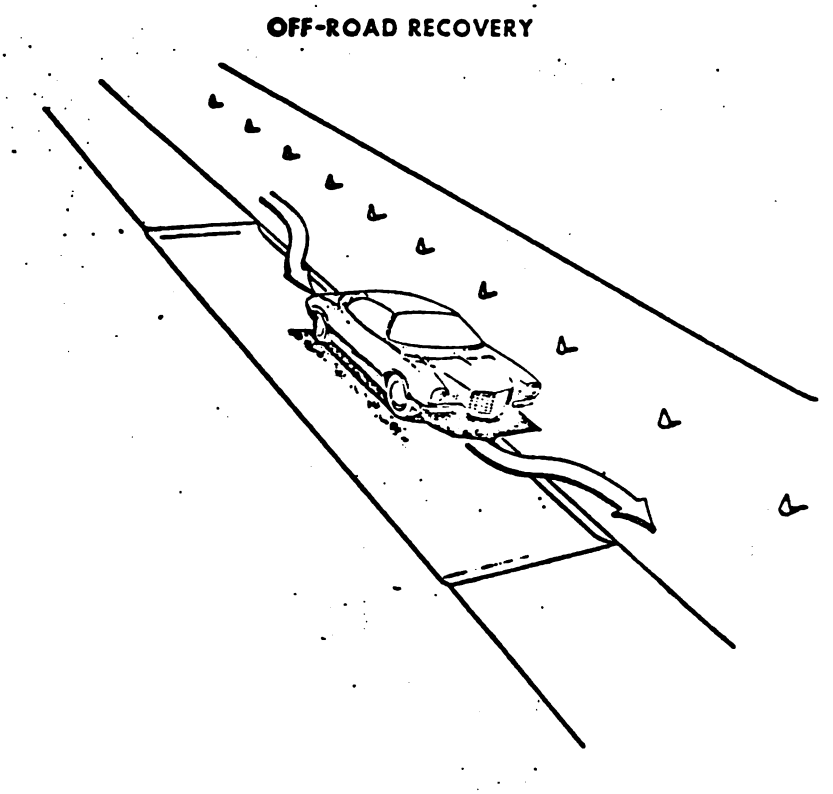
A. Exercise Objective - The purpose of the exercise is to provide you as operator with the skill of rejoining the road surface at a maximum speed. This exercise has been adjusted by increasing the speed and technique with which the exercise will be performed.

B. Performance Procedure -

The operator will:

1. Use a 9 and 3 hand position in steering.
2. Assume an exercise entry speed as designated by the instructor. Note: Repeated rapid eye movement near and far ahead of the vehicle will help operator's judgment in vehicle position and judgment of steering movements.
3. Drop all four wheels off the edge of the curb while maintaining speed. Note: Left wheels should be away from the curb in order to give wheels room to turn.
4. Steer up to 90 degrees to the left, causing left wheels to ride up over curb.
5. Hold steering input until the impact of the second tire over the edge of the curb is felt.
6. Countersteer 180 degrees to right to stabilize vehicle in left lane, thus avoiding barrier.
7. Continue to a smooth stop in the left lane.
8. Repeat the exercise, increasing the speed until he successfully maneuvers the vehicle through the exercise.

C. Course Diagram -



D. Exercise Evaluation - The following constitute failure to complete the exercise proficiently.

If the operator:

1. Does not use a 9 and 3 hand position in steering.
2. Does not maintain entry speed throughout exercise.
3. Positions vehicle's left wheels too far or too close to curbing on initial approach.
4. Steers too much or too little, causing vehicle to leave lane to the left or right.

5. Countersteers late, causing vehicle to move too far left.

6. Fails to look near and far ahead of intended vehicle path.

E. Instructor's Evaluation Form - The following is an example of the form used by the range instructor for skill improvement evaluation of this exercise.

EXERCISE 13 - Off Road Recovery-Increased Speed		Operator ID _____		
Attempts: 1 2 3 4 5 6 7 8 9 10		Speed: 35		45
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
9-3 Hand Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Maintains Speed	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Positions Vehicle Correctly	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Accurate Steering Input	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Controls Vehicle	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears Barrier	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

XIV. Exercise 14 - Double Lane Change (Degree Two: Increased Speed)

A. Exercise Objective - The purpose of this exercise is to provide you as operator with the skill of steering the vehicle at increased speeds in a confined series of lane changes.

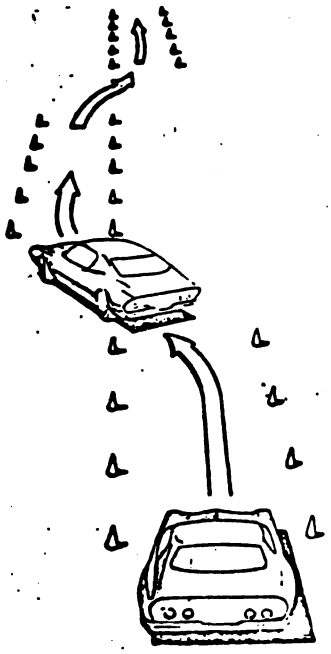
B. Performance Procedure -

The operator will:

1. Use a 9 and 3 hand position on the steering wheel. Note: Increased speed and lane movements require the operator to use visually active perception to match vehicle actions.
2. Assume an exercise entry speed indicated by the instructor. Note: Entry speed must be maintained throughout the exercise.
3. Steer 180 degrees left to the left cone-marked lane, maintaining lane position and speed, thus avoiding the first barrier. Note: The operator must rely upon his own judgment for timing for his steering movements.
4. Return steering to straight ahead to stabilize the vehicle in the left lane.
5. Steer 180 degrees right to the right cone-marked lane, maintaining lane position and speed, thus avoiding the second barrier.
6. Return steering to straight ahead to stabilize the vehicle in the right lane.
7. Bring the vehicle to a smooth stop after clearing the exercise.
8. Repeat the exercise, increasing the speed until he successfully completes the exercise.

C. Course Diagram –

DOUBLE LANE CHANGE



D. Exercise Evaluation - The following constitute failure to complete the exercise proficiently.

If the operator:

1. Does not use a 9 and 3 hand position on steering wheel.
2. Does not maintain entry speed.
3. Leaves any lane to the left or right.
4. Strikes cones.

5. Uses poor judgment in steering, causing late or early steering faults.
6. Countersteers, using poor judgment, causing overcompensation.
7. Loses control of the vehicle.
8. Fails to stop at the end of the exercise.
9. Does not react with adequate visual perception.

E. Instructor's Evaluation Form - The following is an example of the form used by the range instructor for skill improvement evaluation of this exercise.

EXERCISE 14-Double Lane Change-Increased Speed			Operator ID _____	
Attempts: 1 2 3 4 5 6 7 8 9 10			Speed: 35 -- 45	
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
9-3 Hand Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Maintains Speed	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Times Vehicle Movements	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Accurate Steering Inputs	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Controls Vehicle	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears Barriers	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

ULTIMATE EVALUATION

The ultimate evaluation of the operator will be the accident record experience during an extended period following the completion of this course.

While previous research has shown that trained operators experience significantly fewer accidents than untrained operators, it remains a question to be answered for this program.

The combination of knowledge and skill information presented in this course will give you as the operator an excellent opportunity to improve your understanding of, and operation in, the driving task; however, future individual experiences and your personal sense of responsibility will be deciding factors in the final analysis.

APPENDIX B

INSTRUCTOR'S MANUAL, PHASE I: CLASSROOM

INSTRUCTOR's MANUAL, PHASE II: RANGE

INSTRUCTOR'S MANUAL

ADVANCED
DRIVER EDUCATION
FOR
EMERGENCY VEHICLE OPERATORS

PHASE I: CLASSROOM
and
PHASE II: RANGE

TABLE OF CONTENTS

PHASE I: CLASSROOM

Classroom Procedure

The classroom curriculum has been organized in a modular form. This allows the instructors to have flexibility in scheduling the six classroom hours and match the lesson to the time for that frame. For best continuity, the recommendation is to follow the order in which the lesson has been numbered.

The classroom has been designed to precede the range phase. It is more desirable to teach the classroom concurrently with the range; however, in the initial use of this curriculum, this feature is not possible.

BACKGROUND INFORMATION

The instructor is encouraged to familiarize himself with the bibliography in the back of the student classroom manual. Information from these sources has been utilized in both parts of this course. During the course, questions may be asked of the instructor that require resource beyond the scope of the program manual's presentation. The more knowledgeable the instructor is, the more he earns the respect of those participating in the course.

CLASSROOM EVALUATION

A pre-test will be given on classroom knowledge before the first classroom lesson begins. The purpose is to establish what knowledge the operator has prior to the instruction.

Immediately after the last classroom session, a post-test on classroom knowledge will be given.

A statistical comparison of the before and after scores on the classroom phase will establish the reliability of the learning experience.

Results of these tests will be available to instructor and participants. For the instructor, it should be used as an indication of his own ability in presenting the curriculum. As mentioned earlier, it will also be used to show the progress of the learning experience that the participant experienced.

The tests used have been verified to be representative of the curriculum by a panel of traffic safety specialists.

VISUAL AIDS

The preparation of classroom visual aids is evident. Careful consideration was given to many possible sources of film and other types of visual materials. Only those which were consistant with the objectives of the course have been included for use with this curriculum.

CLASSROOM INSTRUCTION METHOD

Using a modular form, the participant and the instructor have complete study information by which to prepare for the classroom lessons and evaluation.

It is suggested that the participant read the lessons before the classroom discussion given by the instructor. This will not be possible for the first lesson because of the pre-test.

The use of question-and-answer by the instructor to stimulate discussion among participant members is encouraged. The depth of their understanding will depend as much on the instructor's explanation of the information as on what they have previously studied in their manual.

