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16. Abstract

The goal of this project was to adapt the National Highway Traffic Safety Administration's (NHTSA) Emergency Vehicle Training Curriculum to the needs of ambulance drivers in the State of Michigan.

This document contains the course structure and lesson plans for a comprehensive basic course in ambulance driving. The course consists of 20 hours of classroom instruction and four hours of driving (skill development) exercises.

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AN INSTRUCTOR'S GUIDE
FOR
AMBULANCE DRIVER TRAINING IN MICHIGAN

Prepared for:

Michigan Office of Highway Safety Planning
Michigan Department of State Police

and

Emergency Medical Services Division
Michigan Department of Health

Prepared by:

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July 1980

INTRODUCTION TO THE LESSON PLANS

PURPOSE

These lesson plans have been adapted from a set of Instructor Lesson Plans developed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, for operators of emergency vehicles.

The purpose of these lesson plans is to provide the instructor with a basic course outline for teaching emergency medical vehicle driving. It is assumed that the instructor will adapt these outlines to the course to be offered and seek approval from the Emergency Medical Services Division, Michigan Department of Health.

This course, as outlined, constitutes a basic offering for the prospective driver having little or no experience in emergency medical vehicle operation. (Experienced drivers will also benefit from the course.) These lesson plans are for a course of 24 hours duration--20 hours classroom, four hours driving/observation in an emergency medical vehicle. These times are minimal; consideration should be given to expanding the time--particularly the time behind the wheel.

OBJECTIVES OF THE COURSE

This course was developed to help ensure a comprehensive, basic level of training and skill for emergency medical vehicle operators throughout the state. Upon completion of the course, the student should be prepared to operate an ambulance under a wide variety of driving situations--both emergency and non-emergency. The goal of this course is to train a driver to transport a patient safely.

PHILOSOPHY

The ambulance is a special vehicle with a mission of mercy.

Pursuit and high-speed driving are not a part of ambulance driving. Driving in excess of the speed limit is never needed and, given the level of training of today's attendants, emergency movement from the scene to the treatment facility is rarely needed. The use of lights and siren are contraindicated in many situations and may only aggravate the condition of the patient.

Careful, calm driving provides the best opportunity for safe, efficient delivery of medical assistance to the patient and the transportation of the patient to a trauma or emergency care facility.

TO THE INSTRUCTOR:

This course is intended to be offered in a manner similar to any other course. A typical classroom setting is envisioned. Teaching aids, student handout material, audio-visual aids, tests, demonstrations, etc., are to be utilized. The lesson outlines present the bare bones of the course. It is left to your imagination to flesh out the skeleton.

The driving portion of the course is intended to be conducted both on a driving range/parking lot and on the street. The skill and precision driving exercises should be set up on an off-road area (driving range, parking lot, airport taxi way, etc.). These exercises should be followed by a trip in traffic under non-emergency conditions.

Adequate facilities must be secured, including a suitable classroom, driving area, and vehicles. The driving should be done in an ambulance. Adequate insurance needs to be provided.

Student assignments or homework are encouraged. A final examination should cover lesson content as well as driving under actual traffic conditions. While emergency conditions cannot be simulated, observation of driving under traffic conditions can be observed and evaluated.

AMBULANCE DRIVER TRAINING

A beginning course for drivers with little or no experience in driving emergency medical vehicles.

Units and Lessons	Est. Time (Hours)
Unit I -- Introduction	
Lesson 1 -- Course Introduction	1/2
Lesson 2 -- Introductory Film	1/2
Unit II -- Legal Aspects of Emergency Vehicle Operation	
Lesson 1 -- Definition of a "True Emergency"	1/2
Lesson 2 -- State Statutes	1
Lesson 3 -- Safety of Others: Civil Liability	1
Unit III -- Communications and Pre-Driving Procedures	
Lesson 1 -- Communications with Others: Lights & Siren	1
Lesson 2 -- Radio Communications	3/4
Lesson 3 -- In-Vehicle Communications	1/4
Lesson 4 -- Route Selection	1
Lesson 5 -- Vehicle Inspection	1
Lesson 6 -- Preparing to Drive	1
Unit IV -- Physical Forces and Emergency Vehicle Control	
Lesson 1 -- Physical Forces - A Review	1
Lesson 2 -- Roadway Characteristics	2
Unit V -- Driving the Emergency Vehicle	
Lesson 1 -- Use of Lights and Siren	1
Lesson 2 -- Basic Control Tasks: Starting, Backing and Parking	1
Lesson 3 -- Driving Techniques	2
Lesson 4 -- Adverse Conditions	1
Lesson 5 -- High-Speed Driving	1
Lesson 6 -- Vehicle and Driving Emergencies	2
Unit VI -- Accident Involvement En Route	
Lesson 1 -- Accident Responsibilities	1/4
Lesson 2 -- Accident Reports	1/4
	20 Hour
Unit VII -- In-Vehicle Driving Exercises	
Lesson 1 -- Vehicle Inspection	1/2
Lesson 2 -- "Patient" Ride	1/4
Lesson 3 -- Low Speed Maneuvers	2
Lesson 4 -- Precision Driving	1-1/4
	4 Hour (Minimum)
TOTAL	24 Hours

COURSE SYLLABUS

A brief description of the content of each Unit and Lesson:

Unit I -- Introduction
An introduction to the course.

Lesson 1 -- Course Introduction
A discussion of the course content, objectives, procedures, calendar, and definitions of terms.

Lesson 2 -- Introductory Film
One of several films on ambulance and/or emergency vehicle driving will be shown.

Unit II -- Legal Aspects of Emergency Vehicle Operation
The legal status of emergency vehicle operation and the responsibilities of the driver to proceed with due care and caution.

Lesson 1 -- Definition of a "True Emergency"
A "true emergency" will be defined and guidelines for application will be discussed. The concept is basic to application of the exemptions in the vehicle code.

Lesson 2 -- State Statutes
A presentation should be made by a [State] police officer to include an overview of state statutes pertaining to emergency vehicle operation, a discussion of state statutes and local ordinances, and department policy and application of the concept of "true emergency."

Lesson 3 -- Safety of Others: Civil Liability
A presentation should be made by an attorney regarding the concept of "due regard for others," civil responsibilities of the driver when operating an ambulance, and consequences of and liability for unsafe operation.

Unit III -- Communications and Pre-Driving Procedures
Basic skills and information needed before the emergency vehicle is driven.

Lesson 1 -- Communication with Others: Lights and Siren
A review of the legal aspects of the use of lights and siren to communicate with other drivers, their effectiveness in warning other drivers of the emergency vehicle's approach.

Lesson 2 -- Radio Communication
Methods and procedures for effective use of the radio in communicating with the vehicle's base and other agencies.

Lesson 3 -- In-Vehicle Communication
Methods of communicating within the vehicle concerning the condition of the patient so that the proper driving mode can be intelligently selected. This is also a continuation of the discussion of a "true emergency."

Lesson 4 -- Route Selection
Route planning and selection, arrival at the scene, and long-distance travel planning.

Lesson 5 -- Vehicle Inspection
The basic workings of the ambulance, guidelines for vehicle inspection, identification of malfunctions, and driver responsibility for emergency vehicle maintenance.

Lesson 6 -- Preparing to Drive
Important proceudres affecting driving ease and safety, safety checks and adjustments, start-up procedures, and pre-motion safety precautions.

Unit IV -- Physical Forces and Emergency Vehicle Control. Laws of Physics Affecting the Emergency Vehicle

Lesson 1 -- Forces affecting emergency vehicle handling:
friction, inertia and momentum, centrifugal force, and weight transfer as it relates to speed and directional control.

Lesson 2 -- Roadway Characteristics
Roadway geometrics, design, signs, and signals as they affect vehicle control and driving.

Unit V -- Driving the Emergency Vehicle
Driving tasks as they apply to operation of the emergency vehicle on both emergency and non-emergency runs.

Lesson 1 -- Use of Lights and Siren
Techniques for using the lights and siren to clear traffic.

Lesson 2 -- Basic Control Tasks -- Starting, Backing, and Parking.
Techniques for starting the vehicle, moving into traffic, backing up, and parking.

Lesson 3 -- Driving Techniques
Techniques for operating the ambulance in various types of traffic situations, including urban driving, negotiating intersections, turning around (U-turn, turn-abouts, etc.), following another vehicle (following and stopping distance), passing vehicles, and expressway operation.

Lesson 4 -- Adverse Conditions
Procedures and techniques used when driving during adverse road and weather conditions--at night, or in wet, snowy, icy, or foggy weather.

Lesson 5 -- High-Speed Driving

Techniques for driving in excess of the safe operating speed limit when necessary.

Lesson 6 -- Vehicle and Driving Emergencies

Techniques for handling vehicle and driving emergencies such as evasive maneuvers, skids, loss of control, vehicle breakdowns, and other unusual driving situations.

Unit VI -- Accident Involvement En Route

The responsibilities of the ambulance driver when involved in an accident with the emergency vehicle.

Lesson 1 -- Accident Responsibilities

The responsibilities of the driver when involved in a collision.

Lesson 2 -- Accident Reports

Suggestions to assist the ambulance driver in recording data concerning the accident when involved in a collision.

Unit VII -- In-Vehicle Driving Exercises

To be conducted in a closed, protected area, using an actual ambulance, preferably of the type the student will be driving.

Lesson 1 -- Vehicle Inspection

The student, using a checksheet or a guide, will carry out a thorough vehicle inspection and have the opportunity to manipulate all vehicle controls, switches, etc.

Lesson 2 -- "Patient" Ride

Each student will be given the experience of being transported on the cot in the vehicle on a simulated emergency run.

Lesson 3 -- Low-Speed Maneuvers

Demonstration and practice in vehicle braking, parking, turns, steering, braking, turn-arounds, etc., so as to develop skill and perception at low speed in performing common vehicle maneuvers.

Lesson 4 -- Precision Driving

Demonstration and practice in vehicle control and handling at urban speeds. Topics include panic stops, evasive steering, lane changing, etc.

AMBULANCE DRIVER TRAINING

UNIT SUMMARY

Unit I , Introduction

Description:

An introduction to the course.

List of Lessons:

1. Course introduction
2. Introductory film

Attachments:

[ ] Review Questions

[ ] Test Questions

AMBULANCE DRIVER TRAINING

Lesson Outline

Unit I , Introduction

Lesson 1 , Course Introduction Est. Time 1/2 Hour

****

Description/Purpose:

A discussion of the course content, objectives, procedures, calendar on terms and definitions.

Topical Outline:

Introduction
General Procedures
Course Organization
Prerequisites and Requirements
Enrollment
Calendar
Definitions
Other Information
Magnitude of Accident Problem

Objectives:

To complete course enrollment

To introduce the course to the students

To define the magnitude of the accident problem

To discuss terminology and symbols

References:

Student Handout Material:

(x) attached

Calendar

Course information sheet

Teaching Aids:

Calendar

Instructor's notes for lesson content:

INTRODUCTION

--Welcome the students

--Tell the students your name

--Ask the students to introduce themselves

--Explain the purpose of the course to the students:

--To enable members of emergency medical services to learn and/or become more competent in the operation of emergency medical vehicles.

General Procedures

The following procedures will be followed on each training day:

A. Attendance

B. Announcements

C. Lesson for the day

--Tell the students the arrangements for the following:

--Break times

--Eating facilities

--Toilet facilities

--Telephones

--Message board

--Student parking

--Other information

Organization of Course:

I. Classroom - Materials will be presented by the lecture and demonstration will apply to all phases of emergency vehicle operation.

II. In-vehicle - Experience in driving an emergency medical vehicle on a closed course will be given.

Discussion is encouraged.
Homework will be assigned.
Tests will be given.

A letter of completion will be given to each person successfully completing the course.

Prerequisites and Requirements:

1. State of Michigan law covering ambulance driver certification.
2. Have each attendee complete student information sheet (example attached)
3. Must be a licensed driver with a good driving record.
4. Must be capable of operating a van or type of vehicle similar to an ambulance.
5. Previous emergency vehicle or emergency medical vehicle driving experience not necessary.

Enrollment:

Have each student complete the following--plus any additional material required of the Department of Health.

Standard Information

Name ______________________________

Address: ______________________________

Telephone Number: ______________________________

Driver's License Number: ______________________________

Health Statement ______________________________
(EMT type medical statement)

Previous ambulance experience __________ Years Driving __________

Ambulance attendant Yes No

Emergency Medical Training Student

Hand out list of lessons, course calendar, and course information. Example attached.

DEFINITIONS

--Make sure these definitions are clear to the trainees.

A. Emergency Mode: A trip in which an authorized emergency vehicle, operating with warning lights and sirens activated, is on a mission involving a (possible) life-threatening situation.

B. Emergency Medical Vehicle (EV): Any ambulance vehicle or other vehicle legally authorized to operate in the emergency mode.

C. Emergency Vehicle Operator: A person authorized to drive an emergency vehicle in the emergency mode.

D. Emergency Service: Police and volunteer or salaried fire, rescue, and ambulance personnel.

E. Illustrations in the text use the following symbols for:

1. An EV:

2. An ordinary car:

3. A truck:

OTHER INFORMATION:

AMBULANCE ACCIDENTS IN MICHIGAN

Thomas L. McDole, Ph.D.[1]

The mission of the ambulance[2] is to bring treatment and transportation to the injured and sick. When medical emergencies exist, the ambulance is permitted, by law, to operate outside of certain traffic laws which govern normal movement. Operation in the "emergency" mode creates disruptions in the flow of traffic and exposes the ambulance to an increased risk of accident involvement. The magnitude of the ambulance accident involvement and suggestions for reducing their involvement in accidents are the subjects of this report.

DATA SOURCE

The data base for this analysis consisted of all police-reported accidents (in a computerized format) occurring in Michigan during 1976 and 1977. From this totality of accident reports, all ambulance-related accidents were extracted. Because of the relatively few ambulance accidents in relation to the overall number of accidents, the two years of data were combined.

While the accident report form as used by all police agencies in Michigan permits a relatively thorough reporting of the circumstances surrounding the accident, it presents only limited data specific to the involvement of the ambulance and the nature of its mission (emergency, non-emergency). The scope of this study must, of necessity, reflect that limitation, leaving several important questions unanswered. Among these are the specific nature of the ambulance mission (to scene, transport, etc.), if the warning devices were properly used, the extent to which the patient (if any) was injured as a result of the accident, and the effect the delay had upon the condition of the patient.

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[1] Senior Research Associate, The Highway Safety Research Institute, The University of Michigan, Ann Arbor, Michigan.

[2] Although ambulance is used here, it is meant to include all Emergency Medical Vehicles.

FINDINGS

In Michigan during 1976-1977 there were 492 accidents involving ambulances out of the 740,351 reported accidents involving all types of vehicles. During the same time period there were 12,079,860 vehicles of all types registered in Michigan. Ambulances accounted for 1,724 of these vehicle registrations as reported by the EMS Division.[3] Only 0.0143 percent of all registered vehicles in the state are ambulances, but ambulances were involved in 0.066 percent of all accidents. Further, by comparing vehicle accident rates for ambulance vehicles and the total vehicle population, it was found that one in 16.3 vehicles in the total population (6.1 percent) was involved in an accident, whereas one in 3.5 ambulance vehicles (28.5 percent) was involved in an accident. Ambulances were involved in accidents 4.7 times more frequently than vehicles in the general population. The rate of accident involvement for fire service vehicles was one in 10.

Table 1 summarizes the vehicle population, number of accidents, and vehicle accident rates.

TABLE 1

Number of Vehicles, Accidents, and Rates for Vehicles in Michigan for 1976 and 1977

	Vehicles				
	Ambulances		All Vehicles		Ambulances as a Percent of Total Vehicle Population
1976	837	(48.5%)	5,93.,557	(49.1%)	0.0141%
1977	887	(51.5%)	6,148,303	(50.9%)	0.0144%
Total	1724	(100.0%)	12,079,860	(100.0%	0.0143%

Continued on next page

3 Emergency Medical Services (EMS) Division, Michigan Department of Public Health.

TABLE 1 CON'T

Accidents					
	Ambulances		All Vehicles		Ambulances as a Percent of Total Vehicle Population
1976	233	(47.4%)	365,600	(49.4%)	0.064%
1977	259	(52.6%)	374,751	(50.6%)	0.069%
Total	492	(100.0%)	740,351	(100.0%)	0.066%

Rates				
	Accidents per Registered Vehicle		Percent of Registered Vehicles Involved in an Accident	
	Ambulances	All Vehicles	Ambulances	All Vehicles
1976	1:3.6	1:16.2	27.8%	6.2%
1977	1:3.4	1:16.4	29.2%	6.1%
Total	1:3.5	1:16.3	28.5%	6.1%

Ambulances are registered with the Michigan Department of Public Health in 82 of the 83 counties in Michigan (Keweenaw County in the upper peninsula is the exception). Table 2 shows the percent of ambulances registered by county for the 13 counties accounting for over 50 percent of the registered ambulances.

TABLE 2

Percent of Ambulances Registered by County in Michigan

County	1976-1977 Percent	
Wayne	14.0	
Oakland	6.2	
Macomb	4.6	
Genesee	3.8	
		28.6%
Monroe	3.0	
Berrien	3.0	
Ingham	2.6	
Kent	2.6	
St. Clair	2.4	
Kalamazoo	2.4	
Calhoun	2.4	
Jackson	2.2	
Lenawee	2.0	
		51.2%

The remaining 70 counties account for the balance of the registration.

The four counties of Wayne, Oakland, Macomb, and Genesee account for over 28 percent of all registered ambulances. The pattern of registration of ambulances gneerally follows the pattern of the population and registered passenger vehicles for these more heavily populated counties.

Ambulance accidents occurred in 65 of the 83 counties during the study period. However, most of the accidents (over 75 percent) occurred in just 12 counties--in all in the southern lower peninsula. The four counties of Wayne, Oakland, Genesee, and Kent accounted for over 50 percent of the accidents. Table 3 summarizes the data. Figure 1 shows the location of these counties and the counties with major urban populations (county with more than 200,000 population and central city).

TABLE 3

Ambulance Accidents
by County in Michigan

County	1976-1977 Percent	
Wayne	30.5	
Oakland	12.2	
Genesee	6.9	
Kent	5.3	
		54.9%
Saginaw	3.7	
Berrien	3.7	
Washtenaw	2.8	
Macomb	2.8	
Jackson	2.4	
Ingham	2.4	
Kalamazoo	2.2	
Calhoun	2.2	
		77.1%
Balance of counties with accidents	22.9	
		100.0%

Accidents were nearly evenly divided between those occurring on an emergency run[4] (emergency warning devices in use) and those occurring on a non-emergency run (emergency warning devices not in use), as shown in Table 4. Of the 18 accidents not classified, 14 were collisions between deer and ambulances.

[4] The type of run--emergency, non-emergency--was determined by the investigating police agency and is not relatable to the actual need to use the emergency warning equipment nor to whether a patient was on board.

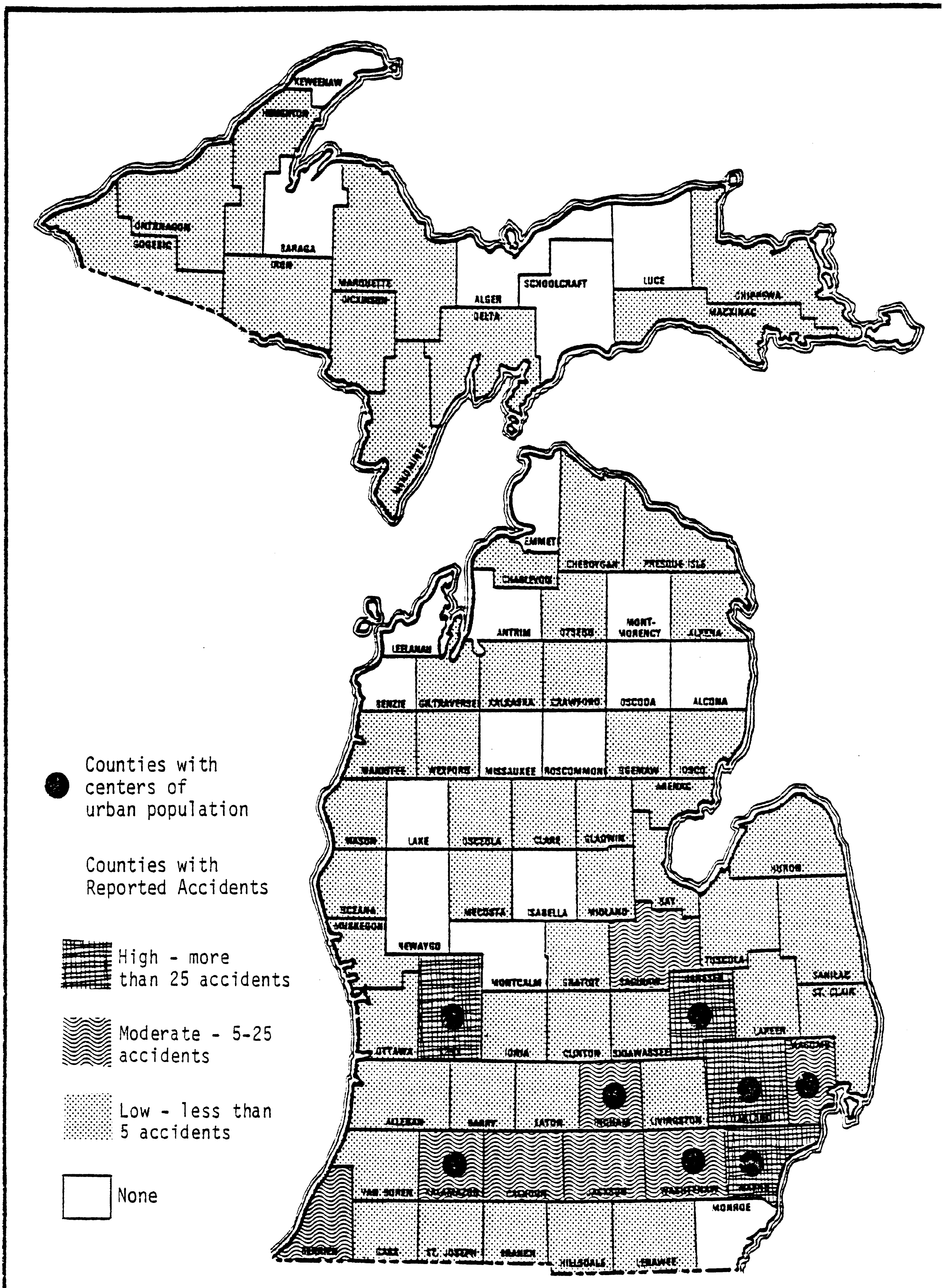

Figure 1 - Michigan Ambulance Accidents by County, 1976-1977

TABLE 4

Ambulance Accidents by Type of Run

	Number	Percent
Emergency	232	47
Non-emergency	242	49
Not classified	18	4
	492	100%

When on an emergency run, the ambulance has the privilege of operating outside the usual restrictions on speed, direction of movement, and intersection right-of-way. When on a non-emergency run (trip) the ambulance is subject to the same traffic regulations as all other vehicles.

Table 5 shows ambulance accidents by type of accident (accident configuration) and compares them to all vehicles.[5]

TABLE 5

Ambulance Accident Configuration

	Ambulance Percent		All Vehicles Percent	
Single vehicle	15.1		35.5	
Two Vehicle - head on	1.7		3.7	
- rear end	18.8		18.5	
- side swipe	3.3	78.7%	2.6	60.1%
- angle	30.3		15.7	
- unclassified	24.6		19.6	
More than two vehicles	6.2		4.4	
	100.0%		100.0%	

Ambulances are involved in less than one-half as many single vehicle collisions as all vehicles. More ambulance accidents involved another vehicle with a high percentage of the two-vehicle collisions of the angle type. This confirms the suspicion that intersections are dangerous places for ambulances.

[5] All vehicles includes passenger cars, trucks, buses, motorcycles, etc.

Comparisons between the operating modes (emergency, non-emergency) of the ambulance and collision type yields some interesting findings as shown in Table 6.

TABLE 6

Ratios of Selected Ambulance Accident Types by Mode of Operation

		Mode of Operation Emergency : Non-emergency
Single vehicle		1 : 2
Multiple vehicle	- head on	2 : 4
	- rear end	2 : 1
	- side swipe	2 : 5
	- angle	2 : 3
	- backed into	1 : 2

Ambulances on emergency runs are more often involved in angle and rear-end type collisions. This is to be expected as, in the case of rear-end collisions, the vehicle ahead often stops abruptly upon hearing the siren.

One would suspect that the occurrence of head-on, side-swipe, and backing accidents would also be high on emergency runs because the vehicle is operating in an unusual manner in relation to the rest of traffic and hence more vulnerable. However, Table 6 data indicate that more accidents of the head-on, side-swipe, and backing variety occur on non-emergency runs (by a factor of at least 2:1).

Table 7 shows data concerning the circumstances surrounding the accident.

TABLE 7

Accident Circumstances

	Emergency	Non-Emergency	All Vehicles
Speed too fast	8.6%	21.0%	23.9%
Failure to yield/disregarded traffic signal	48.7	33.1	27.9
Left of center/improper lane use	15.2	14.5	12.9
Following too close	7.8	12.4	15.9
Improper turn	8.6	7.8	6.1
Other improper driving	4.7	5.4	5.7
Miscellaneous	6.4	5.8	7.6
	100.0%	100.0%	100.0%

In the accident, someone, not necessarily the ambulance driver, was performing an unsafe or improper driving maneuver. Two comparisons are of interest here. First, the accident circumstances between non-emergency and all vehicles are very similar. This indicates that when in non-emergency mode, ambulances are involved in the same kinds of circumstances surrounding accidents as are all vehicles. Second, the high proportion of failure-to-yield and left-of-center accidents in the emergency mode further suggests that when the ambulance is on an emergency run it is vulnerable because of the way it is operated.

Table 8 compares the intent of the driver of the ambulance at the time of the collision with the intent of drivers of all types of vehicles.

TABLE 8

Ambulance Driver Intent

	Emergency	Non-Emergency	All Vehicles
Go straight ahead	67.2%	62.8%	60.5%
Overtaking	9.5	2.9	2.1
Change lanes	1.3	1.2	2.2
Make right turn	3.0	3.3	3.7
Make left turn	4.7	8.7	9.9
Make U turn	2.6	0.0	0.3
Slowing or stopping on road	0.0	2.1	0.9
Starting up on road	0.4	0.4	1.8
Parking	0.0	1.2	0.8
Backing	4.3	5.0	3.6
Stopped on road	1.7	9.1	10.0
Other	5.3	3.3	4.2
	100.0%	100.0%	100.0%

In terms of the driver's intent at the time of the collision, the non-emergency and all other vehicle drivers are very similar. Compared with all collisions, more emergency vehicle collisions occur when the driver is overtaking other vehicles and making U-turns during emergency trips.

Table 9 shows the hazardous action committed by the ambulance driver. This is a violation of traffic law as judged by the investigating officer. A citation may or may not have been issued.

TABLE 9

Hazardous Action by Ambulance Driver

(violation judged, but citation not necessarily issued)

	Emergency	Non-Emergency	All Vehicles
None	53.9%	50.4%	46.0%
Speed too fast	6.0	13.6	16.2
Speed too slow	0.0	0.0	0.1
Failure to yield	13.8	14.1	14.3
Wrong way	0.4	0.4	0.1
Left of center	11.2	7.0	7.6
Improper turn	3.9	4.1	3.5
Improper backing or unsafe start	3.0	3.3	3.1
Following too close	6.9	6.7	8.4
Other	0.9	0.4	0.7
	100.0%	100.0%	100.0%

In approximately one-half of the accidents, no hazardous violation was judged to have been committed. This is true for the emergency, non-emergency, and all vehicle categories. However, in the remaining half of the cases, a hazardous violation either caused the accident or contributed to it. Thus in one-half of the total ambulance accidents (23% emergency, 25% non-emergency), ambulance driver error was serious enough to be judged as contributory by enforcement officials.

The data indicate that ambulance accidents are often the fault of the ambulance driver. While it is true that drivers of other vehicles are expected to yield the right-of-way to ambulances on an emergency run, the ambulance is to be operated with due care and caution at all times (Michigan Law). Certain accident classifications (Tables 5 & 6) and accident circumstances (Table 7), when coupled with the data in Table 9, lead to the conclusion that, particularly among the non-emergency class of accidents, certain accident-producing conditions are avoidable. Clearly, there is no need for excessive speed violation

(Table 9), failure to yield, left of center, and improper backing accidents in the non-emergency phase of operation. These--and other classifications of accidents--seem to be preventable by training or re-training the drivers.

Citations, i.e., traffic tickets, are issued to ambulance drivers as shown in Table 10.

TABLE 10

Citation Issued to Ambulance Driver

	Emergency	Non-Emergency	All Vehicles
None	84.0%	78.9%	70.0%
Hazardous violoation	6.0	9.9	20.4
Other violation	0.5	0.8	2.2
Unknown violation	9.5	10.4	7.4
	100.0%	100.0%	100.0%

While more citations for hazardous violation are issued in non-emergency situations than in emergency, they represent proportionately less than half the number issued to all other vehicles operators. This suggests that police are reluctant to issue citations to ambulance drivers even when circumstances warrant. Hence there is under-reporting.

When ambulances are involved in accidents, their occupants can be injured. Table 11 summarizes the injuries to ambulance occupants. Injury rates are similar to those of other vehicle occupants. However, the Michigan data do not distinguish between driver, attendants, and patient, so the frequency and degree of injury to patients is unknown.

TABLE 11

Injuries to Ambulance Occupants

	Emergency	Non-Emergency	All Vehicles
Fatal	0%	0%	0.2%
Injury	9	7	9.0
Possible injury	15	10	10.6
None	76	83	80.2
	100%	100%	100.0%

In Michigan during the study period, no occupant of an ambulance was killed. However, three ambulances were involved in collisions in which the occupant of another involved vehicle was killed.