VISUAL PRESENTATION METHOD

The instructor has received six visual teaching aids in the curriculum package. Those aids are:

1. Film - "Police Pursuit" - 16 mm, color, sound motion picture, 24 minutes.
2. Slides - SIPDE Introduction, forty, 35mm color slides, with written narration.
3. Slides - Basic Advanced Driver Education Exercises, six 35mm, color slides.
4. Transparencies - two sets of overhead transparencies.
   Set 1 - Advanced Driver Education Exercises Without Distances.
   Set 2 - Advanced Driver Education Exercises With Distances.
5. Film - "Emergency Driving Maneuvers" - 16mm, color, silent.
6. Illustrations - Various sketches throughout the Curriculum Guide in the form of models, etc.

The following information is for use as visual aids:

1. Police Driving Film - After the operators have taken a pre-test and have been given a basic introduction to the course, the film should be shown. At the conclusion of the film, a discussion period (10 minutes) should be held stressing the following points:
   a. Advantages and disadvantages of emergency-type driving.
   b. Comparison of the responsibilities the driver has for safe use of both firearms and the motor vehicle.
   c. Identification of special driving techniques observed in the film.
2. SIPDE Introduction - In Lesson 2 under the question "What Visual Technique Can Help Prevent Accidents?" reference is made to a group of slides that are used to show the student that the mind and eyes can play tricks between what we think we see and what we actually do see. This process is designed to act as an introduction to the actual presentation of SIPDE in the student manual. The narration for these slides is in Appendix A of the Instructor's Manual.
3. Advanced Driver Education Exercises (slides).
4. Advanced Driver Education Exercises (transparencies).
5. Emergency Driving Maneuvers - film - This first presentation has six slides and is the original six exercises conducted by the General Motors Proving Grounds Course. It is suggested that they be used with the film and transparencies (same titles) in the last classroom session. Lesson 4 provides this opportunity to visually and verbally present the range information. It is important that the operator understand the nature of the exercises and what is expected of him before he goes behind the wheel. These three visual presentations will assist in giving the student that understanding. The information in Lesson 4 will assist the instructor in that presentation.

6. Operator Manual Drawings - This is a visual explanation for the written information presented in the Operator's Classroom Manual. The instructor is encouraged to be familiar with these and use them as references in classroom discussion.

PHASE II: RANGE

Range Procedure

The range curriculum has been organized in a series of fourteen lessons. Each lesson is a separate driving exercise. The first seven exercises are repeated and the difficulty increased by changing speed and distances. The total fourteen lessons (i.e. exercises) are arranged in order of progressing difficulty. It should be noted that the skills in each exercise are related in a progressive sense; therefore, Lesson 1-Exercise 1, should be completed by all operators before beginning Lesson 2 - Exercise 2.

RANGE EVALUATION PROCEDURE

During the range training, each operator will be rated three times on each exercise. The purpose of this rating is to establish 1) the level of skill the operator entered with; 2) the level of skills gained by the operator at a mid-point while learning the skills of the exercise; and 3) the level of skill the operator gained overall during the various trials of each single exercise. The analysis of these rating forms, for each operator, will aid in establishing the reliability of the training exercise.

The fourteen evaluation forms have been collected on seven pages (example, Appendix B). The instructor is asked to note the number of total trials on each exercise in the space provided. Speeds for each exercise are noted on the rating sheet and vary from exercise to exercise.

Every rated trial on every exercise has a value of fifty points. The skill values (i.e., 1, 2, 3, 4, 5) are to be marked when the operator fails to perform that part of the exercise. One is the lowest value, five is the highest value; therefore, if the instructor has marked five next to steering, he has indicated that the operator has <u>lost</u> all the points related to steering

in that exercise trial. By this example, the rating is now forty-five instead of the original fifty.

"Range Safety Procedures" and "Pre-Driving Check" do not have point values. They are required skills that must be performed before a trial begins. A "failure to perform" should be noted in the trial scoring area by either writing the violation down as in the case of "Range Safety Procedure". or checking the alphabetical letter which represents the step of the "Pre-Driving Procedure" missed.

The instructor is expected to total the points for each of the trials as they are rated.

PROCEDURE FOR TEACHING THE RANGE EXERCISES

The instructor must be completely familiar with the information in Operator Manual One and Two to competently conduct the range program. The information in this manual is supplemental. Information in this manual gives additional assistance to the instructor in teaching of the range exercises. It is based on the more common mistakes operators usually make.

Instructors are reminded that first consideration should be given to the driver's ability in smoothness of vehicle control. Speed achievement in an exercise is not as important as how well the driver performed the overall exercise.

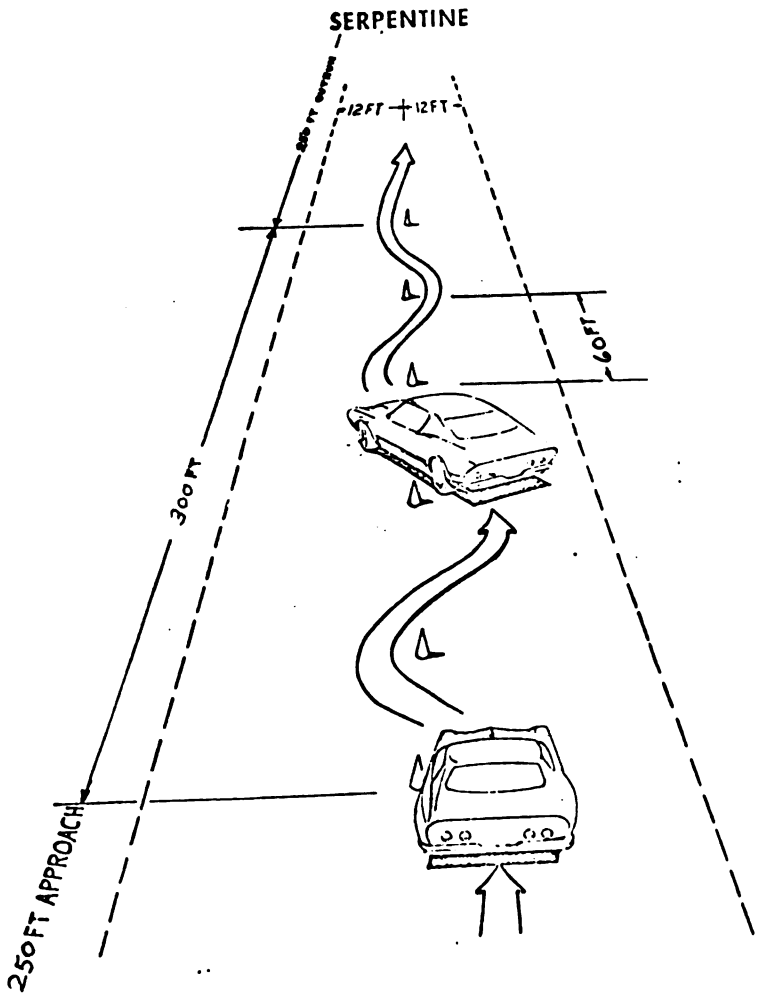
The purpose of the minimum and maximum speeds noted on evaluation forms is to introduce an increasing degree of difficulty throughout the fourteen exercises.

EXERCISE 1 - SERPENTINE

Operator Faults:

1. Steers too little, thus hits cones.
2. Steers too much, resulting in wider and wider turns through the cones.
3. Increases or decreases speed, resulting in poor timing.
4. Change hand position on steering wheel from 9 and 3.
5. Steers early or late, placing vehicle in wrong position in relation to cones.

Course Diagram: Serpentine



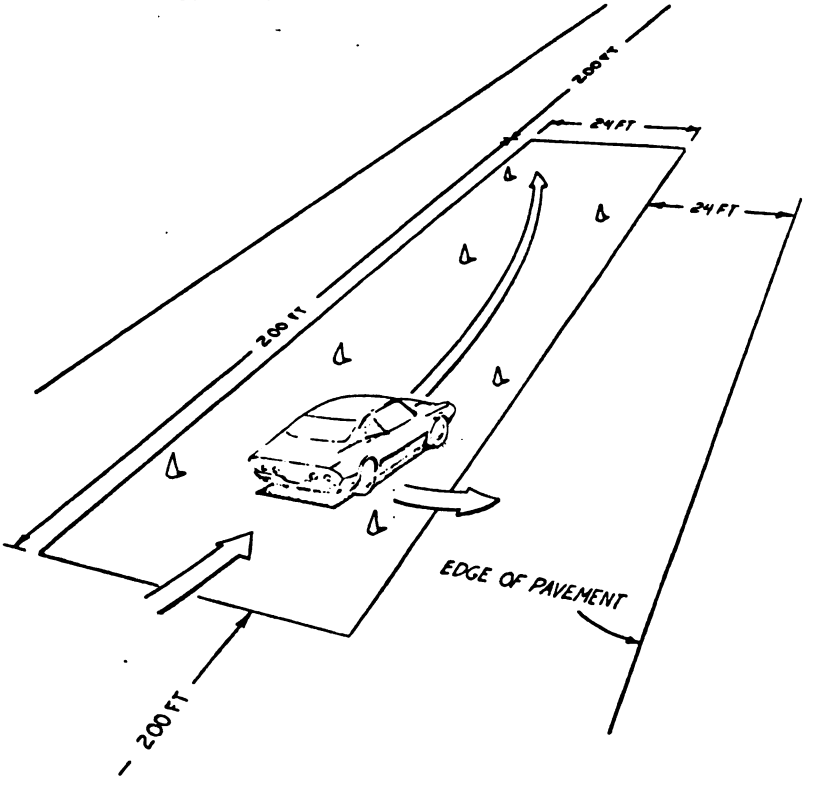
EXERCISE 2 - SKID CONTROL

Operator Faults:

1. Fails to release accelerator.
2. Brakes.
3. Responds too slowly or too late to skid, allowing vehicle to move beyond point of control.
4. Steers too much or too late on first skid, resulting in a second skid.
5. Steers in wrong direction in response to vehicle skid direction indicated.
6. Fails to keep working to recover from each succeeding skid.