Lastly, the consumption of alcohol by drivers has been found to be a factor in many traffic accidents. Ambulance drivers are no exception, as shown in Table 12.

TABLE 12

Alcolhol Use By Ambulance Driver

	Emergency	Non-Emergency	Total
Had been drinking	1	3	4
Had not been drinking	217	226	443
Unknown	14	13	27
	232	242	474

A total of four ambulance drivers (0.8 percent) were found by police to have shown signs of drinking at the time of the accident. This is compared to 9.3 percent for the general population. While alcohol consumption and ambulance driving is not a major problem, it should not occur at all. If an attendant has been drinking and must attend the ambulance, the driving should be left to another person.

SUMMARY

The rate of accident involvement for ambulances is 4.7 times that of all vehicles. Ambulance accidents most frequently involve a collision with another vehicle. Accidents are almost evenly divided between emergency and non-emergency modes of operation. While the types of accident differ by type of mode, ambulance drivers contributed to or caused nearly one-half of the accidents. Excessive speed, failure to yield, and left-of-center operation were prime causes of accidents in the non-emergency mode. Occupants of ambulances, including patients, are injured as a result of accident involvement.

DISCUSSION

Based on this limited data, nearly one-half of the ambulance accidents appear to be preventable through a better understanding of the applicable traffic laws and proper driving techniques.

Each ambulance call is made up of three basic parts -- the run to the scene, the transfer from the scene to the treatment center, and the return to the base. Emergency warning equipment may or may not be needed or used. While it is not known exactly on which leg of the trip the accidents are occurring, it is known that one-half of the accidents occur while emergency equipment is not in use and the vehicle is traveling as ordinary traffic. The expectation is that the ambulance, because it is a specialized vehicle, is operated in a safe manner at <u>all</u> times and therefore should be less involved in accidents. While the ambulance is on an emergency run, and operating outside the realm of normal traffic movement, it is vulnerable, and thus the higher risk of accident involvement is to be expected. However, the data do not confirm either of these points. Instead, ambulances appear to be operated in a dangerous manner most of the time.

Much reliance is placed on the siren to announce arrival and clear traffic. Reliable studies have shown that the siren's penetration under ideal city traffic condition is less than 123 feet at 25 miles per hour for on-coming traffic (straight ahead). This gives a driver approaching the ambulance only 3.4 seconds from the time of hearing the siren to the approach of the ambulance (under ideal conditions). Cross-traffic (siren penetration 39 feet to the side) under the same driving conditions has only 1.1 seconds to react and make appropriate maneuvers. Under normal driver/traffic conditions driver reaction time alone is approximately 1 second. Similar data for suburban situations (35 mph) and rural areas (55 mph) is: suburban straight ahead (penetration 440'), 10 seconds: suburban cross traffic (penetration 106'), 2.4 seconds; rural straight ahead (penetration 33'), 0.4 seconds; and rural cross traffic (penetration 14'), 0.2 seconds. Therefore, the siren is of limited use in notifying drivers of an ambulance approach. While these data are greatly simplified and represent ideal conditions, most ambulance operation is under less than ideal conditions with the siren heavily relied upon to clear traffic.

Additionally, the ambulance is acknowledge characteristics than ordinary passenger vehicles. Problems of underbraking, high center-of-gravity, poor directional response, etc., are alleged. Yet the vehicle is often driven in a manner without regard for these limitations or the limitations that poor weather and road conditions impose on operation.

Siren effectiveness and vehicle handling are but two aspects of operation of which drivers are poorly informed. The results of the lack of such information can be seen in these accident data.

CONCLUSIONS

Ambulances are overinvolved in accidents, and drivers of ambulances cause a large share of these accidents. Of the multitude of corrective actions available, three actions (below) seem to have a high probability of success.

The accident data presented here point out the need for driver training and, in part, form the criteria for course content. By knowing the common driving errors, corrective action and instruction can be presented to the student.

Accurate information can be presented to drivers to assist them in evaluating their own driving and help them in reformulating their driving habits.

Controls need to be placed on drivers such that those with poor driving records or poor driving habits are not allowed to drive. Law enforcement agencies can help by properly and adequately enforcing the law for ambulance drivers also.

The response to and transportation of people in need of emergency medical services should be delivered with the same high standards of care as any other part of the emergency medical care system. Transportation is an inextricable link in the emergency medical care chain. Improper transportation and careless driving can undo the best of medical care rendered prior to the movement by ambulance.

Failure to drive in a reasonable and responsible manner exposes the patient to a substantial risk of accident involvement and injury and causes delay in the response to medical emergencies.

Example of Handout Material
for First Class

BASIC AMBULANCE DRIVER TRAINING

A FIRST COURSE IN EMERGENCY VEHICLE DRIVING

Sponsor: ______________________________

Inclusive
Dates: ______________________________

Instructor: ___________________________

Location: _____________________________

Schedule: _____________________________

____

(Student Handout Material)

COURSE SYLLABUS

A brief description of the content of each Unit and Lesson:

Unit I -- Introduction
An introduction to the course.

Lesson 1 -- Course Introduction
A discussion of the course content, objectives, procedures, calendar, and definitions of terms.

Lesson 2 -- Introductory Film
One of several films on ambulance and/or emergency vehicle driving will be shown.

Unit II -- Legal Aspects of Emergency Vehicle Operation
The legal status of emergency vehicle operation and the responsibilities of the driver to proceed with due care and caution.

Lesson 1 -- Definition of a "True Emergency"
A "true emergency" will be defined and guidelines for application will be discussed. The concept is basic to application of the exemptions in the vehicle code.

Lesson 2 -- State Statutes
A presentation should be made by a [State] police officer to include an overview of state statutes pertaining to emergency vehicle operation, a discussion of state statutes and local ordinances, and department policy and application of the concept of "true emergency."

Lesson 3 -- Safety of Others: Civil Liability
A presentation should be made by an attorney regarding the concept of "due regard for others," civil responsibilities of the driver when operating an ambulance, and consequences of and liability for unsafe operation.

Unit III -- Communications and Pre-Driving Procedures
Basic skills and information needed before the emergency vehicle is driven.

Lesson 1 -- Communication with Others: Lights and Siren
A review of the legal aspects of the use of lights and siren to communicate with other drivers, their effectiveness in warning other drivers of the emergency vehicle's approach.

Lesson 2 -- Radio Communication
Methods and procedures for effective use of the radio in communicating with the vehicle's base and other agencies.

Lesson 3 -- In-Vehicle Communication
Methods of communicating within the vehicle concerning the condition of the patient so that the proper driving mode can be intelligently selected. This is also a continuation of the discussion of a "true emergency."

Lesson 4 -- Route Selection
Route planning and selection, arrival at the scene, and long-distance travel planning.

Lesson 5 -- Vehicle Inspection
The basic workings of the ambulance, guidelines for vehicle inspection, identification of malfunctions, and driver responsibility for emergency vehicle maintenance.

Lesson 6 -- Preparing to Drive
Important proceudres affecting driving ease and safety, safety checks and adjustments, start-up procedures, and pre-motion safety precautions.

Unit IV -- Physical Forces and Emergency Vehicle Control. Laws of Physics Affecting the Emergency Vehicle

Lesson 1 -- Forces affecting emergency vehicle handling:
friction, inertia and momentum, centrifugal force, and weight transfer as it relates to speed and directional control.

Lesson 2 -- Roadway Characteristics
Roadway geometrics, design, signs, and signals as they affect vehicle control and driving.

Unit V -- Driving the Emergency Vehicle
Driving tasks as they apply to operation of the emergency vehicle on both emergency and non-emergency runs.

Lesson 1 -- Use of Lights and Siren
Techniques for using the lights and siren to clear traffic.

Lesson 2 -- Basic Control Tasks -- Starting, Backing, and Parking.
Techniques for starting the vehicle, moving into traffic, backing up, and parking.

Lesson 3 -- Driving Techniques
Techniques for operating the ambulance in various types of traffic situations, including urban driving, negotiating intersections, turning around (U-turn, turn-abouts, etc.), following another vehicle (following and stopping distance), passing vehicles, and expressway operation.

Lesson 4 -- Adverse Conditions
Procedures and techniques used when driving during adverse road and weather conditions--at night, or in wet, snowy, icy, or foggy weather.

Lesson 5 -- High-Speed Driving
Techniques for driving in excess of the safe operating speed limit when necessary.

Lesson 6 -- Vehicle and Driving Emergencies
Techniques for handling vehicle and driving emergencies such as evasive maneuvers, skids, loss of control, vehicle breakdowns, and other unusual driving situations.

Unit VI -- Accident Involvement En Route
The responsibilities of the ambulance driver when involved in an accident with the emergency vehicle.

Lesson 1 -- Accident Responsibilities
The responsibilities of the driver when involved in a collision.

Lesson 2 -- Accident Reports
Suggestions to assist the ambulance driver in recording data concerning the accident when involved in a collision.

Unit VII -- In-Vehicle Driving Exercises
To be conducted in a closed, protected area, using an actual ambulance, preferably of the type the student will be driving.

Lesson 1 -- Vehicle Inspection
The student, using a checksheet or a guide, will carry out a thorough vehicle inspection and have the opportunity to manipulate all vehicle controls, switches, etc.

Lesson 2 -- "Patient" Ride
Each student will be given the experience of being transported on the cot in the vehicle on a simulated emergency run.

Lesson 3 -- Low-Speed Maneuvers
Demonstration and practice in vehicle braking, parking, turns, steering, braking, turn-arounds, etc., so as to develop skill and perception at low speed in performing common vehicle maneuvers.

Lesson 4 -- Precision Driving
Demonstration and practice in vehicle control and handling at urban speeds. Topics include panic stops, evasive steering, lane changing, etc.

AMBULANCE DRIVER TRAINING

Lesson Outline

Unit I , Introduction

Lesson 2 , Introductory Film Est. Time 1/2 Hour

****

Description/Purpose:

One of several films on ambulance and/or emergency vehicle driving will be shown.

Topical Outline:

Introductory film on Ambulance Driving.

Discussion

Objectives:

To introduce the student to the task of driving an emergency medical vehicle.

References:

Student Handout Material:

Teaching Aids:

Suitable projector and screen.

Instructor's notes for lesson content:

Use either a film, filmstrip, or slide presentation.

Useful are: Emergency Run
Driving the Ambulance Safely

Following the film, hold a class discussion on the responsibility of the driver of the ambulance to the patient, crew, other members of the motoring public.

Also discuss the need for speed in ambulance operation for the sake of the patient vs. the safety in operation of the ambulance.

AMBULANCE DRIVER TRAINING

UNIT SUMMARY

Unit II, Legal Aspects of Emergency Vehicle Operation

Description:

A presentation concerning the legal status of emergency vehicle operation and the responsibilities of the driver to proceed with due care and caution.

List of Lessons:

1. "True Emergency"
2. State Statutes
3. Civil Liability

Attachments:

[x] Review Questions

[ ] Test Questions

Review Exercise

1. For each of the topical areas listed below, write a brief description of the relevant points of your state statute:

   a. Proceeding past red lights and stop signals:

   b. Violating traffic flow and turn regulations:

   c. Parking at the scene of an emergency:

2. From the information available, which of the following situations should be treated as a true emergency by an EV operator? Explain Why?

   a. Three-car collision, injuries (severity unknown). No other EVs at the scene.

      True emergency (yes or no)? Yes

      Why? Primarily because there are injuries. Because so little information is given about the injuries or about any other circumstances (e.g., road blocked?), the operator must assume a true emergency.

b. The dispatcher reports that a dog, possibly rabid, is threatening children in a nearby neighborhood.

True emergency (yes or no)? Yes

Why? A rabid dog would represent a real threat to human life. Since there is no way to determine, for certain, whether or not the dog is rabid without the aid of a veterinarian, someone should arrive at the scene quickly to restrain the animal.

c. The dispatcher reports that a man phoned, requesting aid. He thinks his son may have broken his ankle; there is some pain and swelling.

True emergency (yes or no)? No

Why? Unless local policy dictates otherwise, a broken bone is generally not considered a threat to human life.

3. From the information available, which of the following situations seem to represent "due regard for the safety of others," and which do not? Why?

a. An EV operator, enroute to a true emergency, traveling 70 mph on an asphalt road in the rain (posted limit is 45 mph).

Due regard (yes or no)? No

Why? Road and weather conditions are poor; the EV is traveling 25 miles OVER the posted limit; loss of control is not only possible, but likely.

b. Proceeding through a red light, after slowing to 10 mph when returning to the station at the end of a run.

Due regard (yes or no)? No

Why? There is no indication of a true emergency. Under that circumstance, proceeding through a red light not only represents a lack of due regard, but it is illegal.

c. Traveling the wrong way down a one-way street, while enroute to a fire at a large apartment complex, using all signaling equipment.

Due regard (yes or no)? Yes

Why? A true emergency does exist. The EV operator is complying with the statute (using signaling equipment) while violating normal direction of movement. Without more information to indicate why traveling the wrong way down this street might be unsafe, it would seem that the operator is exercising due regard.

AMBULANCE DRIVER TRAINING

Lesson Outline

Unit II , Legal Aspects of Emergency Vehicle Operation

Lesson 1 , Definition of a True Emergency Est. Time 1/2 Hour

****

Description/Purpose:

A "true emergency" will be defined and guidelines for application will be discussed. The concept is basic to the application of the exemptions in the vehicle code.

Topical Outline:

Definition of a True Emergency
Situations requiring immediate action
Effect of delay in reaching patient and in transfer to treatment facility
Department or company policy
Discussion

Objectives:

Student will define "true emergency."

Student will apply definition to several situations to determine if true emergency exists

Student will describe what effects transportation delay will have on the probable course of recovery of patient.

References:

Student Handout Material:

Teaching Aids:

Instructor's Notes for Lesson Content

INTERPRETING THE LAW

Actions will be judged by others (e.g., superiors in court) from at least two aspects:

A. True emergency?

B. Due regard? Civil responsibility

What is a True Emergency?

Exemptions legal only in true emergency situation. Definition of true emergency is unclear.

A. Sometimes operator does not have to decide for himself.

--The code system used will make the severity of the emergency clear.

--Information provided by and solicited from the dispatcher will make the nature of the emergency clear.

--The emergency service the operator is affiliated with will make the nature of the emergency clear.

B. When operator must decide, the following definition should be considered:

--A situation in which there is a high probability of death or serious injury to an individual, or significant property loss, and action by an EV operator may reduce the seriousness of the situation.

Cite examples that illustrate this definition.

Case History

Allow the students a few minutes to read over the case history (Figure I-1). Raise the following questions:

--Might the results of this case been different if the officer has slowed to 20 mph?

--Might the results have been different if the officer had had both hands on the steering wheel?

--Might the results have been different if the little girl had had a more serious injury initially (e.g., uncontrolled bleeding)?

When discussion is complete, summarize the case as follows:

Every one of the factors might have caused the court to reach a different decision. The most critical factor, however, was probable the fact that the child was not seriously injured--her condition did not represent a "true emergency." The officer was negligent in exercising the exemptions granted by the law.