Course Diagram: Skid Control

SKID CONTROL



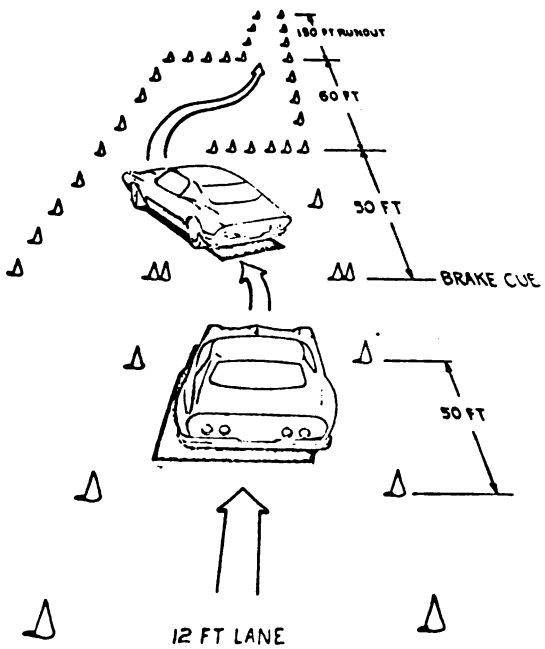
EXERCISE 3 - CONTROLLED BRAKING

Operator Faults:

1. Locks brakes, thus loses steering control.
2. Steers too much and cannot recover before hitting second barrier.
3. Steers too little, thus hits first barrier.
4. Brakes early (before cue), thus stops before returning to right hand lane.
5. Responds too late or responds too early to cue.
6. Slightly locks brake but gives up instead of releasing pressure on brake and working the remaining distance.

Course Diagram: Controlled Braking

CONTROLLED BRAKING

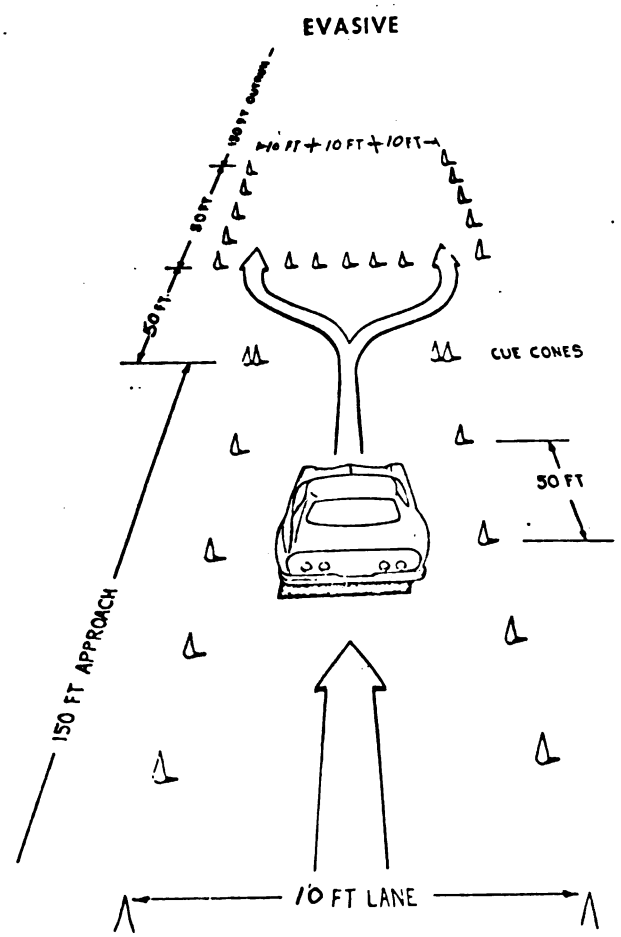


EXERCISE 4, EVASIVE MANEUVER

Operator Faults:

1. Mentally pre-determines direction, thus takes wrong lane. Note: Proper technique is more important than choosing proper lane.
2. Poor timing (early or late) of steering to lane and countersteer recovery.
3. Failure to maintain set speed.
4. Failure to use 9 and 3 hand position on steering wheel.

Course Diagram: Evasive Maneuver

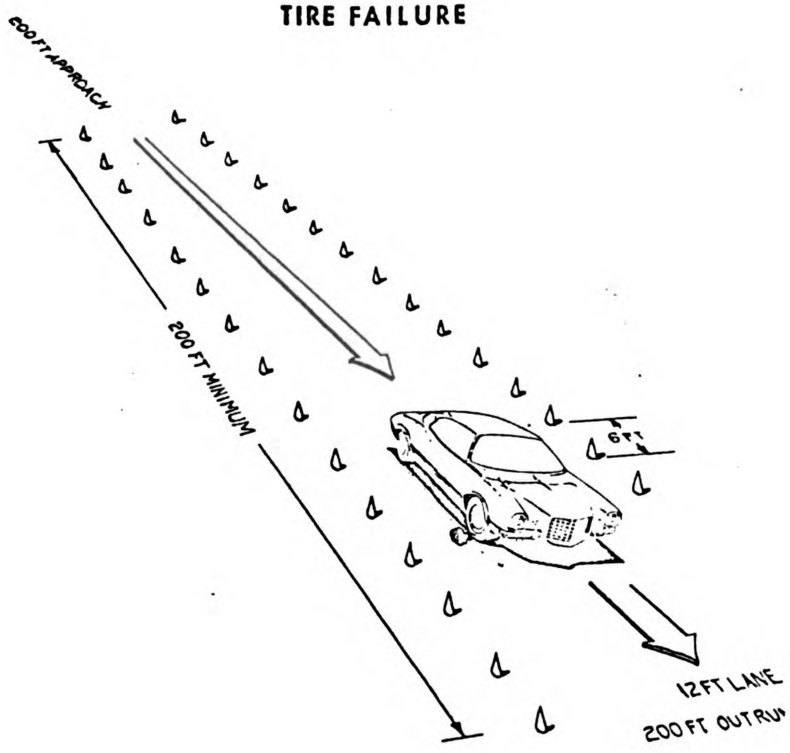


EXERCISE 5 - TIRE FAILURE (RIGHT FRONT)

Operator Faults:

1. Over-reacts to the failure by braking.
2. Does not steer, thus allows vehicle to leave lane (left or right).
3. Steers too much.
4. Does not release accelerator.

Course Diagram: Tire Failure (Right Front)



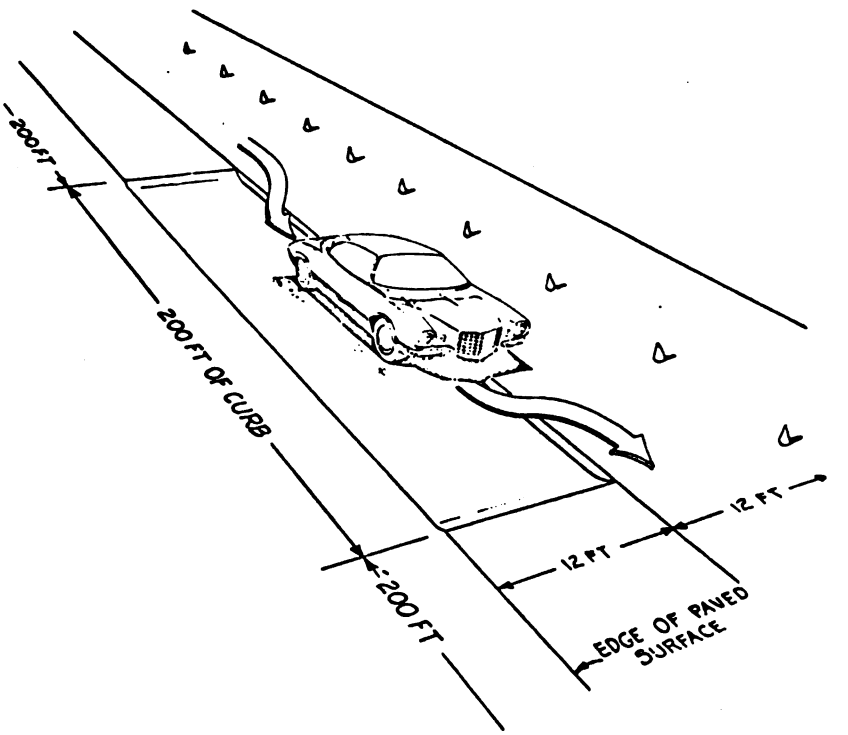
EXERCISE 6 - OFF-ROAD RECOVERY

Operator Faults:

1. Fails to position vehicle so the tires have the room to work.
2. Understeers, resulting in scrubbing effect of tires against curb.
3. Late countersteer, thus allowing vehicle to cross into next lane.
4. Steers too much on the countersteer, allowing vehicle to drop back off curb.

Course Diagram: Off-Road Recovery

OFF-ROAD RECOVERY



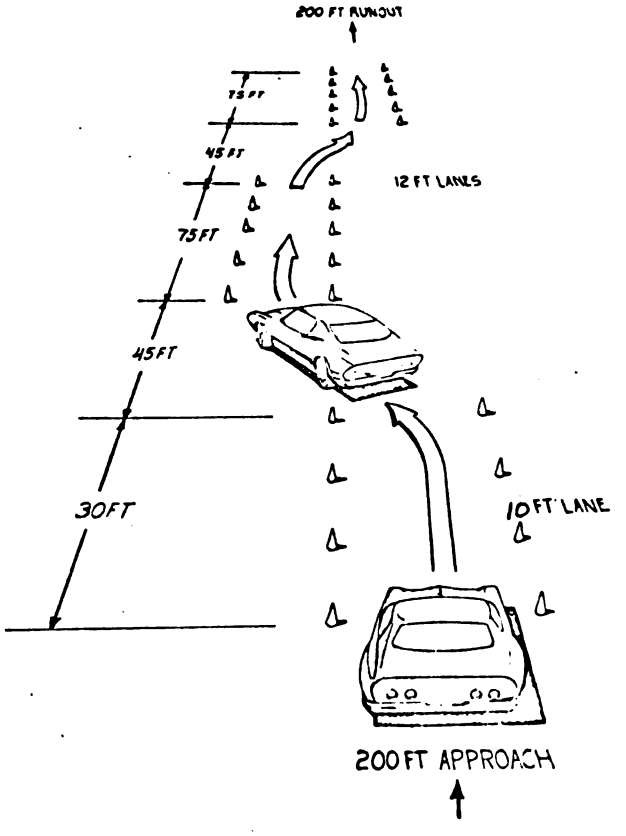
EXERCISE 7 - DOUBLE LANE CHANGE

Operator Faults:

1. Does not maintain constant speed throughout exercise.
2. Moves hands on steering wheel from a 9 and 3 hand position.
3. Poor timing of steering (steers early or late) into or out of left lane.
4. Countersteers late.
5. Over-countersteers, causing total loss of control.