In the case of Wood v. Morris* a police officer was transporting a young girl with an injured arm to the hospital when he collided with another vehicle. The collision caused additional injury to the child. Although the police vehicle's siren and red light were in operation at the time of the collision, the court found him negligent, and an appellate court affirmed that finding as follows:

> The evidence shows that the defendant approached the intersection, which he knew to be one of the main traffic arteries of the city, at a speed of 45-50 mph; that he knew the speed limit at that place was 25 mph; that the street was wet with rain and was of asphalt construction, which he knew makes it even more slick; that he did not apply the brakes as he approached the intersection and only slowed the vehicle perhaps 5 mph before entering the intersection; that he was operating the vehicle with his left hand, while holding the siren with his right hand, being right-handed; that the plaintiff's injuries were not of a critically serious nature, being confined to her arm, so that she was able to get into the automobile and talk. The above evidence was sufficient to authorize a finding of ordinary negligence on the part of the defendant policeman . . . .**

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*109 Ga. App. 148, 135 S.E. 2nd 484, 487 (1964).

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Situations requiring immediate action:

--Breathing difficulty

--Uncontrollable bleeding

--Complicated childbirth

--Any situation where the nature of the situation is unknown or unclear

--General rule: if a dealy in response will adversely affect the patient, then it is an emergency.

--All other situations are non-emergency.

Effect of delay in reaching patient and in transfer to treatment facility:

--Driving to the scene is only one part of the process of arriving. Others are time between injury and call, time from alarm to entering vehicle, time at the scene, time from arrival to application of definitive treatment at treatment facility.

--Often driving time is minimized by use of lights and siren--i.e., emergency, when the time saved is only a small fraction of the total time from onset of the problems to beginning of treatment in an emergency care unit.

--Guideline: With a basic level of care at scene, i.e., EMT or more, the patient should be stabilized before transportation is attempted--except in limited situations. If the answer to the question "Will a few seconds or minutes delay in arrival affect the outcome of the patient?" is No, then emergency transportation is not needed or desireable.

--Improper driving can result in an accident and cause more delay in reaching the scene or treatment facility than would driving as normal traffic with less risk of accident.

Department of Company Policy

--Discuss any company policy or directions that apply to driving.

Discussion

--Cite several cases and determine whether driving in emergency or non-emergency manner would affect outcome of patient condition.

AMBULANCE DRIVER TRAINING

Lesson Outline

Unit __II__, Legal Aspects

Lesson __2__, State Statutes Est. Time __1__ Hour

****

Description/Purpose:

A presentation should be made by a [State] police officer to include an overview of state statutes pertaining to emergency vehicle operation, a discussion of state statutes and local ordinances and department policy and application of the concept of "true emergency."

Topical Outline:

State Laws which apply to driving of ambulances.

NOTE: This section is best presented by a Law Enforcement Officer.

Objectives:

To detail the requirements of Michigan State Law as it applies to ambulance driving.

References:

Michigan Vehicle Code

Student Handout Material:

(x) attached

Teaching Aids:

Instructor's Notes for Lesson Content

INTRODUCTION

A. Three types of regulations to follow: (1) motor vehicle and traffic laws enacted by the state government, (2) local ordinances (e.g., local speed limits), and (3) department policy about what you as an EV operator may and may not do.

B. Three principles of EV operation.

--Emphasize these three points:

1. EV operators are subject to all traffic regulations unless a specific exemption is made.

   --A specific exemption is a statement which appears in the statutes such as: "The driver of an authorized emergency vehicle may exceed the maximum speed limits so long as he does not endanger life or property."

2. Exemptions are legal only in the emergency mode.

3. Even with an exemption, operator can be found criminally or civilly liable if involved in an accident.

STATES STATUTES ON EMERGENCY VEHICLE OPERATION

--Provide students with copies of the listing of state statutes you have prepared. Help the trainees translate the legal jargon into plain language. (Suggest notetaking.) Provide clarification or further explanation if needed.

--Provide any local ordinances or departmental policy relevant to the statutes.

Local Regulations -
Driver's local regulations, if any.
Company Policy -
Driver's company policy, if any.

Michigan Vehicle Code -- Sections of interest to
Ambulance Drivers

Note: Words crossed out for clarity only.

MICHIGAN VEHICLE CODE
and Related Laws Concerning
the Ownership and Use of
Vehicles on the Streets and
Highways

Licensing and Operation of Ambulances

[Act 330, P.A. 1976]

257.1225 Emergency vehicle privileges. [MSA 14.528(75)]

Sec. 5. The driver of an ambulance, when operating an ambulance under emergency conditions or a reasonable belief that an emergency condition does in fact exist, may exercise the privileges and be subject to the constraints prescribed by the statutes of the state pertaining to the driver of an authorized emergency vehicle.

[Act 300, P.A. 1949]

Chapter I

Words and Phrases Defined

257.2 Authorized emergency vehicle. [MSA 9.1802]

Sec. 2. "Authorized emergency vehicle" means vehicles of the fire department, police vehicles, ambulances, privately owned motor vehicles of volunteer or paid firemen, or privately owned motor vehicles of volunteer ambulance drivers or licensed ambulance drivers or attendants as are authorized by the department of state police.

Am. 1976, Act 347.

Chapter VI

Obedience to and Effect of Traffic Laws

257.602 Obedience to police officers. [MSA 9.2302]

Sec. 602. A person shall not refuse to comply with a lawful order or direction of a police officer when that officer, for public interest and safety, is guiding, directing, controlling, or regulating traffic on the highways of this state.

Am. 1973, Act 200.

Speed Limitations

257.632 ~~Vehicle in pursuit of criminal, fire apparatus,~~ ambulance. [MSA 9.2332]

Sec. 632. The speed limitation set forth in this chapter shall not apply to vehicles when operated with due regard for safety ~~under the direction of the police when traveling in emergencies or in the chase or apprehension of violators of the law or of persons charged with or suspected of a violation, nor to fire department or fire patrol vehicles when traveling in response to a fire alarm,~~ nor to public or private ambulances when traveling in emergencies. This exemption shall apply only when the driver of the vehicle while in motion sounds an audible signal by ~~bell,~~ siren ~~or exhaust whistle~~ as may be reasonably necessary or when the vehicle is equipped with ~~at least 1 lighted~~ lamp displaying a flashing, ~~oscillating or rotating~~ red or blue light ~~visible under normal atmospheric conditions from a distance of 500 feet to the front of such vehicles, unless the nature of the mission requires that a law enforcement officer travel without giving warning to suspected law violators.~~ This exemption shall not however protect the driver of the vehicle from the consequences of a reckless disregard of the safety of others.

Am. 1976, Act 164.

Right-of-Way

257.653 Authorized emergency vehicle; right-of-way yielded by other vehicles. [MSA 9.2353]

Sec. 653. (a) Upon the immediate approach of an authorized emergency vehicle equipped with a~~t least 1~~ lighted ~~flashing,~~ rotating ~~or oscillating~~ lamp exhibiting a red or blue light ~~visible under normal atmospheric condition from a distance of 500 feet to the front of such vehicle~~ and when the driver is giving audible signal by siren, ~~exhaust whistle, or bell:~~

1. The driver of every other vehicle shall yield the right of way and shall immediately drive to a position parallel to and as close as possible to, the righthand edge or curb of the roadway clear of any intersection and shall stop and remain in such position until the authorized emergency vehicle has passed, except when otherwise directed by a police officer.

~~2. Upon the approach of an authorized emergency vehicle, as above stated, the motorman of every street car shall immediately stop such car clear of any intersection and keep it in such position until the authorized emergency vehicle has passed, except when otherwise directed by a police officer.~~

(b) This section shall not operate to relieve the driver of an authorized emergency vehicle from the duty to drive with due regard for the safety of all persons using the highway.

Am. 1964, Act 7.

257.603 Traffic regulations; government vehicles, authorized emergency vehicles, workers upon surface of highways. [MSA 9.2303]

Sec. 603. (a) The provisions of this chapter applicable to the drivers of vehicles upon the highway shall apply to the drivers of all vehicles owned or operated by the United States, this state, or a county, city, town, district, or any other political subdivision of the state, subject to the specific exceptions as are set forth in this chapter with reference to authorized emergency vehicles.

(b) The driver of an authorized emergency vehicle when responding to an emergency call, but not while returning from an emergency call, may exercise the privileges set forth in this section, subject to the conditions of this section.

(c) The driver of an authorized emergency vehicle may:

(1) Park or stand, irrespective of the provisions of this act.

(2) Proceed past a red or stop signal or stop sign, but only after slowing down as may be necessary for safe operation.

(3) Exceed the prima facie speed limits so long as he does not endanger life or property.

(4) Disregard regulations governing direction of movement or turning in specified direction.

(d) The exemptions granted in this section to an authorized emergency vehicle shall apply only when the driver of the vehicle while in motion sounds an audible signal by ~~bell~~, siren, air horn, ~~or exhaust whistle~~ as may be reasonably necessary ~~except as provided in subsection (e)~~, and when the vehicle is equipped with at least 1 lighted lamp displaying a flashing, oscillating, or rotating red or blue light visible under normal atmospheric conditions from a distance of 500 feet in a 360 degree arc ~~except where it is deemed advisable not to equip a police vehicle operating as an authorized emergency vehicle with a flashing, oscillating or rotating light which is visible in a 360 degree arc. In those cases a police vehicle shall display a flashing, oscillating, or rotating red or blue light which is visible under normal atmospheric conditions from a distance of 500 feet to the front of the vehicle. Only police vehicles which are publicly owned shall be equipped with a flashing, oscillating, or rotating blue light which when activated shall be visible under normal atmospheric conditions from a distance of 500 feet in a 360 degree arc.~~

~~(e) A police vehicle shall retain the exemptions granted in this section to an authorized emergency vehicle without sounding an audible signal if the police vehicle is engaged in an emergency run where silence is required.~~

333.20332 Revocation of driver authorization

Sec. 20332. (1) The department may revoke the authorization of a driver in a licensed ambulance operation for failure of the driver to comply with, or for violation of, provisions, standards, or requirements of this part, or rules promulgated under this part, but only after warning and reasonable time for compliance as set by the department. The revocation shall be by certified mail. If the driver wishes to appeal the revocation, application for a hearing must be made to the department within 10 working days after receipt of notification of the revocation. The hearings shall be held pursuant to procedures established by the department. Within 30 days after conclusion of the hearing, the department shall issue a written decision which shall include findings as to the revocation of the authorization. The department's written decision shall be transmitted promptly to the appellant.

(2) Upon revocation of a driver's authorization, the driver shall cease to drive an ambulance, and a person shall not employ or permit that individual to drive an ambulance.

P.A.1978, No. 368, § 20332, Eff. Sept. 30.

Cross References

Revocation of licenses, in general, see § 333.20165 et seq.

Library References

Automobiles ⇐144.1(1). C.J.S. Motor Vehicles §§ 164.16, 164.17.

333.20333 Emergency conditions; privileges and constraints of drivers

Sec. 20333. The driver of an ambulance, when operating an ambulance under emergency conditions or a reasonable belief that an emergency condition does in fact exist, may exercise the privileges and be subject to the constraints prescribed by the statutes of this state pertaining to the driver of an authorized emergency vehicle.

P.A.1978, No. 368, § 20333, Eff. Sept. 30.

Library References

Automobiles ⇐175(1). C.J.S. Motor Vehicles § 371 et seq.

333.20335 Emergency medical technician and attendants; exemptions

Sec. 20335. (1) An ambulance shall not be operated and a person shall not operate, attend, or permit an ambulance to be operated while transporting a patient unless 1 or more attendants are in the patient compartment.

(2) After 1978, an ambulance shall not be operated, and a person shall not operate, attend, or permit an ambulance to be operated, while transporting a patient unless 1 or more emergency medical technicians and 1 attendant are in the ambulance. The emergency medical technician shall be in the patient compartment while transporting a patient. An exemption from this subsection may be granted pursuant to section 20336.[1]

(3) Subsections (1) and (2) shall not apply to the transportation of a patient by an ambulance when the individual who is accompanying the patient in the patient compartment is a licensed health professional and a provider-patient relationship existed before the transportation.

P.A.1978, No. 368, § 20335, Eff. Sept. 30.

[1] Section 333.20336.

Library References

Automobiles ⇐59. C.J.S. Motor Vehicles § 44 et seq.

333.20336 Exemptions from requirements and standards

Sec. 20336. (1) An exemption from section 20323(3) or 20335(2),[1] or both, shall be granted under the circumstances described in this section.

(2) A local governmental unit or an ambulance operation shall demonstrate, to the regional emergency medical service advisory council in the health service area

MCLA

29.7a Prevention of fires or explosions; appointment of representatives by commissioner of state police, powers

Sec. 7a. The commissioner may appoint 1 or more persons in any incorporated city, incorporated village or township as his representative or representatives to act under the provisions of this section when a request for the appointment is made in writing by the governing body of any such city, village or township. Each appointment shall be made in writing. Such representatives shall be either the commanding officer of the fire department of such city, village or township, or a person mutually agreed upon between the commissioner and such commanding officer. Whenever in the opinion of the commissioner, any of his officers, or his duly authorized representative, any dangerous condition involving explosives or flammable vapors exists, the commissioner, any of his officers, or his authorized representative, as prescribed in this section, upon finding an emergency condition dangerous to persons or property, shall have power to take all necessary steps and prescribe all necessary restrictions and requirements to protect persons and property until the dangerous condition is abated.

The commissioner, any of his officers, or his duly authorized representative responding to a fire or emergency call, who, upon arriving at the scene of such fire or emergency, finds a condition dangerous to persons or property, shall have the power to take all necessary steps and requirements to protect persons and property until the dangerous condition is abated.

The commissioner, any of his officers, or his authorized representative shall have power to investigate causes and effects related to dangerous conditions involving explosive or flammable vapors. P.A. 1941, No. 207, § 7a, added by P.A.1952, No. 26, § 1, Eff. Sept. 18, as amended P.A.1965, No. 200, § 1, Imd. Eff. July 16.

Historical Note

The 1965 amendment inserted, in the first sentence of the first paragraph, the words "when a request for the appointment is made in writing by the governing body of any such city, village or township"; and inserted, wherever appearing, the words "any of his officers".

Library References

States ⇐46. C.J.S. States §§ 49, 52, 68 et seq.

29.8 Fire hazards, access to investigate; report for abatement

Sec. 8. The commissioner or any of his officers, the chief of any organized fire department, regular or voluntary, or any fireman in uniform acting under the orders and directions of the local fire chief, the clerk of any village or township not having an organized fire de-

(b) Assure that approved emergency medical technician training courses are conducted by instructors approved by the department.

(c) Maintain a file of emergency medical technician training courses and instructors approved by the department.

(d) License advanced mobile emergency care services, periodically review records of training and performance, assess the quality of service being rendered, and prescribe and publish guidelines for the operation of an advanced mobile emergency care service.