Course Diagram: Double Lane Change

DOUBLE LANE CHANGE



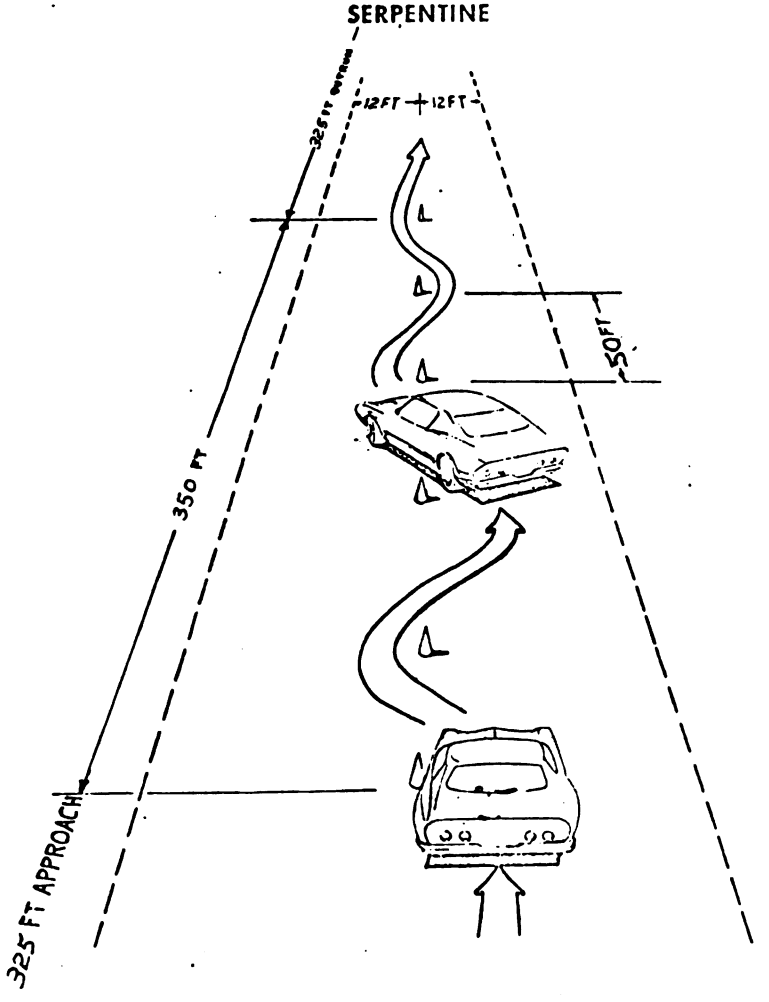
THE REMAINING SEVEN EXERCISES

For the remaining seven exercises, only the course diagram will be given.

Note any changes in course design distances and speed increase for each exercise.

EXERCISE 8 - SERPENTINE

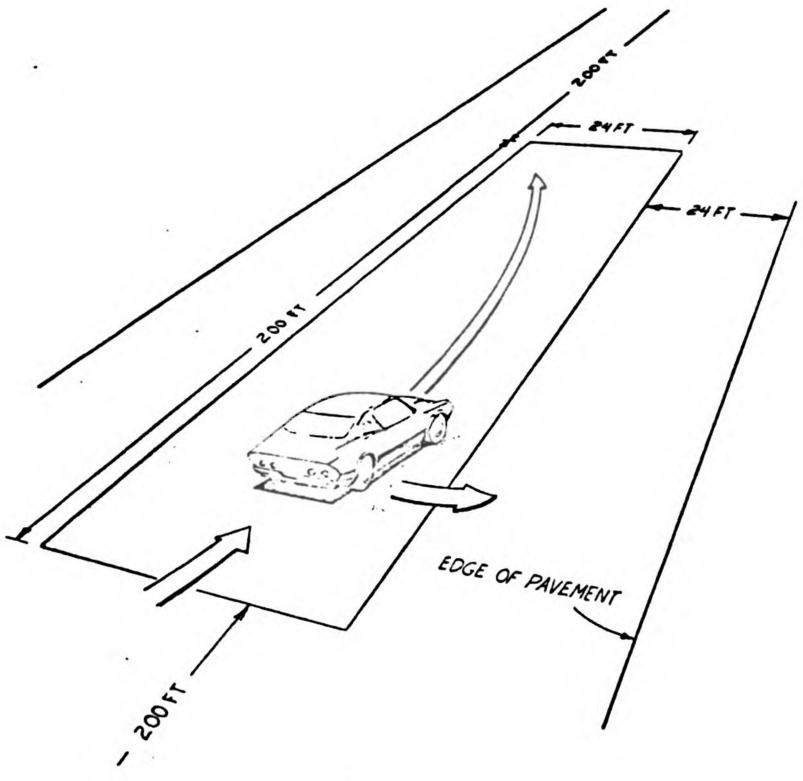
Course Diagram: Serpentine



EXERCISE 9 - SKID CONTROL

Course Diagram: Skid Control

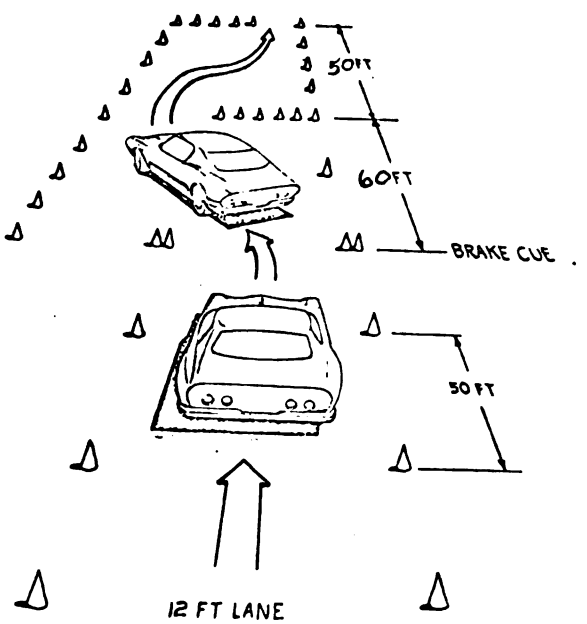
SKID CONTROL



EXERCISE 10 - CONTROLLED BRAKING

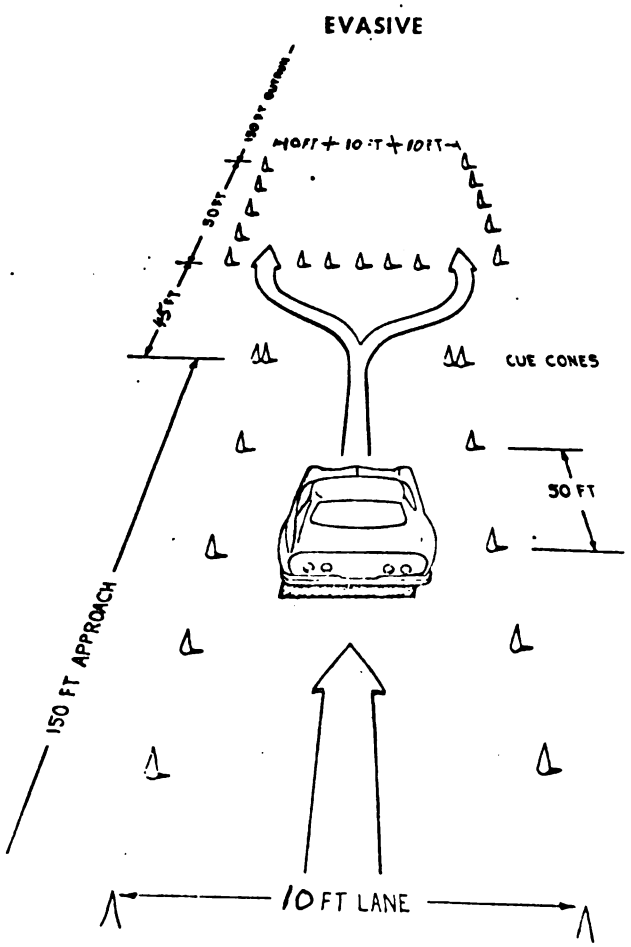
Course Diagram: Controlled Braking

CONTROLLED BRAKING



EXERCISE 11 - EVASIVE MANEUVERS

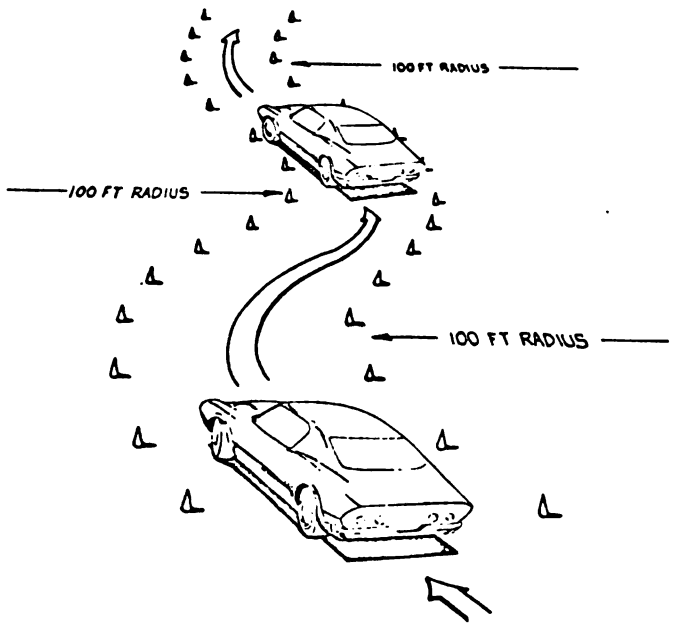
Course Diagram: Evasive Maneuver



EXERCISE 12 - TIRE FAILURE (RIGHT FRONT)

Course Diagram: Tire Failure (Right Front)

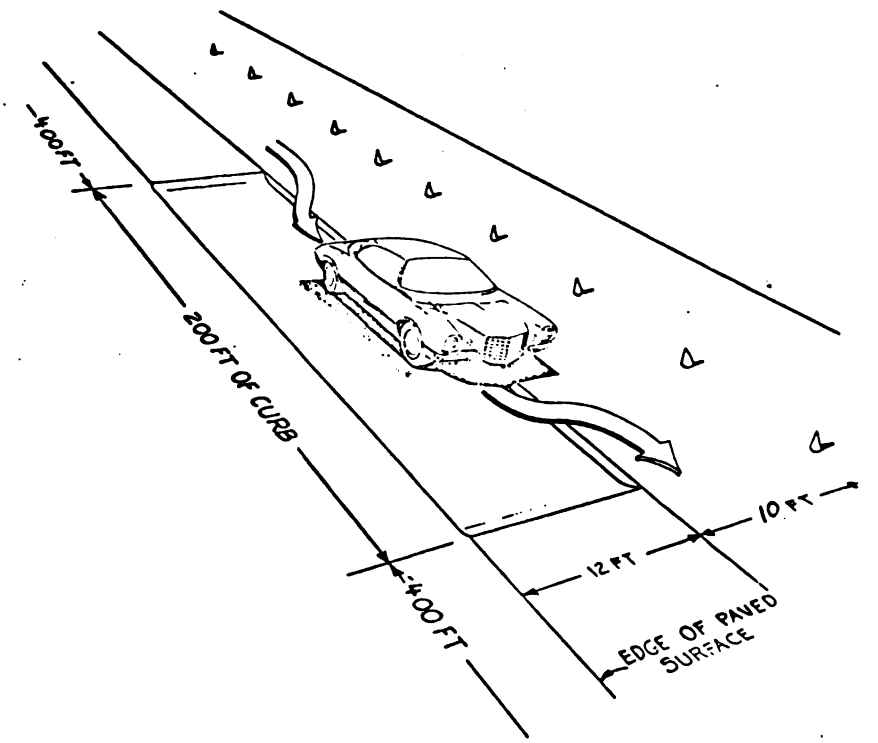
TIRE FAILURE



EXERCISE 13 - OFF-ROAD RECOVERY

Course Diagram: Off-Road Recovery

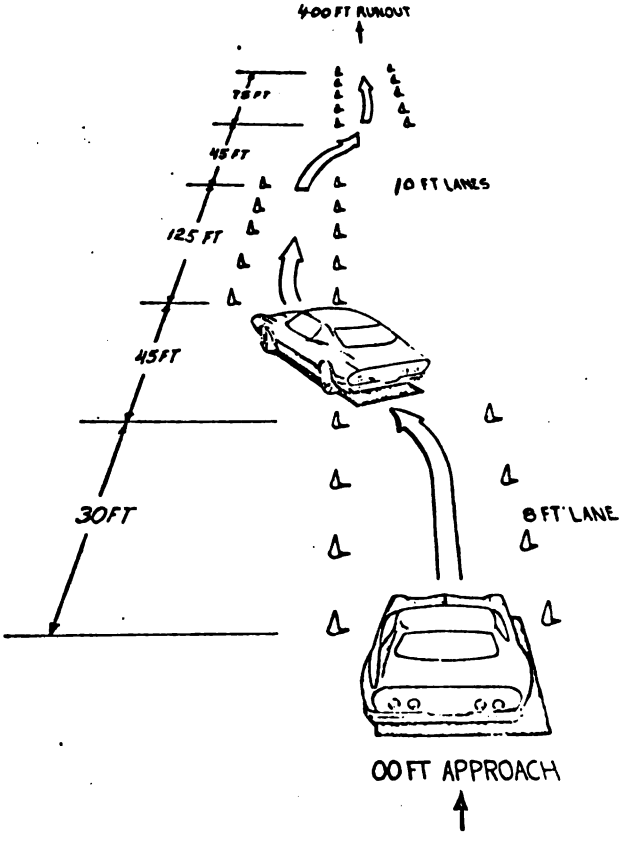
OFF-ROAD RECOVERY



EXERCISE 14 - DOUBLE LANE CHANGE

Course Diagram: Double Lane Change

DOUBLE LANE CHANGE



APPENDIX A

SLIDE 1 - Start

SLIDE 2 - What other technique can help prevent accidents?

SLIDE 3 - The answer to this question is: "A sound visual perception system."

SLIDE 4 - Of all the senses we use in driving, vision gives us the most information.

SLIDE 5 - It is upon this information that we make decisions and judgments critical to the driving task.

SLIDE 6 - It seems to be a human trait to take many things in life for granted. This is also true for vision.

A group of slides will now be shown to demonstrate that our eyes can, in spite of their grand ability, deceive us.

SLIDE 7 - Concentrate on the center of this starburst. For most people, the pattern will vibrate a little. This sensation is caused by little irregularities in the lens of the eye.

SLIDE 8 - On this one, we will start with a herringbone pattern.

SLIDE 9 - Then we will add some lines on top of the pattern. Are the lines parallel? (5 seconds) Check Yes ___, or No ___.

SLIDE 10 - Look again! The answer is Yes; the lines were actually parallel. By removing the pattern, we see they are parallel lines.

SLIDE 11 - Circles can be deceiving too. Here are two circular spots of equal size and color.

SLIDE 12 - What happens when each spot is surrounded with circular spots of unequal size? The original circular spots appear to be unequal in size.

SLIDE 13 - Look at this pattern. What you think you see is a spiral going round and round into the center.

SLIDE 14 - If the background pattern is removed, you discover the spiral line is actually broken into distinct, separate lines. The background pattern confused the visual process.

SLIDE 15 - Colors and tones can cause confusion also. Scan the entire screen and you will see Ghost blue dots where the white lines cross each other.

SLIDE 16 - Rectangles can have a similar effect as the circle did. They may not look it, but all the inner rectangles are the same size and color.

SLIDE 17 - The next slide requires you to concentrate on the slide for about 30 seconds. Keep staring at the black dot in the middle of the of the interstate sign. By staring and concentrating at the dot, you will overstimulate the color receptors in your eyes.
Keep looking at that black dot. (Allow for 30 seconds.)

SLIDE 18 - As we change the slide, keep looking at the black dot. You should be able to see the interstate sign <u>in its proper colors</u>. Keep looking; it will be there.
You didn't see it? Well, for the slower members of the audience, we'll .....

SLIDE 19 - Try it again. Remember now, concentrate hard on the black dot. We will wait 30 seconds for your eyes to adjust.

SLIDE 20 - How about now? Do you see it this time?

SLIDE 21 - Remembering that vision is both a mental and physical process, it is possible to play tricks on the mind as well. This optical illusion could be two things. A vase or two faces.
Close your eyes and open them again. Now what do you see?

SLIDE 22 - Here is another one. The artist has only painted part of the picture. Can you mentally construct the missing areas? Use your imagination.

Does anybody see a horse and rider?

SLIDE 23 - Well, it is! The outline helps fill the missing areas.

Through the magic or instant replay, let's show it again.

SLIDE 24 - Can you see now?

SLIDE 25 - If you move your head or blink your eyes, your mind will reverse what you see the first time. Some people see blocks piled up; others see the blocks upside down. What do you see?

The next picture will go by fast, so be ready. See if you can read what is inside the triangle within a second! Ready .....

SLIDE 26 - (1 second)

SLIDE 27 - What did you read? Most of you read, "Buckle up for safety." Is that what it said? Let's look again.

SLIDE 28 - It reads, "Buckle up <u>for for</u> safety." Most did not see the second "for." We have seen or read the saying so many times that we mentally fill in the rest. Consequently, many never see the second "for."

SLIDE 29 - Finally, the letters of the alphabet are more difficult to read at a distance than numbers. In this picture the letters on the license plate are a little larger than the numbers.

SLIDE 30 - The complexity of today's driving task means we can no longer trust our basic visual instincts. We now know that they can be wrong.

SLIDE 31 - We must base driver action on a system that will allow the driver <u>time, speed</u>, and <u>distance</u> to make <u>accurate</u> decisions about the driving task.