(e) Approve and place on a registry each individual licensed under part 172[1] upon proper application to the department and after a determination by the department that the individual has received appropriate education, training, or experience designed to sufficiently prepare the individual to perform emergency medical services and has passed the appropriate written, practical examination prescribed by the department for emergency medical technicians or advanced emergency medical technicians.

P.A.1978, No. 368, § 20369, Eff. Sept. 30.

[1] Section 333.17201 et seq.

Cross References

Licensure and certification, in general, see § 333.20131 et seq.

333.20374 Persons performing and extent of emergency medical services authorized

Sec. 20374. (1) An ambulance attendant or an emergency medical technician may perform emergency medical services consistent with his or her training.

(2) An advanced emergency medical technician may perform emergency medical services, and when authorized may perform in accordance with subsection (3) any advanced emergency medical technique consistent with the technician's training.

(3) An advanced emergency medical technician may perform advanced emergency medical techniques, in each individual case, pursuant to the written authorization, the verbal authorization, or the authorization transmitted through a direct communication device of a licensed physician or a registered nurse designated by the physician. If communications fail during an emergency situation, the advanced emergency medical technician may perform an advanced emergency medical technique consistent with the technician's training if, in the tehnician's judgment, the life of the patient is in immediate danger. A detailed report stating the causes of the communication failure and an outline of the techniques employed by the advanced emergency medical technician shall be forwarded to the department within 24 hours after the occurrence.

P.A.1978, No. 368, § 20374, Eff. Sept. 30.

Library References

Physicians and Surgeons ⟜4. C.J.S. Physicians and Surgeons § 12.

333.20377 Authority for management of patient and scene in an emergency

Sec. 20377. (1) Authority for the management of a patient in an emergency is vested in the licensed health professional at the scene of the emergency who has the most training specific to the provision of emergency medical care. If a licensed health professional is not available, the authority is vested in the most appropriately trained representative of a public safety agency at the scene of the emergency.

(2) Authority for the management of the scene of an emergency is vested in appropriate public safety agencies. The scene of an emergency shall be managed in a manner that will minimize the risk of death or health impairment to the patient and to other individuals who may be exposed to the risks as a result of the emergency. Priority shall be given to the interests of those individuals exposed to the more serious remediable risks to life and health. Public safety officials shall ordinarily consult emergency medical services personnel or other authoritative health professionals at the scene in the determination of relevant risks.

P.A.1978, No. 368, § 20377, Eff. Sept. 30.

See 2/80 EMS News letter

MCLA

EMS NEWSLETTER

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

35 North Logan Lansing, MI 48909

ol. 4, No. 2 (517) 373-1406 September, 1977

WHO'S IN CHARGE, POLICE OR EMT?

A frequent problem for EMTs involves direct confrontations with law enforcement officers at the scene of an accident or emergency. Whose authority is superior at the scene of an accident or emergency? Is it the police or the EMTs? The problem typically occurs when police arrive first at the scene and begin removing injured parties from their vehicles without proper medical evaluation. To further compound the problem, police will often order EMTs to immediately transport patients without giving EMTs an opportunity to evaluate these patients.

Should the EMT disobey the police and medically assess the patients or should he do as he is ordered? What legal risks exist for EMTs under these difficult circumstances? Since a great deal of statutory variation exists in this area, the EMT should be familiar with his own state law. It is unfortunate that this problem exists because it usually results from lack of communication between police and EMTs.

Generally speaking the police have a broad statutory power to act to protect the health and welfare of the citizens. At the scene of an accident this broad police power extends to those involved in the accident, other drivers, onlookers, and anybody else who happens to come upon the scene, including EMTs. Police are generally authorized to enforce the law in relation to the supervision and regulation of traffic and to make arrests for the commission of crimes in this regard.

Is there any legal authority recognizing the professional role of the EMT at the scene of an accident or emergency? Michigan has a new law on its books which goes a long way toward solving this problem for the EMT, the Emergency Personnel Act (Act 290), signed into law on October 25, 1976.

Section 9 (1) of this law provides: "Authority for patient management in a medical emergency shall be vested in that licensed medical professional or paraprofessional at the scene of the emergency who has the most training specific to the provision of emergency medical care. If a licensed medical professional or paraprofessional is not available, the authority shall be vested in the most appropriate trained representative of other public safety agencies who may have responded to the emergency."

Section 9 (2) further provides: "Authority for the management of the scene of a medical emergency shall be vested in appropriate public safety agencies. The scene of a medical emergency shall be managed in a manner designed to minimize the risk of death or health impairment to the patient and to other persons who may be exposed to the risks as a result of the emergency condition, and priority shall be placed upon the interests of those persons exposed to the more serious remediable risks to life and health. Public safety officials shall ordinarily consult emergency medical services personnel or other authoritative medical professionals at the scene in the determination of relevant risks."

Act 290 of 1976 essentially divides responsibility at the scene into two areas, management of the scene in general and management of the patients

(continued next page)

in particular. Patient management responsibility is vested in the licensed EMT and management of the scene is vested in the police. Although this law acknowledges the separate missions of the EMT and the police, circumstances will undoubtedly arise where responsibilities overlap. When this occurs there will be no substitute for cooperation between EMTs and the police. The mission of preserving the public health is common to both parties.

Errors of judgment have occurred at the scene both on the part of the police and the EMTs. Police officers have insisted on immediate transport without giving EMTs a chance to make a medical assessment and apply proper immobilization.

On the other hand, EMTs have also committed judgment errors in patient care at the scene. EMTs have occasionally been criticized by police for wasting time in attempting to get academic blood pressure readings at the scene. Often times vital signs could have been more easily and safely obtained in the ambulance en route to the hospital rather than at the scene. If clinically indicated, vital signs should be obtained as soon as possible at the scene. If a police confrontation is developing and vital signs can safely be deferred, this course of action should be pursued.

In the final analysis it is important for the EMT and police to understand that they have a shared responsibility to the patient at the scene of an accident or emergency. Disagreements between police and EMTs will inevitably recur. EMTs should avoid prolonged debate with police at the scene. Argument benefits nobody, least of all the injured patient in need of prompt and efficient emergency care.

. . Adapted from EMT Legal Bulletin, Vol. 1, No. 4, Summer 1977

AMBULANCE DRIVER TRAINING

Lesson Outline

Unit II, Legal Aspects

Lesson 3, Safety of Others: Civil Liability Est. Time 1 Hour

****

Description/Purpose:

A presentation should be made by an attorney regarding the concept of "due regard for others," civil responsibilities of the driver when operating an ambulance, and consequences of an liability for unsafe operation.

Topical Outline:

Due Regard for Safety of Others

"Reasonable Man" Concept

Your Responsibility

Summary

NOTE: An attorney should present this lesson.

Objectives:

To discuss the concept of due regard.

To present an example of the consequences of failing to exercise due regard.

To present the concept of full driver responsibility in regard to exercising of due regard.

References:

Student Handout Material:

[ ] attached

Teaching Aids:

Instructor's Notes for Lesson Content

What is Due Regard for the Safety of Others?

Must be based on circumstances. Guidelines:

A. "Enough" notice of approach, before collision in inevitable.

--"Enough" is difficult to define. If motorists have windows up, heater or air conditioner and radio on, it may take them a long time to respond.

--Notice is given by using appropriate signaling equipment (i.e., lights and siren) in accordance with statutes.

B. In judging due regard in use of signaling equipment, courts will consider:

1. Was it necessary to use it?
2. Was it used?
3. Was signal audible and/or visible to motorists and pedestrians?

C. Use of signaling equipment must be accompanied by caution.

D. An accepted definition of due regard is:

A reasonable careful man, performing similar duties and under similar circumstances, would act in the same manner.

A Second Case History

--Allow the students a few minutes to read over Figure I-2 on the following page. Raise the following questions (page I-B-16):

Pittsburgh Press, Mon., Jan. 17, 1977

1,073% Property Tax Increase Periling Midwest Town

By JAMES J. FISHER

SALIX, Iowa — This town of 387 souls, 17 miles south of Sioux City, amid the rich bottomlands of the Missouri river, could be any of a thousand small towns in Middle America: a post office, a few stores, a feed mill, three bars, two schools and, of course, the tree-lined streets where residents, 53 per cent retired and on fixed incomes, live in scrubbed houses.

But Salix isn't one of those towns. It's unique, for today it sits on a precipice — one from which it will almost surely fall come March 15, when the new city budget is certified and the 137 real property taxpayers find their bills increased by an average of 1,073 per cent to pay off a six-year-old lawsuit against the town.

FOR ROGER HUOT, a corn farmer, that means his bill will go from $400 to $2,500; for Mrs. Edna Peppin, whose husband has been in poor health for eight years, the jump will be from $200 to $1,500, and for Rupert Thorpe, the postmaster, the bill will go from $300 to nearly $5,000.

Talk of money pervades this town. Not greedy talk, but talk of relief from the burden that most know is coming.

There have been fanciful suggestions to burn the town to the ground, to move it to another townsite, or for the city council of six members to resign in protest.

And some talk isn't so fanciful. "We could solve all our problems if we'd take every judge, lawyer and insurance agent in the county out and line them up and shoot them," says one farmer. He is dead serious.

Salix's problems began on the afternoon of Oct. 29, 1970, when the Salix volunteer ambulance, transporting a dying 80-year-old man to a Sioux City hospital, collided with a car in Sioux City.

The ambulance entered the intersection against the stoplight, with siren and red light on. The car, driven by Grant Wetz, an attorney who specialized in insurance, had the green. Wetz was injured fatally in the accident.

Subsequently, his widow, Mrs. Frances Wetz, filed a $200,000 suit against the town of Salix. Although it was a volunteer ambulance squad, court decisions concerning workman's compensation have declared that even volunteers are employes of a city.

Salix had insurance — $100,000 — with Western Casualty and Surety of Fort Scott, Kan.

"Western was convinced that the town didn't have a thing to worry about," says William Shuminsky, Salix attorney. "They wanted to go to court. In April 1972, the attorneys for Mrs. Wetz offered to settle for $95,000. I wrote Western's attorneys and demanded that they come to terms. But no, they went to court."

JUDGE JAMES P. KELLEY heard the suit in mid-1972 without a jury. He ruled in July 1972, awarding the Wetz estate $188,662, plus interest from the day of the accident. The decision was later affirmed by the Iowa Supreme Court. Western paid out its $100,000, plus about $15,000 in interest. That left Salix holding the bag for the remainder. With interest, that came to $118,551.03.

The Iowa legislature responded to Salix's plight last year by passing a law allowing the town to pay the debt off in 10 yearly installments. That law was struck down as unconstitutional by the Iowa courts on the grounds that it infringed on a judicial decision.

Thus, this year, Salix was ordered by the courts to budget the settlement into its city appropriations, meaning the town will spend $129,000. The town budget is usually about $11,000.

Shuminsky has filed suit against Western in the amount of $118,551.03, charging that the company acted in bad faith. There is little hope the suit can come to trial before the city budget is certified.

Postmaster Rupert Thorpe, who was driving the ambulance the day the accident occurred (but who never was charged with violation of any traffic laws), said the rescue squad still operates.

"We could have just quit, but that would have meant a lot of people would have died out on the interstate, in the towns around here or out on the farms," he says. "But people depend on us. That's why we go on."

And how much insurance does the rescue squad have?

"A million bucks," says Thorpe.

Women's News Service

Figure I-2. Property Tax Increase Periling Midwest Town.

--Did this situation appear to be a true emergency?

--Did the operator exercise due regard for the safety of others?

--Why do you think the court reached the decision it reached?

Summarize the case:

--The situation appears to be a true emergency. The court probably based its decision on the doctrine of lack of due regard for the safety of others.

"Reasonable Man" Concept

--How would a person of similar "persuasion," i.e., training and motivation, react.

--Reasonable action under circumstances.

--Industry and community standards tests.

Your Responsibility

--At all times act in a manner to protect <u>all</u> persons with whom you may interact - patient, attendants, public.

--You cannot delegate your responsibility

--You are the driver--and you alone are responsible for safe operation of the vehicle.

--Insurance does not relieve you of responsibility.

SUMMARY

Guidelines to minimize negligence:

A. True emergency must exist before exercising exemptions.

1. High probability of death or serious injury.
2. Property is imperiled.
3. Action on operator's part could reduce severity.

B. Under any and all circumstances, exercise due regard.

C. You can be called to account for your actions. If found to be at fault, i.e., negligent, you must pay.

D. Play a game with yourself. Imagine several common driving situations and describe your actions. Then try and define your actions in a "court of law." Is what you did reasonable and does your explanation sound reasonable to someone else?

This is a good topic for the class to role play. Select a plaintiff, defendant, judge and jury. Take a situation with a resulting problem and bring it to "court."

AMBULANCE DRIVER TRAINING

UNIT SUMMARY

Unit III, Communications and Pre-Driving Procedures

Description:

Basic skills and information needed before the emergency vehicle is driven.

List of Lessons:

1. Communications with Others: Lights and Sirens
2. Radio Communications
3. In-Vehicle Communications
4. Route Selection
5. Vehicle Inspection
6. Preparing to Drive

Attachments:

[x] Review Questions

[ ] Test Questions

--Unusual noises

--Jerky on wheel turn

c. Belts

--Cracked, frayed

--Loose, depresses more than one inch at center

--Tight, glazed surface, frayed

d. Seat belt

--Not bolted to floor

--Badly frayed

--Will not hold adjustment

--Will not pull out fully

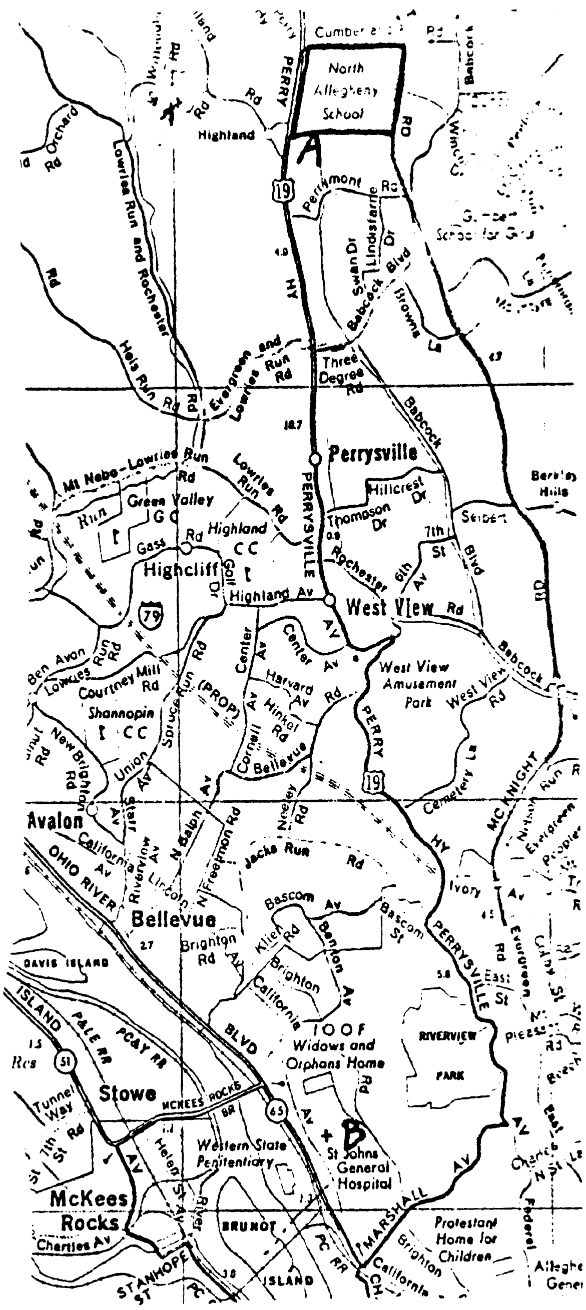
e. Brakes

--Grab

--Pull to one side

--Spongy

--Squeal, scream



Conduct an emergency run from the North Allegheny School (A) to St. Johns General Hospital (B).
The conditions are as follows:

a. The entrance to the high school is on McKnight Road

b. The entrance to the hospital is on California Ave.

c. Perrysville Avenue (Rt.19) is closed in the vicinity of Riverview Park.

d. McKnight Road is a heavily-traveled road, with several shopping centers.

e. It is 4:30 p.m.