SLIDE 32 - (Dark)

SLIDE 33 - (Focus)

SLIDE 34 - Serpentine

SLIDE 35 - Evasive

SLIDE 36 - Controlled Braking

SLIDE 37 - Skid Control

SLIDE 38 - Off-Road Recovery

SLIDE 39 - Blow outs

SLIDE 40 - (Dark)

APPENDIX B

EXERCISE 1 - Serpentine - Low Speed			Operator ID _____	
Attempts: 1 2 3 4 5 6 7 8 9 10			Speed: 20	28
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
9-3 Hand Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Close Cone Approach	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Maintains Speed	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Steering Inputs	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Clear Right Side Vehicle	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clear Left Side Vehicle	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R *	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R *	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

EXERCISE 2 - Skid Control - Low Speed			Operator ID _____	
Attempts: 1 2 3 4 5 6 7 8 9 10			Speed: 25	30
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
Controls Vehicle	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Maintains Course	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Response to Skid	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Steering Inputs	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Countersteer	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Hand Technique	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

EXERCISE 3 - Controlled Braking - Low Speed			Operator ID _____	
Attempts: 1 2 3 4 5 6 7 8 9 10			Speed: 30	38
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
9-3 Hand Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Response Time to Cue	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Braking Technique	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Steering Input	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Clears Barriers	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Stop At Course End	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . : . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

*Required

EXERCISE 4 - Evasive Maneuver - Low Speed			Operator ID _____	
Attempts: 1 2 3 4 5 6 7 8 9 10			Speed: 25	35
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
9-3 Hand Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Response Time to Cue	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Chooses Correct Lane	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Steering Inputs	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Timing On Countersteers	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears Barriers	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

EXERCISE 5 - Tire Failure (RF) - Low Speed			Operator ID _____	
Attempts: 1 2 3 4 5 6 7 8 9 10			Speed: 25 35	
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
9-3 Hand Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Correct Response To Emergency	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Response Time To Emergency	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Steering Inputs	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Maintains Lane Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Controls Vehicle	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

EXERCISE 6 - Off Road Recovery - Low Speed			Operator ID _____	
Attempts: 1 2 3 4 5 6 7 8 9 10			Speed: 25 35	
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
9-3 Hand Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Maintains Speed	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Positions Vehicle Correctly	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Accurate Steering Input	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Controls Vehicle	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears Barrier	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

EXERCISE 7 - Double Lane Change - Low Speed			Operator ID _____	
Attempts: 1 2 3 4 5 6 7 8 9 10			Speed: 25	35
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
9-3 Hand Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Maintains Speed	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Times Vehicle Movement	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Steering Inputs	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Controls Vehicle	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears Barrier	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

EXERCISE 8 - Serpentine - Increased Speed			Operator ID _____	
Attempts: 1 2 3 4 5 6 7 8 9 10			Speed: 28	35
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
9-3 Hand Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Close Cone Approach	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Maintains Speed	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Steering Rhythm	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Clears Right Side Vehicle	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears Left Side Vehicle	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

EXERCISE 9 - Skid Control - Increased Speed		Operator ID _____		
Attempts: 1 2 3 4 5 6 7 8 9 10		Speed: 30		35
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
Controls Vehicle: First Curve	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Controls Vehicle: Second Curve	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Response to Skid	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Steering Technique	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Countersteer	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Hand Technique	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

EXERCISE 10 - Controlled Braking-Increased Speed		Operator ID _____		
Attempts: 1 2 3 4 5 6 7 8 9 10		Speed: 38		48
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
9-3 Hand Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Response To Cue	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Braking Technique	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Steering Inputs	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Clears Barrier	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Stop at Course End	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

EXERCISE 11 - Evasive Maneuver-Increased Speed			Operator ID _____	
Attempts: 1 2 3 4 5 6 7 8 9 10			Speed: 35	45
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
9-3 Hand Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Response Time to Cue	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Chooses Correct Lane	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Steering Inputs	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Timing on Countersteer	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears Barrier	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

EXERCISE 12 - Tire Failure (RF)-Increased Speed			Operator ID _____	
Attempts: 1 2 3 4 5 6 7 8 9 10			Speed: 30	40
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
9-3 Hand Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Correct Response To Emergency	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Response Time To Emergency	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Steering Inputs	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Maintains Lane Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Controls Vehicle	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

EXERCISE 13 - Off Road Recovery-Increased Speed		Operator ID _____		
Attempts: 1 2 3 4 5 6 7 8 9 10		Speed: 35		45
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
9-3 Hand Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Maintains Speed	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Positions Vehicle Correctly	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Accurate Steering Input	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Controls Vehicle	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears Barrier	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

EXERCISE 14-Double Lane Change-Increased Speed		Operator ID _____		
Attempts: 1 2 3 4 5 6 7 8 9 10		Speed: 35		45
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
9-3 Hand Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Maintains Speed	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Times Vehicle Movements	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Accurate Steering Inputs	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Controls Vehicle	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears Barriers	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

APPENDIX C

TEST

(Test Time: 20 min.)

ADVANCED
DRIVER EDUCATION
FOR
EMERGENCY VEHICLE OPERATORS

CLASSROOM PHASE

DIRECTIONS: Choose the ONE BEST answer for each of the following statements. Mark only on the separate answer sheet.

1. The Driving Task is getting from Point A to Point B _____.
   1. As fast as possible
   2. In the shortest possible time
   3. Without an accident
   4. First
   5. Without regard for personal risk

2. The most effective form of pursuit driving uses _____ vehicle speeds.
   1. Aggressive
   2. Moderate
   3. High
   4. Uncontrolled
   5. Low

3. The most effective form of pursuit driving uses _____ driving skills.
   1. Moderate
   2. Beginning
   3. High Speed
   4. Aggressive
   5. Superior

4. The use of seat and shoulder belts is _____.
   1. Recommended
   2. Not worth the extra effort
   3. For John Q. Public only
   4. Will not help me in a collision
   5. Not recommended

5. One reason for using a system approach to understanding the driver task is _____.

   1. Only one component is of real importance
   2. All of the components are given equal consideration
   3. The driving task is simple to explain
   4. The driving task is made up of less than 1000 items
   5. A system is not task oriented

6. The goal of the driving task is best described by _____.

   1. A guarantee that accidents will never happen
   2. To get from one point to another as fast as possible
   3. Is dictated by the vehicle and environment
   4. To get from Point "A" to Point "B" safely
   5. Never has been defined

7. The minimum driving task is _____.

   1. Whatever it takes to get you there
   2. Totally dependent on the skill of the driver
   3. The sum of the capacities of the system components
   4. The goal, minus the task and the components
   5. The minimum amount of time to get there

8. The components of the driving system are _____.

   1. Speed, skill and luck
   2. The driver, the vehicle, and the environment
   3. Education, Engineering and enforcement
   4. Education, skill, and desire
   5. The task, the method, and the results

9. According to a study by the Human Resources Research Organization, _____ factors have been identified in the driving task.

   1. 30
   2. 130
   3. 230
   4. 1300
   5. 2300

10. If the capacity of the system components do not meet the minimum driving task requirement, the probability of avoiding an accident is _____.

    1. A factor of luck
    2. Very low
    3. Too difficult to predict
    4. Very high
    5. Impossible to predict

11. The single most basic cause of accidents is _____.

    1. A combination of unsafe acts and unsafe conditions
    2. An unsafe act
    3. Those events which lead to unsafe conditions
    4. An unsafe condition
    5. Has never been defined successfully

12. The definition of a "preventable accident" questions the accountability of _____.

    1. The other operator who hit you
    2. Both operators
    3. You as the operator
    4. The passengers involved
    5. Witnesses

13. The "S" in the acronym "SIPDE" stands for _____.

    1. Service
    2. Safety
    3. Survey
    4. Search
    5. Supply

14. The responsibility to temporarily disqualify a driver who is physically impaired most often depends upon _____.

    1. The operator himself
    2. The supervisor
    3. A friend
    4. The family doctor
    5. A fellow employee

15. Temporary physical impairments can keep the operator's physical performance from reaching _____.

    1. A reasonable work level
    2. A minimum work level
    3. The amount needed for the job
    4. Its full capability
    5. A point of compromise

16. One of the most important mental aspects of driving is the operator's _____.

    1. Feelings
    2. Attitude
    3. Concentration
    4. Readiness
    5. Alertness

17. The definition "to prevent accidents in spite of the incorrect actions of others and/or adverse conditions" defines _____.

    1. Preventability
    2. Accidents
    3. Defensive driving
    4. An unsafe act
    5. Safety

18. The most immediate answer to "when are accidents considered to be preventable?" is _____.

1. All of the time
2. On good days only
3. In dry weather more than wet
4. Most of the time
5. Depends on the season

19. The definition "Did you do everything you reasonably could have done to prevent the accident?" defines _____.

1. Defensive driving
2. Attitude
3. Preventability
4. The need for safety
5. The human element

20. A high percentage of accidents are caused by _____.

1. Human error
2. Computer error
3. Vehicle error
4. Environmental error
5. System error

21. Of all our senses we use in driving, _____ gives the operator the most information.

1. Hearing
2. Vision
3. Smell
4. Touch
5. ESP

22. In order to assist in the identification of a driving hazard, it is recommended that you _____.

1. Keep your eye on the problem
2. Check your rear view mirror
3. Don't think about what you are looking at
4. Look near the vehicle
5. Shift your eyes every two seconds

23. The result of trying to predict a hazardous situation is that _____.

1. It happens in advance of the situation's becoming critical
2. It makes you an over-cautious driver
3. You drive a lot slower
4. You need less time for looking
5. It happens only at critical times.

24. To decide how to avoid a hazard, the driver must choose appropriate relationships between _____.

1. His vehicle and the other
2. Speed and the vehicle
3. The hazard and the chance
4. Time, speed and distance
5. His vehicle and the environment

-5-

25. To avoid accidents, a driver must use superior skills of _____.

1. Quick reactions
2. Luck and chance happenings
3. Steering, braking, acceleration
4. Past experiences
5. Speed

26. The SIPDE system is completed within _____.

1. An extended period of time
2. Usually takes a long period of time
3. A 30-minute time period
4. About five minutes
5. A few seconds

27. The key role in assuring that the maintenance of the vehicle is accomplished by the garage is played by _____.

1. The operator
2. The shop foreman
3. The garage
4. Management
5. The supervisor

28. The responsibility of daily checks of the condition of the vehicle is usually left up to _____.

1. The operator
2. The supervisor
3. The garage
4. The management
5. The shop foreman

29. The recommended hand position on the steering wheel for maximum speed in steering reversal is _____.

1. 10 and 2
2. 12 and 3
3. 9 and 3
4. 12 and 6
5. 10 and 4

30. Before starting to drive, making proper seat belt and head support adjustments are considered part of the operator's _____.

1. Major distractions
2. Personal safety
3. Basic vehicle check
4. Time consuming efforts
5. Occasional responsibilities

31. One physical fact about traction and steering the vehicle is that _____.

1. Only the front wheels steer

2. Traction is not a function of steering
3. The physical laws of nature do not apply in a skid
4. All four wheels steer
5. The car will always go where you steer

32. The most important single physical component governing the handling and control performance of the vehicle is _____.

1. The steering
2. The road
3. The brakes
4. The chassis
5. The tires

33. The force exerted laterally by the tire against the road surface to resist centrifugal force is called _____.

1. Driving traction
2. Cornering traction
3. Braking traction
4. Lateral extension
5. Friction limitations

34. A basic physical concept is that a locked or spinning tire cannot produce _____.

1. Increased driving traction
2. Increased braking traction
3. Increased handling characteristics
4. Increased cornering traction
5. Increased centrifugal resistance

APPENDIX C

KNOWLEDGE: PRE-TEST AND POST-TEST

TEST

(Test Time: 20 min.)

ADVANCED
DRIVER EDUCATION
FOR
EMERGENCY VEHICLE OPERATORS

CLASSROOM PHASE

DIRECTIONS: Choose the ONE BEST answer for each of the following statements. Mark only on the separate answer sheet.

1. The Driving Task is getting from Point A to Point B _____.

   1. As fast as possible
   2. In the shortest possible time
   3. Without an accident
   4. First
   5. Without regard for personal risk

2. The most effective form of pursuit driving uses _____vehicle speeds.

   1. Aggressive
   2. Moderate
   3. High
   4. Uncontrolled
   5. Low

3. The most effective form of pursuit driving uses_____driving skills.

   1. Moderate
   2. Beginning
   3. High Speed
   4. Aggressive
   5. Superior

4. The use of seat and shoulder belts is _____.

   1. Recommended
   2. Not worth the extra effort
   3. For John Q. Public only
   4. Will not help me in a collision
   5. Not recommended

5. One reason for using a system approach to understanding the driver task is _____.

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   1. A guarantee that accidents will never happen
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   4. To get from Point "A" to Point "B" safely
   5. Never has been defined

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   1. Whatever it takes to get you there
   2. Totally dependent on the skill of the driver
   3. The sum of the capacities of the system components
   4. The goal, minus the task and the components
   5. The minimum amount of time to get there

8. The components of the driving system are _____.

   1. Speed, skill and luck
   2. The driver, the vehicle, and the environment
   3. Education, Engineering, and enforcement
   4. Education, skill, and desire
   5. The task, the method, and the results

9. According to a study by the Human Resources Research Organization,_____ factors have been identified in the driving task.

   1. 30
   2. 130
   3. 230
   4. 1300
   5. 2300

10. If the capacity of the system components do not meet the minimum driving task requirement, the probability of avoiding an accident is _____.

    1. A factor of luck
    2. Very low
    3. Too difficult to predict
    4. Very high
    5. Impossible to predict

11. The single most basic cause of accidents is_____.

    1. A combinati n of unsafe acts and unsafe conditions
    2. An unsafe act
    3. Those events which lead to unsafe conditions
    4. An unsafe condition
    5. Has never been identified successfully

12. The definition of a "preventable accident" questions the accountability of _____.

    1. The other operator who hit you

2. Both operators
3. You as the operator
4. The passengers involved
5. Witnesses

13. The "S" in the acronym "SIPDE" stands for _____.

1. Service
2. Safety
3. Survey
4. Search
5. Supply

14. The responsibility to temporarily disqualify a driver who is physically impaired most often depends upon_____.

1. The operator himself
2. The supervisor
3. A friend
4. The family doctor
5. A fellow employee

15. Temporary physical impairments can keep the operator's physical performance from reaching _____.

1. A reasonable work level
2. A minimum work level
3. The amount needed for the job
4. Its full capability
5. A point of compromise

16. One of the most important mental aspects of driving is the operator's _____.

1. Feelings
2. Attitude
3. Concentration
4. Readiness
5. Alertness

17. The definition "to prevent accidents in spite of the incorrect actions of others and/or adverse conditions" defines _____.

1. Preventability
2. Accidents
3. Defensive driving
4. An unsafe act
5. Safety

18. The most immediate answer to "when are accident considered to be preventable?" is _____.

1. All of the time
2. On good days only
3. In dry weather more than wet
4. Most of the time
5. Depends on the season

19. The definition "Did you do everything you reasonably could have done to prevent the accident?" defines _____.

1. Defensive driving
2. Attitude
3. Preventability
4. The need for safety
5. The human element

20. A high percentage of accidents are caused by _____.

1. Human error
2. Computer error
3. Vehicle error
4. Environmental error
5. System error

21. Of all our senses we use in driving, _____ gives the operator the most information.

1. Hearing
2. Vision
3. Smell
4. Touch
5. ESP

22. In order to assist in the identification of a driving hazard, it is recommended that you _____.

1. Keep your eye on the problem
2. Check your rearview mirror
3. Don't think about what you are looking at
4. Look near the vehicle
5. Shift your eyes every two seconds

23. The result of trying to predict a hazardous situation is that _____.

1. It happens in advance of the situation's becoming critical
2. It makes you an over-cautious driver
3. You drive a lot slower
4. You need less time for looking
5. It happens only at critical times

24. To decide how to avoid a hazard, the driver must choose appropriate relationships between _____.

1. His vehicle and the other
2. Speed and the vehicle
3. The hazard and chance
4. Time, speed, and distance
5. His vehicle and the environment

25. To avoid accidents, a driver must use superior skills of _____.

1. Quick reactions
2. Luck and chance happenings
3. Steering, braking, acceleration
4. Past experiences
5. Speed

26. The SIPDE system is completed within_____.

1. An extended period of time
2. Usually takes a long period of time
3. A 30 minute time period
4. About five minutes
5. A few seconds

27. The key role in assuring that the maintenance of the vehicle is accomplished by the garage is played by_____.

1. The operator
2. The shop foreman
3. The garage
4. Management
5. The supervisor

28. The responsibility of daily checks of the condition of the vehicle is usually left up to_____.

1. The operator
2. The supervisor
3. The garage
4. The management
5. The shop foreman

29. The recommended hand position on the steering wheel for maximum speed in steering reversal is _____.

1. 10 and 2
2. 12 and 3
3. 9 and 3
4. 12 and 6
5. 10 and 4

30. Before starting to drive, making proper seat belt and head support adjustments are considered part of the operator's _____.

1. Major distractions
2. Personal safety
3. Basic vehicle check
4. Time consuming efforts
5. Occasional responsibilities

31. One physical fact about traction and steering the vehicle is that_____.

    1. Only the front wheels steer
    2. Traction is not a function of steering
    3. The physical laws of nature do not apply in a skid
    4. All four wheels steer
    5. The car will always go where you steer

32. The most important single physical component governing the handling and control performance of the vehicle is _____.

    1. The steering
    2. The road
    3. The brakes
    4. The chassis
    5. The tires

33. The force exerted laterally by the tire against the road surface to resist centrifugal force is called _____.

    1. Driving traction
    2. Cornering traction
    3. Braking traction
    4. Lateral extension
    5. Friction limitations

34. A basic physical concept is that a locked or spinning tire cannot produce _____.

    1. Increased driving traction
    2. Increased braking traction
    3. Increased handling characteristics
    4. Increased cornering traction
    5. Increased centrifugal resistance

APPENDIX D

SKILL: PRE-TEST AND POST-TEST

EXERCISE 1 - Serpentine - Low Speed			Operator ID _____	
Attempts: 1 2 3 4 5 6 7 8 9 10			Speed: 20	28
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
9-3 Hand Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Close Cone Approach	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Maintains Speed	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Steering Inputs	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Clear Right Side Vehicle	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clear Left Side Vehicle	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R *	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R *	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

EXERCISE 2 - Skid Control - Low Speed			Operator ID _____	
Attempts: 1 2 3 4 5 6 7 8 9 10			Speed: 25	30
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
Controls Vehicle	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Maintains Course	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Response to Skid	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Steering Inputs	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Countersteer	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Hand Technique	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

EXERCISE 3 - Controlled Braking - Low Speed		Operator ID _____		
Attempts: 1 2 3 4 5 6 7 8 9 10		Speed: 30		38
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
9-3 Hand Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Response Time to Cue	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Braking Technique	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Steering Input	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Clears Barriers	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Stop At Course End	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

*Required

EXERCISE 4 - Evasive Maneuver - Low Speed		Operator ID _____		
Attempts: 1 2 3 4 5 6 7 8 9 10		Speed: 25		35
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
9-3 Hand Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Response Time to Cue	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Chooses Correct Lane	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Steering Inputs	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Timing On Countersteers	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears Barriers	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

EXERCISE 5 - Tire Failure (RF) - Low Speed			Operator ID _____	
Attempts: 1 2 3 4 5 6 7 8 9 10			Speed: 25	35
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
9-3 Hand Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Correct Response To Emergency	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Response Time To Emergency	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Steering Inputs	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Maintains Lane Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Controls Vehicle	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

EXERCISE 6 - Off Road Recovery - Low Speed			Operator ID _____	
Attempts: 1 2 3 4 5 6 7 8 9 10			Speed: 25	35
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
9-3 Hand Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Maintains Speed	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Positions Vehicle Correctly	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Accurate Steering Input	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Controls Vehicle	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears Barrier	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

EXERCISE 7 - Double Lane Change - Low Speed			Operator ID _____	
Attempts: 1 2 3 4 5 6 7 8 9 10			Speed: 25	35
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
9-3 Hand Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Maintains Speed	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Times Vehicle Movement	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Steering Inputs	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Controls Vehicle	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears Barrier	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

EXERCISE 8 - Serpentine - Increased Speed			Operator ID _____	
Attempts: 1 2 3 4 5 6 7 8 9 10			Speed: 28	35
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
9-3 Hand Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Close Cone Approach	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Maintains Speed	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Steering Rhythm	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Clears Right Side Vehicle	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears Left Side Vehicle	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