Answer the following true/false questions.

1. You should inspect your vehicle once a week, at the end of a shift (False).
2. Loose objects, such as paper cups, newspapers, flashlights, etc. should be removed from the passenger compartment or secured (True).
3. Springs and shock absorbers and part of the suspension system (True).
4. If the gas gauge indicates below 3/4 full, it is a good idea to have the tank filled (True).
5. If you are working a daylight shift, it is not necessary to have a vehicle with a burned-out headlamp serviced (False).
6. When a vehicle tends to wander due to steering problems, it is safe for emergency operation (False).
7. A tire with a bubble by the rim does not have to be replaced as long as the tread-wear indicator is not showing (False).
8. If your lights are dim, the vheicle is safe for emergency operation (False).
9. If the vehicle swerves when you apply the brakes, it could mean that the wheels are not braking evenly (True).

List two key indicators of problem/malfunction for each of the following items:

a. Tires
   --Tread-wear indicator visible
   --Uneven tread wear
   --Breaks, cracks, bubbles in sidewalls
   --Pressure does not meet manufacturer's specifications

b. Steering
   --Wheel turns more than 1/8 turn without response
   --Vehicle wanders

Review Exercises

1. List two advantages of careful route planning.

   Travel time can be cut to a minimum.

   Careful route planning minimizes the amount of "accident exposure."

   The driver can devote his full attention to the driving tasks.

2. List three examples of the kinds of facilities whose location could be essential to route planning.

Schools	High-density work areas
Factories	Hospitals
Shopping centers	Churches
Civic Auditoriums, concert halls	

3. Indicate which of the following statements are true and which are false:

   a. All communications with the dispatcher should be conducted using 10-codes (Depends on local policy).

   b. Communications should be completed before starting a run, if possible (True).

   c. The EV operator should always inform the dispatcher if he will be leaving the vehicle (True).

   d. If a second crew member is present, he should conduct communications (True).

   e. The microphone should always be placed on its clamp by the receiver as soon as communications are ended (False).

4. List the three items of information that must be obtained from the dispatcher before responding to any emergency call.

   Description of emergency.

   Address (location)

   Indication of priority

AMBULANCE DRIVER TRAINING

Lesson Outline

Unit III, Communications and Pre-Driving Procedures

Lesson 1, Communication with Others: Lights and Sirens   Est. Time 1 Hour

****

Description/Purpose:

A review of the legal aspects of the use of lights and siren to communicate with other drivers and a statement of their effectiveness in warning other drivers of the emergency vehicle's approach.

Topical Outline:

Use of Lights and Siren

Legal Aspects

Lights Usage

Siren Usage

Objectives:

To acquaint students with specific laws governing lights and siren usage in their respective states.

To acquaint students with the proper use of emergency lights.

To acquaint students with the proper use of siren.

To present situations which limit the effectiveness of emergency lights and/or siren.

References:

Student Handout Material:

[x] attached

Reproducible handout for students: Summary of Warning Effectiveness Distances for Representative Situations

Teaching Aids:

Summary of warning effectiveness distances for representative situations.

Source	Urban Situation[1]	
	Straight Ahead Distance Between Vehicles	Crossroads Distance Between Vehicles Developed Along Road
Electronic Wail ...	123 ft	39 ft
Electronic Yelp ...	120 ft	38 ft
Electronic Hi-Lo..	81 ft	26 ft
Mechanical Wail ..	146 ft	40 ft

	Suburban Situation[2]	
	Straight Ahead Distance Between Vehicles	Crossroads Distance to Corner
Electronic Wail ...	440 ft	>106 ft *
Electronic Yelp ...	426 ft	>106 ft *
Electronic Hi-Lo..	257 ft	78 ft
Mechanical Wail ..	445 ft	>106 ft *

*Detected as vehicles emerge from behind assumed barrier.

	Rural Situation[3]	
	Straight Ahead Distance Between Vehicles	Crossroads Distance to Corner
Electronic Wail ...	33 ft	14 ft
Electronic Yelp ...	32 ft	12 ft
Electronic Hi-Lo..	24 ft	<12 ft
Mechanical Wail ..	33 ft	<12 ft

[1]Urban Traffic — Window Open — No Radio.
[2]30 MPH — Window Open — No Radio.
[3]55 MPH — Window Closed — Radio On.

Instructor's Notes for Lesson Content

USE OF LIGHTS AND SIREN

Legal Aspects

A. Lights and sirens are used to inform traffic of an EV's presence, and thus aid in clearing a path for the EV.

--Due regard must always be exercised, even in the most serious of emergencies.

B. Most state laws require the EV to use emergency signaling equipment whenever any of the exemptions are exercised.

--Tell the students exactly what the laws in this state say. Be sure to point out:

--This does not mean that every time there is an emergency, signaling equipment must be used.

--Whenever there is an emergency, if exemptions are not being exercised, use of signaling equipment is at the operator's discretion.

--For instance, all signaling equipment would not be required if an ambulance were transporting a patient to a medical facility if the ambulance were traveling below the speed limit and obeying all traffic laws. Patients having a heart attack should not be transported with siren operating.

--If traffic were moving slowly the operator might elect to use emergency signaling equipment.

C. Use of signaling equipment doesn't quarantee operator safety, nor does it free him from the possibility of civil or criminal liability if a mishap does occur.

Lights

A. Particular type and configuration of emergency lights is set by law and local policy.

--Review the locally applicable, specific light arrangements and policy for use of various configurations of emergency lights.

B. Operating Procedures

--Review operating procedures; controls, options, etc.

C. Some limitations on emergency light usage.

1. Low sun or glare can greatly reduce effectiveness.
2. At night red beacons can be confused with traffic lights and neons.
3. Lights on high EVs may pass over motorists if EV is close to rear of vehicle ahead.

Sirens

A. Particular type and siren options are set by law and local policy.

--Review the capabilities of the specific type of siren the students will use.

B. Operating procedures

--Review operating procedures; controls, options, etc.

C. Limitations on Siren Usage

1. Usually siren sound travels forward from the vehicle in a cone shape.

   a. The higher the frequency, the narrrower the cone.

b. The higher the frequency, the greater the distance the siren can be heard.

c. The physical parameters that establish the effectiveness of sirens are: sound level and spectral content, directivity, propagation losses, vehicle insertion loss, and vehicle background noise level.

--Explain these terms:

--Vehicle insertion loss is the difference in sound level observed at the driver's position in a vehicle from that observed at the same location outside the vehicle, for the same external noise source.

--Explain the implications:

--High-frequency siren is better for alerting motorists at some distance ahead.

--A study has shown that existing sirens are effective only to vehicles traveling in the same direction ahead of the emergency vehicle, or to vehicles weaving slowly through stationary traffic or pedestrians.

--The mode of operation of the siren is not relevant to detection.

2. Sirens do not travel around buildings or corners very well.

--Turn off siren at intersections.

3. At high speeds it is possible to "out run" the siren.

--This means than vehicles in front of EV won't hear the siren before EV reaches them.

4. Even at fairly close range, the siren may not be heart by a motorist with windows up, radio, and air conditioner on.

Student Handout

SUMMARY OF WARNING EFFECTIVENESS DISTANCES FOR REPRESENTATIVE SITUATIONS *

URBAN SITUATION[1]

Source	Straight Ahead Distance Between Vehicles	Crossroads Distance Between Vehicles Developed Along Road
Electronic Wail	123 ft (37m)	39 ft (12m)
Electronic Yelp	120 ft (37m)	38 ft (12m)
Electronic Hi-Lo	81 ft (25m)	26 ft (8m)
Mechanical Wail	146 ft (44m)	40 ft (12m)

SUBURBAN SITUATION[2]

Source	Straight Ahead Distance Between Vehicles	Crossroads Distance to Corner
Electronic Wail	440 ft (134m)	>106 ft (32m)*
Electronic Yelp	426 ft (130m)	>106 ft (32m)*
Electronic Hi-Lo	257 ft (78m)	78 ft (24m)
Mechanical Wail	445 ft (136m)	>106 ft (32m)*

*Detected as vehicles emerge from behind assumed barrier.

RURAL SITUATION[3]

Source	Straight Ahead Distance Between Vehicles	Crossroads Distance to Corner
Electronic Wail	33 ft (10m)	14 ft (4.3m)
Electronic Yelp	32 ft (9.7m)	12 ft (3.5m)
Electronic Hi-Lo	24 ft (7.3m)	<12 ft (3.6m)
Mechanical Wail	33 ft (10m)	<12 ft (3.6m)

[1] Urban Traffic - Window Open - No Radio.

[2] 30 MPH - Window Open - No Radio.

[3] 55 MPH - Window Closed - Radio On.

*"Effectiveness of Audible Warning Devices on Emergency Vehicles" R.C. Potter, et al., U.S. Department of Transportation, Washington, D.C. Available through: NTIS, Springfield, Virginia 22161, Report no. DOT-TS-OST-77-38.

AMBULANCE DRIVER TRAINING

Lesson Outline

Unit III, Communications and Pre-Driving Procedures

Lesson 2, Radio Communications Est. Time 3/4 Hour

****

Description/Purpose:

Methods and procedures for effective use of the radio in communicating with the vehicle's base and other agencies.

Topical Outline:

- Introduction
  - In-vehicle communications equipment
  - Standard codes
  - General Techniques
- Routine Communications
- Mission-Related Communications

Objectives:

To present the students with the information they need to perperly utilize their vehicle's communications equipment.

To give the students practice in utilizing their equipment.

To present simulated situations designed to test the students' understanding.

References:

Student Handout Material:

[x] attached

Official list of 10-codes

Teaching Aids:

List of any applicable priority codes

Three pre-prepared "emergency situation" transmissions

Practice

--Describe the conditions listed below to the class.

--Ask one of the students to explain why that condition should (or should not) be reported to the dispatcher.

--Broken traffic light at major intersection.

--Disabled vehicle blocking traffic.

--A new detour.

--Section of missing guard rail on freeway.

Mission-Related Communications

A. The three items that must be obtained for every call:

1. Description of emergency.
2. Address (location) and other identifiers.
3. Indication of priority.

--If priority codes are used locally, this is the appropriate place to present them to the class. If students will be using priority codes and communications codes, make sure they have a clear understanding of the difference between the types of codes.

B. Other information that might be obtained (depending on type of call):

1. Roadway blocked?
2. Other EVs on the way or on scene?
3. Hazardous materials (e.g., gasoline spillage)?

--Items 2 and 3 can have bearing on route planning and parking for any emergency.

--For example, if gasoline spillage were involved, it might be wise to approach from the direction that represented the least risk of danger.

Practice

--Select a student and "transmit" one of the messages you prepared earlier. Allow the student to solicit additional information.

Instructor's Notes for Lesson Content

REPORTING EMERGENCY VEHICLE OPERATIONS

Introduction

Routine- and mission-related communications.

A. In-vehicle communications equipment to communicate with dispatcher.

B. Standard codes (e.g., 10-codes) that speed up communications.

--Ask the students to look at the example listing of communications codes (Figure I-3); the listing of 10-codes is meant as an example only.

--If it is necessary for you to teach the students any codes relevant to their service, this is the appropriate time to do so.

C. General techniques for all communications:

--The goal of good communications is to communicate all necessary information with minimal disruption of the driving tasks.

1. Be brief and concise.
2. Use codes, if appropriate.
3. Weigh urgency of communicating against difficulty of driving--don't compromise safety.
4. Drop mike into lap to avoid tangling.
5. Have partner conduct communications (if possible).
6. Finish communications before starting run (if possible).

Routine Communications

A. Operator must inform dispatcher before leaving the vehicle.
   1. It provides protection for the operator.
   2. It saves time--the dispatcher will not waste time trying to make contact.

B. Report arrival at destination. Provides opportunity to:

1. Ask dispatcher to alert other organizations needed (e.g., hospital, highway maintenance).
2. Receive information that might alter route or next destination.
3. Tell the dispatcher you will be away from vehicle.

C. Report any major condition likely to cause disruption to emergency service or ones other EVs probably don't know about.

--Be sure to point out any of the three items of information the student forgot to obtain, and the reason why that information is important.

--Repeat for all of the "transmissions" you prepared.

Message 1:
Prepared by Instructor.

Message 2:
Prepared by Instructor.

Message 3:
Prepared by Instructor.

AMBULANCE DRIVER TRAINING

Lesson Outline

Unit III, Communications and Pre-Driving Procedures

Lesson 3, In-Vehicle Communication Est. Time 1/4 Hour

****

Description/Purpose:

Methods of communication within the vehicle concerning the condition of the patient so that the proper driving mode can be intelligently selected. This is also a continuation of the discussion of a "true emergency."

Topical Outline:

Purpose of in-vehicle communications

Methods

Objectives:

To present the concept and purpose of in-vehicle communications.

To discuss proper methods of in-vehicle communications.

References:

Student Handout Material:

Teaching Aids:

Instructor's Notes for Lesson Content

--Purpose of In-Vehicle Communications

--Inform the driver of the condition of the patient so that the driver can take appropriate action in (1) changing the mode of transport, i.e., emergency, non-emergency; (2) selecting routes; (3) altering speed and driving style to accomodate needs of patient.

--Advise attendants of road conditions likely to affect patient.

--Conduct communications privately.

Methods

--Voice - (1) use of ordinary words
(2) coded messages

--Lights - Red - condition critical
Yellow - condition unstable
Green - condition stable

--Other symbols or systems

NOTES:

(1) If the condition of the patient changes, the driver can either select an emergency or non-emergency mode of driving, depending upon the change in condition of the patient.

(2) The driver can warn the atteddants of changes in road conditions likely to affect the patient, i.e., potholds, railroad tracks, etc.

(3) If it is desirable or necessary, patient conditions can be discussed without alarming others (patients, relatives, etc.).

AMBULANCE DRIVER TRAINING

Lesson Outline

Unit III , Communications and Pre-Driving Procedures

Lesson 4 , Route Selection Est. Time 1 Hour

****

Description/Purpose:

A discussion of route planning and selection, arrival at the scene and long-distance travel planning.

Topical Outline:

- Route planning
- Selecting routes
  - Advantages of preselection
    - Preselection factors
- Summary
- Practice

Objectives:

To familiarize students with how to plan a route.

To acquaint the students with the advantages of route preselection

To provide practice in route selection

References:

Student Handout Material:

Appropriate Maps

Teaching Aids:

Transparency

Overhead Projector

Appropriate Maps

Instructor's Notes for Lesson Content

ROUTE PLANNING

A. For ambulances operating from a fixed base, it is particularly important to plan in advance the various routes the ambulance is likely to travel. Advance planning usually takes the form of a "Routing Plan."

1. Divide the area into sections.
2. Be based on test runs over selected routes at various times of day and night.

   --Test runs should be made in a passenger car (if possible). If an ambulance is used, NEVER use emergency signaling equipment; it is ILLEGAL.

   --Pinpoint times of heavy traffic congestion.

   --Locate less congested, alternate routes.

3. Be updated at regular intervals.
   --Reroutings are sometimes necessary due to construction, detours, etc.

B. Drivers should always inform the dispatcher of any new conditions about the area (e.g., detours). This information can also be put in a trip report.

SELECTING ROUTES

Advantages of Preselection

A. Travel time cut to minimum.
B. Minimizes amount of "accident exposure."
C. Driver can devote full attention to driving.

Factors to be Considered

Four factors:

A. Location of Facilities (and their entrances and exits).

--Have students assist in developing the list of facilities. Make sure that at least the following are included:

--Schools

--Factories

--Shopping centers

--Large apartment complexes

--High-density work areas (industrial parks, downtown work areas)

--Hospitals

--Churches

--Civic auditoriums, concert halls, stadiums, etc.

B. Events Affecting Traffic Flow

--Have students assist in developing the list of events. Make sure that at least the following are included:

--Beginning and end of normal work day.

--Shift-change times for large factories, hospitals, etc.

--Beginning and end of normal school day.

--Special events. This category is not as predictable as the others. An EV operator must make a special effort to keep informed of special events.

--Ask the students to think of some ways to keep informaed to special events. Make sure at least the following are included:

--Departmental bulletins.

--Newspaper, other media

--School calendars.

C. Characteristics of Local Roads and Streets

1. Maps are essential to "new" EV operators or those who have been transferred to a new location.

--Ask the students to think of the kinds of information likely to be found on detailed area maps. Make sure at least the following are included:

--Road size (number of lanes).

--Divided roads.

--Limited-access roads.

--Large facilities (e.g., hospitals).

2. Useful information not on maps can be added (penciled in).

--Areas with a high incidence of accidents.

--Very steep grades.

--Roads or lanes on roads that change direction according to the traffic flow or time of day.

D. Road Conditions. Operator must keep informed; condition can be noted on maps.

--Damaged roads (potholes, badly rutted).

--Detours or closed roads.

--Roads or sections of roads that are difficult to travel in bad weather.

--Accumulated water areas.

--Speed breakers (dips or bumps).

Summary

Advantages:

A. Travel or transport time minimized.

B. "Accident exposure" minimized.

C. Driver can devote full attention to driving.

Practice

--Pass out copies of the map and list of conditions you prepared.

--Use the projector to show the transparency you prepared earlier.

--Select a student to describe a good route to the destination. Use the student's route selection as the basis for discussion. If there is disagreement about the chosen route, allow other students to present their viewpoints.

--Present these conclusions:

--In many cases there is no "single best route."

--The shortest route (in terms of miles) may not be the fastest route (in terms of time).

--Familiarity with the area is a tremendous advantage in selecting routes.

AMBULANCE DRIVER TRAINING

Lesson Outline

Unit III , Communications and Pre-Driving Procedures

Lesson 5 , Vehicle Inspection Est. Time 1 Hour

****

Description/Purpose:

An explanation of the basic workings of the ambulance, guidelines for vehicle inspection, identification of malfunctions, and driver responsibility for emergency vehicle maintenance.

Topical Outline:

- Introduction
  - Operator responsibilities
- Major Vehicle Components
- Physical and Visual Inspection
  - Overall inspection
  - Emergency medical equipment inspection
- Vehicle Maintenance
  - Key indicator chart

Objectives:

Students will be able to correctly identify proper procedures for vehicle inspection and maintenance.

Students will be able to identify individual components, and list two signs that signify component malfunction.

Students will successfully perform a peroper inspection of their vehicles.

References:

Student Handout Material:

(x) attached

-Engine Components Diagram	-Ambulance Equipment Checklist
-Inspection Checklist	-Key Indicator Chart

Teaching Aids:

Overhead Projector

Transparency:

Instructor's Copy of Key Indicator Chart

Instructor's Notes for Lesson Content

VEHICLE INSPECTION--THE OPERATOR'S RESPONSIBILITY

Introduction

A. Many accidents could be prevented by a five-minute physical and visual inspection.

B. Responsibility for the mechanical safety of the vehicle rests with the operator.

--Tell the students what their responsibilities are:

--Inspect vehicle every day (preferably at the beginning of shift).

--Ensure that maintenance/repair will be performed.

--Recheck the vehicle after maintenance.

--Determine if and when EV is unsafe (or potentially unsafe) for emergency operation.

Major Components of a Vehicle

Basic understanding of how vehicle components work will help operator perform the inspection.

--Your Vehicle Components Chart appears on the next page. Have the students refer to their Vehicle Components Chart. Explain each system of components to the students.

VEHICLE COMPONENTS

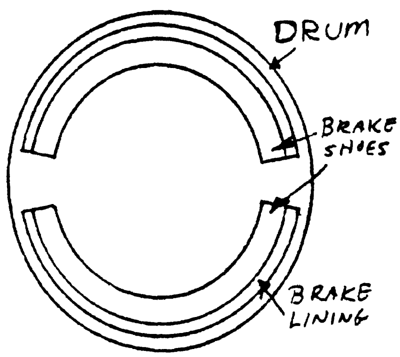
BRAKING SYSTEM

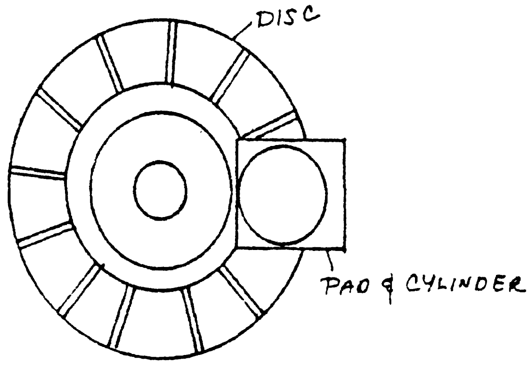
Drum Brakes

Pressure on brake pedal causes fluid or air to flow into brake cylinder. Cylinder moves brake shoe outward against brake drum (inner surface of metal wheel). This pressure of shoe against drum causes wheel to slow and stop.

Disc Brakes

A disc brake consists of a rotor and caliper assembly. The rotor is the disc. It is attached to the wheel axle. When the brake pedal is depressed, a hydraulic piston in the caliper causes the caliper to squeeze together, bringing a pair of brake shoes into contact with the rotor. The friction of the opposing brake pads as they squeeze the rotor slows the rotor rotation and causes the wheel to slow and stop.





VEHICLE COMPONENTS (Continued)

ENGINE (gasoline)

Carburetor
Combustion Chambers
Pistons
Crankshaft
Camshaft

Takes fuel in gas tank, mixes it with air in carburetor. Mixture is fed into combustion chamber where it is ignited by spark plugs. The exploding mixture causes pistons to move. The motion of the pistons causes the crankshaft to turn. The rotating crankshaft connects the final power from the engine to the transmission. The power is then carried to the driveshaft, the differential, the rear axles, and the rear wheels.

ENGINE (diesel)

Combustion Chambers
Pistons
Crankshaft

High compression of air charge in cylinder creates great heat. Fuel charge is injected into cylinder and is ignited by hot air. The exploding misture causes pistons to move. The motion of the pistons causes crankshaft to turn.

TRANSMISSION AND DRIVE-SHAFT

A system of gears which allows you to change the ratio of number of engine revolutions to number of wheel revolutions. For example, in low gear, the engine might turn 100 times for one wheel turn. In a higher gear, the engine might turn ten times for one wheel turn. The driveshaft connects the transmission to the rear wheels, making them turn.

CLUTCH PEDAL

When depressed, disconnects engine from transmission so you can change transmission gears.

STEERING ASSEMBLY

Steering wheel and column connects to gears and linkage mechanism which changes direction of front wheels.

ELECTRICAL SYSTEM

Generator

Alternator

Battery

Supplies power for primary and auxiliary functions.

Primary Functions:

- Power generation and storage (battery, generator/alternator, and voltage regulator).
- Power distribution (engine wiring).
- Timing (distributor).
- Spark generation (spark plugs and coil).

Auxiliary Functions:

- Inside/outside lighting (headlights, amber/red/blue signal or warning lights, turn signals, instrument panel lights, etc.).
- Air/heat circulation (heater, defroster, blowers).
- Horn, siren, PA system.

SUSPENSION

Springs, shock absorbers, wheels, and tires which enable the driver to handle the vehicle properly on rough terrain and sharp curves, etc.

THE PHYSICAL AND VISUAL INSPECTION

A. Inspection uses a simple checklist; takes a few minutes. Operator should:

1. Inspect vehicle when engine is cold.

   --for accurate readings (e.g., tire pressure) and to avoid burns.

2. Inspect when interruptions are unlikely.

--Ask students to look at the Inspection Checklist.

B. Checklist

--Explain the purpose of the five "events."

--Approach Vehicle. This event is visual, conducted while the operator is walking towards the vehicle. Purpose: Check vehicle attitude, body damage.

--Circle vehicle. Purpose: Check all exterior vehicle equipment.

--Under Hood. Purpose: Check fluid levels, belts, hoses, etc. Visual check for leaks or seepage.

(Present transparency)

--For further clarification of the under hood part of the inspection, discuss transparency.

--Enter Vehicle. Purpose: Check all interior equipment including control switches, gauges, indicator lights, mirror, safety equipment, etc.

--Vehicle in Motion. Purpose: Check all equipment and functions that cannot be checked in a stationary vehicle (e.g., brakes, steering).

MEDICAL EQUIPMENT INSPECTION

Additionally, the driver or an attendant should inspect the vehicle's medical supplies and life-support equipment daily.

--Checklist should be used to ensure that equipment is inspected.

--If you have access to a medical supply and life-support equipment checklist that the students will use on the job, substitute it for the one handed out to students.

MAINTENANCE OF THE EMERGENCY VEHICLE

A. Operator safety is dependent on vehicle condition. Well maintained vehicles have fewer malfunctions; are easier to control.

Part of the operator's job is to:

1. Perform minor maintenance.

--Operator responsibility in this area varies greatly, depending on locale, size of department, etc. As specifically as possible, tell the students what kinds of maintenance they are expected to perform themselves (if any).

2. Schedule maintenance, or notify those responsible for scheduling maintenance.
3. Recheck vehicle after maintenance/repair has been performed to verify correction.

--Explain the specific departmental structure for having maintenance performed in the students' locality. Copies of any departmental forms forms regarding maintenance and/or inspection can be presented at this time.

B. No matter who performs maintenance, it is the operator's responsibility to see that it is performed. Three ways to do this:

--Operator schedules maintenance, verifies upon completion.

--Operator reports problem to those responsible for scheduling maintenance, and verifies upon completion of maintenance.

Key Indicator Chart

--The Key Indicator Chart, Figure I-6, begins on the following page. Ask the students to turn to their copy of the chart and follow along as you explain what the column headings mean. Keep in mind that the students' chart does not have the last two columns filled in.

Column headings:

A. "Items." Items correspond directly with the listing on the Inspection Checklist.

B. "Key Indicators." Descriptions or indications of conditions that require corrective maintenance.

C. "Unsafe for Emergency Operation." Malfunction of items checked in this column could make a vehicle unsafe for emergency operation.

D. "Operator Maintenance." Items checked under this heading are those that, according to local or departmental policy, should be corrected by the operator himself.

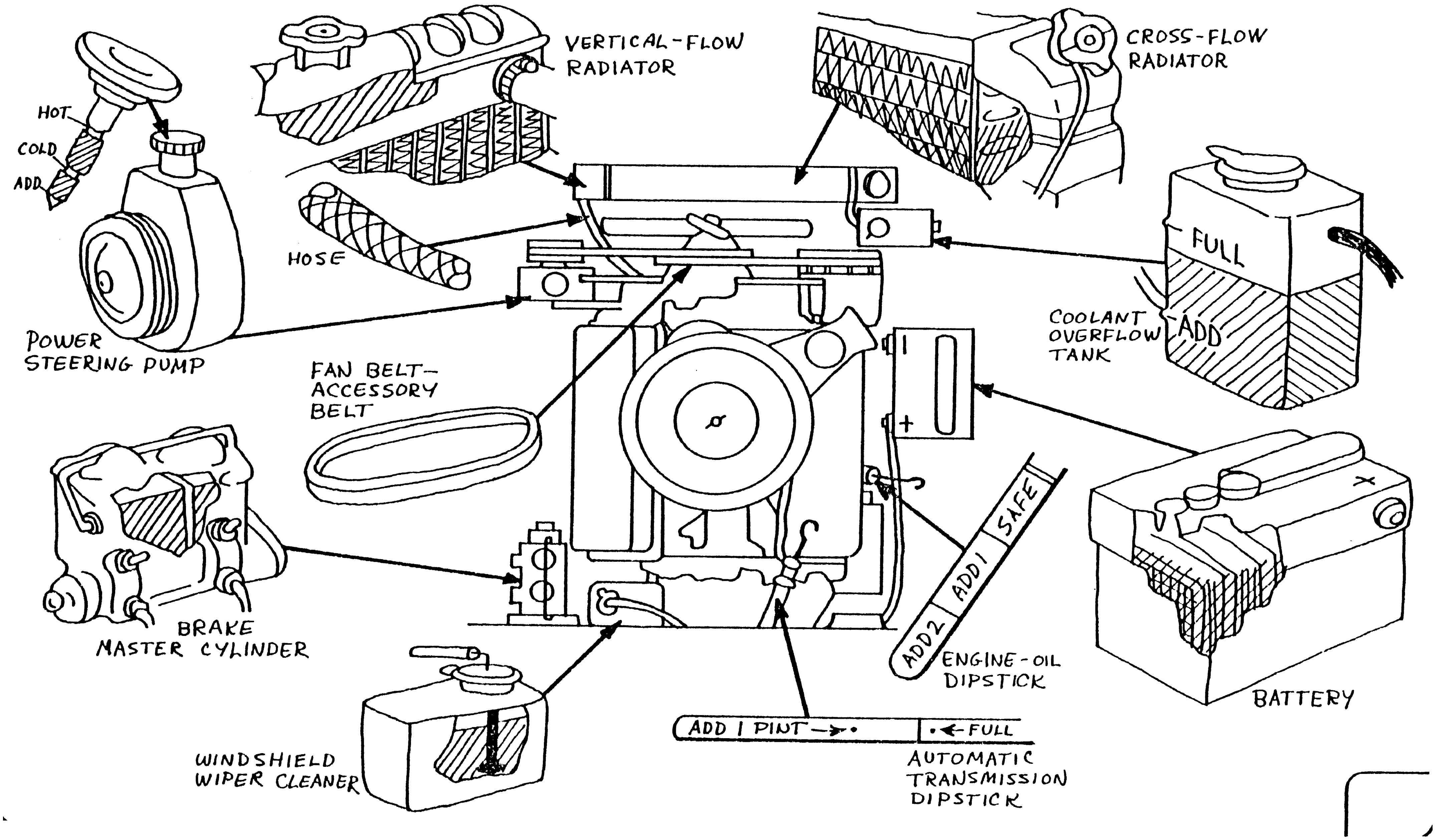
--Go over each key indicator for the students. Tell the students that as you do so, you will tell them which items should be checked in the last two columns.