EXERCISE 9 - Skid Control - Increased Speed			Operator ID _____	
Attempts: 1 2 3 4 5 6 7 8 9 10			Speed: 30	35
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
Controls Vehicle: First Curve	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Controls Vehicle: Second Curve	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Response to Skid	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Steering Technique	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Countersteer	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Hand Technique	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

EXERCISE 10 - Controlled Braking-Increased Speed			Operator ID _____	
Attempts: 1 2 3 4 5 6 7 8 9 10			Speed: 38	48
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
9-3 Hand Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Response To Cue	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Braking Technique	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Steering Inputs	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Clears Barrier	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Stop at Course End	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

EXERCISE 11 - Evasive Maneuver-Increased Speed			Operator ID _____	
Attempts: 1 2 3 4 5 6 7 8 9 10			Speed: 35	45
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
9-3 Hand Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Response Time to Cue	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Chooses Correct Lane	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Steering Inputs	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Timing on Countersteer	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears Barrier	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

EXERCISE 12 - Tire Failure (RF)-Increased Speed			Operator ID _____	
Attempts: 1 2 3 4 5 6 7 8 9 10			Speed: 30	40
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
9-3 Hand Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Correct Response To Emergency	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Response Time To Emergency	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Steering Inputs	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Maintains Lane Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Controls Vehicle	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

EXERCISE 13 - Off Road Recovery-Increased Speed		Operator ID _____		
Attempts: 1 2 3 4 5 6 7 8 9 10		Speed: 35		45
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
9-3 Hand Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Maintains Speed	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Positions Vehicle Correctly	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Accurate Steering Input	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Controls Vehicle	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears Barrier	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

EXERCISE 14-Double Lane Change-Increased Speed		Operator ID _____		
Attempts: 1 2 3 4 5 6 7 8 9 10		Speed: 35		45
SKILLS	Value	FIRST TRIAL	MIDDLE TRIAL	FINAL TRIAL
9-3 Hand Position	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Maintains Speed	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Times Vehicle Movements	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Accurate Steering Inputs	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Controls Vehicle	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears Barriers	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Clears All Cones	5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Good Visual Procedure	10	0 2 4 6 8 10	0 2 4 6 8 10	0 2 4 6 8 10
Good Range Safety Procedure	R*	. . . . .	. . . . .	. . . . .
Completes Pre-Driving Check	R*	a b c d e f g	a b c d e f g	a b c d e f g
Instructor's Comments:				
TOTAL POINTS	50			

* Required

APPENDIX E

STANDARD INSTRUCTIONS: RANGE PRE-TEST AND POST-TEST SKILL TEST

STANDARD INSTRUCTIONS

RANGE

PRE AND POST TEST

1 The name of this exericse is:	2 The purpose of the exericse is:	3 The instructions are:
A. Serpentine	To test your skill in steering.	Drive at a speed of ___ and weave through the cones.
B. Skid Control	To test your skill in controlling a skid.	Control the skid by using the steering wheel only. Your speed will be ____.
C. Controlled Braking	To test your skill in braking to a stop in the shortest possible distance.	To approach the barrier and on the cue "now" steer left and brake the car to a stop. Your speed will be ___.
D. Evasive Maneuver	To test your skill to evade right or left by using steering input.	To approach the barrier and on the cue "right" or "left" steer to that lane. Your speed will be _____.
E. Tire Failure	To test your skill in controlling a tire failure.	To approach the lane ahead at ___mph and control the vehicle when tire failure occurs.
F. Off Road Recovery	To test your skill in returning to the road surface with a low shoulder.	To approach the test area with half of the vehicle on the pavement and evade left to return to the road. Your speed is _____.
G. Double Lane Change	To test your skill in a series of rapid lane changes.	To approach the lane at _____mph and follow the lane as marked.

APPENDIX F

SUBJECT TEST SCORES

PRIMARY RATER

EXERCISE			1				2				3				4				5			
			Serpentine (N=50)				Skid Control				Controlled Braking				Evasive Maneuver				Double Lane Cneck			
	Knowledge Test		Low MPH		Increased MPH		Low MPH		Increased MPH		Low MPH		Increased MPH		Low MPH		Increased MPH		Low MPH		Increased MPH	
UNTRAINED SUBJECTS	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
001	17	18	20	25	15	16	30	32	18	35	26	41	34	33	32	28	26	34	30	28	31	29
002	26	26	33	37	18	32	43	45	45	27	32	31	18	33	43	40	30	44	38	45	47	46
003	15	16	21	31	25	25	35	31	31	32	22	19	27	32	32	36	11	31	16	37	29	41
004	17	21	34	33	21	40	42	44	26	30	35	39	39	29	23	31	29	22	36	32	39	35
005	14	15	27	33	20	23	9	8	18	17	31	38	16	18	30	37	41	25	30	36	35	
006	19	24	30	26	24	25	34	43	39	38	25	39	43	30	19	44	36	34	43	44	45	31
007	21	21	25	25	31	27	40	39	36	42	26	27	6	6	27	39	16	16	36	40	37	42
008	14	15	36	36	26	32	24	33	30	28	16	33	21	18	27	0	27	30	31	32	27	29
009	19	22	37	21	23	22	37	-	38	-	25	22	20	5	32	14	29	30	29	34	34	37
010	15	17	33	39	26	34	12	-	13	-	24	43	27	40	23	33	10	34	25	45	31	41
011	15	15	29	39	28	35	30	-	31	-	18	40	22	31	34	37	32	38	33	39	32	43
012	21	25	30	31	26	32	26	-	21	-	28	38	18	38	27	41	30	44	27	34	27	39

SECONDARY RATER

001	17	18	31	29	24	23	34	42	33	42	38	41	41	38	37	36	34	37	36	35	35	37
002	26	26	33	38	32	32	41	29	43	29	39	39	37	38	43	44	33	40	40	40	46	45
003	15	16	29	38	32	34	38	34	36	35	36	34	36	35	39	39	30	43	27	40	36	38
004	17	21	33	39	27	36	39	41	31	32	42	44	34	38	39	41	38	41	43	44	48	43
005	14	15	31	32	9	32	38	23	14	16	42	41	26	25	23	35	38	18	32	22	28	31
006	19	24	43	42	36	36	37	44	34	35	31	36	27	31	23	40	33	33	38	43	41	37
007	21	21	32	36	35	37	42	40	39	33	44	48	10	12	25	44	9	14	42	40	36	36
008	14	15	32	35	29	33	37	38	36	37	30	35	31	26	30	8	31	31	31	30	30	29
009	19	22	24	25	22	27	33	-	40	-	28	23	23	20	41	8	36	31	36	36	42	36
010	15	17	28	44	24	29	13	-	13	-	28	41	29	38	18	32	11	28	24	41	34	41
011	15	15	30	35	23	32	45	-	47	-	31	44	30	43	38	25	31	36	37	34	37	38
012	21	25	33	31	28	31	47	-	26	-	41	39	17	46	19	35	31	39	33	38	34	37

PRIMARY RATER

EXERCISE	1				2				3				4				5			
	Serpentine (N=50)				Skid Control				Controlling Braking				Evasive Maneuver				Double Lane Change			
TRAINED SUBJECTS	Knowledge Test		Low MPH		Increased MPH		Low MPH		Increased MPH		Low MPH		Increased MPH		Low MPH		Increased MPH		Low MPH		Increased MPH	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
101	19	27	44	50	17	47	31	49	34	48	36	46	25	50	34	42	27	50	34	43	36	42
102	18	27	28	50	41	47	40	48	20	37	26	49	33	31	44	41	30	50	40	45	33	49
103	21	27	17	36	21	28	47	50	29	45	44	33	45	48	33	28	23	28	36	50	29	47
104	21	20	37	41	21	34	41	43	37	31	30	44	35	42	44	43	40	41	38	45	36	50
105	25	27	41	47	35	46	40	48	43	48	28	28	17	27	44	46	11	34	47	47	44	50
106	21	27	36	45	36	45	45	47	46	48	36	43	37	43	45	37	36	41	42	45	44	48
107	20	31	45	48	35	50	41	42	38	47	32	43	28	42	33	25	24	39	33	49	39	50
108	22	25	33	45	27	48	39	46	42	46	42	44	43	45	36	39	28	44	39	43	39	47
109	20	25	32	36	24	30	36	30	34	39	33	34	35	35	25	28	36	31	32	43	41	43
110	18	23	32	39	32	45	38	44	33	39	37	38	34	35	30	41	36	41	31	39	28	41
111	18	21	39	45	26	42	35	42	35	39	33	43	32	35	39	44	23	37	34	44	31	43
112	21	28	48	48	45	47	32	40	38	39	42	44	43	39	41	46	39	46	41	45	39	43

SECONDARY RATER

101	19	27	46	42	26	46	37	47	43	48	45	43	33	50	41	37	45	42	43	42	45	41
102	18	27	28	47	44	47	43	42	36	32	32	43	38	21	45	31	36	46	38	35	32	45
103	21	27	32	42	23	40	42	41	30	37	44	34	47	48	39	45	30	25	38	46	36	43
104	21	20	37	45	28	47	39	43	43	30	28	44	29	44	46	42	44	35	38	42	41	47
105	25	27	45	45	32	43	39	41	46	34	44	42	25	33	41	44	32	34	40	42	40	44
106	21	27	28	37	27	41	50	48	50	50	32	36	31	43	50	34	31	27	39	45	47	41
107	20	31	45	40	26	46	47	41	43	41	30	42	23	38	34	18	30	32	23	41	42	39
108	22	25	35	40	23	50	47	39	50	46	34	46	47	35	44	45	30	48	39	43	48	42
109	20	25	30	38	25	42	45	24	31	45	32	41	36	42	20	32	30	30	27	41	36	42
110	18	23	34	44	28	43	34	45	31	42	34	44	27	41	21	47	42	47	28	44	27	47
111	18	21	42	49	29	47	36	47	41	42	29	50	35	39	41	48	33	44	40	45	33	44
112	21	28	48	48	46	49	47	47	46	45	43	47	43	42	49	49	44	49	43	42	43	43

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