ITEM	KEY INDICATOR	UNSAFE FOR EMERGENCY OPERATION	OPERATOR MAINTENANCE
APPROACH VEHICLE			
<u>Attitude</u>			
-Springs, torsion bars, tires	Vehicle tilts, sags to one side, slants.	■	□
<u>Body</u>	Dents or other damage.	□	□
	Oil on quarter panel.	□	□
CIRCLE VEHICLE			
<u>Lights</u>			
-Emergency lights	Light does not go on; dirty lenses; cracked lenses;	■	□
-Head, parking, brake, back-up	lights noticeably dim.	■	□
<u>Tires</u>			
-Tread	Tread-wear indicator visible, uneven tread wear.	■	□
-Sidewalls	Breaks, cracks, bubbles.	■	□
-Pressure	Does not meet <u>vehicle manufacturer's</u> specifications.	■	□
<u>Wheels</u>	Cracked, bent rim, loose lug nuts.	■	□
<u>Doors</u>	Do not close squarely or totally.	□	□
UNDER HOOD			
<u>Fluid Levels</u>			
-Radiator	Fluid not visible in radiator.	□	□
-Oil	More than one quart low.	■	□
-Windshield washer	Less than half full.	□	□
-Hydraulic	Below add mark.	■	□
-Battery	Water not visible in cells.	□	□
-Power Steering	Below add mark.	■	□
-Automatic Transmission	Below add mark.	□	□
<u>Engine Block</u>	Check for evidence of oil or other fluid leak.	□	□
<u>Hoses</u>	Cracked, loose connections.	□	□
<u>Belts</u>	Cracked; loose: depresses more than one inch at center; tight: glazed surface.	□	□

INSTRUCTOR COPY - KEY INDICATOR CHART

ITEM	KEY INDICATOR	UNSAFE FOR EMERGENCY OPERATION	OPERATOR MAINTENANCE
ENTER VEHICLE			
Cleanliness	Dirt or loose objects.	■	□
Seat Belt	Not bolted to floor; badly frayed; will not adjust properly or pull out fully.	■	□
Gauge and Display Indicators			
-Gas	Low (below 3/4).	□	□
-Oil Pressure	Low indication.	■	□
-Alternator/ammeter	Charging excessively; discharging; light on.	■	□
-Brake	Warning light on; skid control unit malfunction.	■	□
-Temperature	Warning light on; rises into danger zone.	■	□
-Air Pressure	Does not indicate proper pressure.	■	□
Turn Signals	Fast blinker; no blinker.	□	□
Windshield Wipers	Do not make contact with windshield; do not clear windshield properly.	□	□
Windshield Washers	Fluid does not come out; fluid does not come out with sufficient pressure; improperly aimed.	□	□
Communications Equipment	Cannot send or receive; channel drifts out.	■	□
Mirrors	Missing; will not hold adjustment.	■	□
Siren	Not audible.	■	□
Seat Adjustment	Will not lock into place.	■	□
PA System	Does not work; distorts.	□	□
Interior Lights	Do not light.	□	□
Cleanliness of Windows			
Engine	Will not start; stalls.	■	□
VEHICLE IN MOTION			
Steering	Wheel turns more than 1/8 turn without response; vehicle wanders; unusual noise; jerky on turn.	■	□
Brakes	Grab; pull to left or right; spongey; squealing.	■	□
Suspension	Unusual noise; too bouncy, not stable; noticeable vibration.	■	□
Acceleration	Rough, uneven, hesitates; cuts out.	■	□

INSTRUCTOR COPY - KEY INDICATOR CHART



ENGINE COMPONENT DIAGRAM

EMERGENCY VEHICLE INSPECTION CHECKLIST

Name:______________________ Date:__________ Time:________

Vehicle Identification No.:____________ Location:______________

		OK	FIX		OK	FIX
APPROACH VEHICLE	Vehicle Attitude	☐	☐	Body Damage	☐	☐
	Remarks: ____________________					
CIRCLE VEHICLE	Headlights	☐	☐	Beacon	☐	☐
	Running Lights	☐	☐	Flood	☐	☐
	Brake Lights	☐	☐	Body	☐	☐
	Four-Way Flasher	☐	☐	Wheels	☐	☐
	Tires	☐	☐	Windshield	☐	☐
	Doors	☐	☐			
	Remarks: ____________________					
UNDER HOOD	Hoses	☐	☐	Belts	☐	☐
Fluids:	*Radiator	☐	☐	Oil	☐	☐
	Windshield	☐	☐	Hydraulic	☐	☐
	Battery	☐	☐	Steering/Brake	☐	☐
	Remarks: ____________________					
ENTER VEHICLE	Cleanliness	☐	☐	Interior Lights	☐	☐
	Gas Gauge	☐	☐	Seat Belt	☐	☐
	Alternator	☐	☐	Brake Indicator	☐	☐
	Temperature	☐	☐	Air Pressure	☐	☐
	Windshield Wipers	☐	☐	Turn Signals	☐	☐
	Inner Mirrors	☐	☐	Communications	☐	☐
	Outer Mirrors	☐	☐	Siren/Audibles	☐	☐
	Oil Pressure	☐	☐	PA System	☐	☐
	Seat Adjustment	☐	☐			
	Remarks: ____________________					
VEHICLE IN MOTION	Steering/Smoothness	☐	☐	Brakes	☐	☐
	Unusual Noises	☐	☐	Suspension	☐	☐
	Remarks: ____________________					

*Radiator must be cool to avoid injury and to make accurate inspection.

EQUIPMENT CHECKLIST

Medical	OK	LOW	REPLACED
Pillows			
Blanks & Sheets			
Portable suction apparatus			
Bag-mask ventilation unit			
a. Adult mask			
b. Child mask			
C. Infant mask			
Oropharyngeal airways			
a. Adult			
b. Child			
c. Infant			
Mouth to mouth airways			
a. Adult			
b. Child			
Oxygen equipment, tubing & masks			
a. Adult			
b. Child			
c. Infant			
Mouth gags and tongue blades			
Universal dressings			
Sterile gauze pads			

	OK	LOW	REPLACED
Soft roller self-adhering bandages			
Aluminum foil, sterile & wrapped			
Adhesive tape			
Burn sheets			
Traction splint, limb-support slings, ankle hitch and traction strap			
Inflatable splints			
Spine boards with accessories			
a. Short			
b. Long			
Triangular bandages			
Large-size safety pins			
Shears for bandages			
Sterile obstetrical kit			
Poison kit			
Blood pressure manometer, cuff, and stethoscope			
Compartmentalized pneumatic trousers with inflation equipment			

Other	OK	LOW	REPLACED
Fire extinguishing equipment			
Two-way radio for direct hospital communication			
Warning devices			
-triangular reflectors			
-battery operated flares			
Telementry equipment			
Extrication equipment			
Wrench			
Screwdriver			
Screwdriver - Phillips			
Hacksaw - (carbide) blades			
Pliers			
Hammer			

	OK	LOW	REPLACED
Fire Axe			
Wrecking bar			
Crowbar			
Bolt cutter			
Power jack & spreader tool			
Shovel			
Tin snip			
Two 50' manila ropes - 3/4" diameter			
Hard hat			
Safety goggles			
15' Rated chain with grab hook & running hook			

Remarks: ______________________________

Driver: ______________________ Date: ______________

Supervisor: ______________________ Date: ______________

ITEM	KEY INDICATOR	UNSAFE FOR EMERGENCY OPERATION	OPERATOR MAINTENANCE
APPROACH VEHICLE			
Attitude			
-Springs, torsion bars, tires	Vehicle lists, sags to one side, slants.	☐	☐
Body	Dents or other damage.	☐	☐
	Oil on quarter panel.	☐	☐
CIRCLE VEHICLE			
Lights			
-Emergency lights	Light does not go on; dirty lenses; cracked lenses;	☐	☐
-Head, parking, brake, back-up	lights noticeably dim.	☐	☐
Tires			
-Tread	Tread-wear indicator visible, uneven tread wear.	☐	☐
-Sidewalls	Breaks, cracks, bubbles.	☐	☐
-Pressure	Does not meet vehicle manufacturer's specifications.	☐	☐
Wheels	Cracked, bent rim, loose lug nuts.	☐	☐
Doors	Do not close squarely or totally.	☐	☐
UNDER HOOD			
Fluid Levels			
-Radiator	Fluid not visible in radiator.	☐	☐
-Oil	More than one quart low.	☐	☐
-Windshield washer	Less than half full.	☐	☐
-Hydraulic	Below add mark.	☐	☐
-Battery	Water not visible in cells.	☐	☐
-Power Steering	Below add mark.	☐	☐
-Automatic Transmission	Below add mark.	☐	☐
Engine Block	Check for evidence of oil or other fluid leak.	☐	☐
Hoses	Cracked, loose connections.	☐	☐
Belts	Cracked; loose: depresses more than one inch at center; tight: glazed surface.	☐	☐

ITEM	KEY INDICATOR	UNSAFE FOR EMERGENCY OPERATIC	OPERATOR MAINTENANCE
ENTER VEHICLE			
Cleanliness	Dirt or loose objects.	☐	☐
Seat Belt	Not bolted to floor; badly frayed; will not adjust properly or pull out fully.	☐	☐
Gauge and Display Indicators			
-Gas	Low (below 3/4).	☐	☐
-Oil Pressure	Low indication.	☐	☐
-Alternator/ammeter	Charging excessively; discharging; light on.	☐	☐
-Brake	Warning light on; skid control unit malfunction.	☐	☐
-Temperature	Warning light on; rises into danger zone.	☐	☐
-Air Pressure	Does not indicate proper pressure.	☐	☐
Turn Signals	Fast blinker; no blinker.	☐	☐
Windshield Wipers	Do not make contact with windshield; do not clear windshield properly.	☐	☐
Windshield Washers	Fluid does not come out; fluid does not come out with sufficient pressure; improperly aimed.	☐	☐
Communications Equipment	Cannot send or receive; channel drifts out.	☐	☐
Mirrors	Missing; will not hold adjustment.	☐	☐
Siren	Not audible.	☐	☐
Seat Adjustment	Will not lock into place.	☐	☐
PA System	Does not work; distorts.	☐	☐
Interior Lights	Do not light.	☐	☐
Cleanliness of Windows			
Engine	Will not start; stalls.	☐	☐
VEHICLE IN MOTION			
Steering	Wheel turns more than 1/8 turn without response; vehicle wanders; unusual noise; jerky on turn.	☐	☐
Brakes	Grab; pull to left or right; spongey; squealing.	☐	☐
Suspension	Unusual noise; too bouncy, not stable; noticeable vibration.	☐	☐
Acceleration	Rough, uneven, hesitates; cuts out.	☐	☐

AMBULANCE DRIVER TRAINING

Lesson Outline

Unit III, Communications and Pre-Driving Procedures

Lesson 6, Preparing to Drive Est. Time 1 Hour

****

Description/Purpose:

Important procedures affecting driving ease and safety, safety checks and adjustments, and start-up procedures; and pre-motion safety precautions.

Topical Outline:

- Preparing to Drive
  - General Procedures
    - safety checks and adjustments
    - starting procedures
    - precautions before moving

Objectives:

To acquaint students with the criteria for the proper adjustments and usage of their vehicle's seat positions, head restraint, lap belts, shoulder harnesses, and rear view mirrors.

To give the students actual practice in adjusting the above-mentioned vehicle equipment items.

References:

Student Handout Material:

(x) attached

Blind spots in rear-view mirrors.

Teaching Aids:

Overhead projector

Transparency:

Vehicles for "Hands On" Training

Instructor's Notes for Lesson Content

PREPARING TO DRIVE

General Procedures to Increase Driving Ease and Safety

A. Safety checks and adjustments.

B. Appropriate starting procedures.

C. Precautions before moving.

Making Safety Checks and Adjustments

A. Safety belts and shoulder harnesses.

1. Why wear them?

a. Restraints reduce the likelihood of serious injury or death.

--Nine to twelve thousand lives could be saved every year if all drivers conscientiously buckled up.

--Occupants who are thrown from vehicles during collisions have an extremely high fatality rate. Occupants wearing restraints are almost never thrown from the vehicle.

b. Restraints improve operator's ability to control the vehicle.

--Ask the students how properly adjusted restraints can improve vehicle control. Lead them to the following conclusions:

--Restraints keep the driver in position during sharp turns, etc.

--Restraints will keep the driver from being thrown from the vehicle in the event of a collision.

2. Proper adjustment for occupant restraints:

a. Lap belt: snug across lower pelvis--not across stomach.

b. Shoulder harness: loose enough that a fist can fit between harness and chest.

B. Head restraints

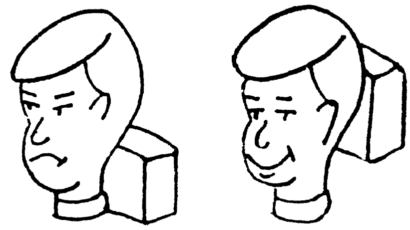
1. Why use them?

a. Help prevent neck and spinal injuries.

b. Help the operator stay in position in a collision.

2. Proper adjustment for head restraints: center of restraint positioned at back of skull--NOT at the base of the neck where it could serve as a fulcrum and snap the neck if the vehicle is struck from the rear.

--If the head restraint is too low, the neck could be broken (when head snaps back) if force of impact is great:



C. Seat position--when properly adjusted:

1. Brake and accelerator can be applied without fully extending the leg.
2. Steering wheel can be held with only a slight bend at the elbows.
3. The seat is fully locked into position.

D. Mirrors. The student handout illustrates the following points:

(Present Transparency)

1. Proper adjustment
   a. Inside, rear-view mirror:
      (1) Entire rear window visible with head in normal driving position.
      (2) Vehicle directly behind EV should be centered in mirror.
   b. Outside, side-view mirror.
      (1) Edge of EV's rear fender and side lanes visible.
      (2) Before a passing vehicle's image leaves rear-view mirror, it would be visible in side-view mirror.
2. Blind spots.

   --In all vehicles the most dangerous blind spots are by the rear quarter panels.

   --In larger vehicles (vans and trucks) there are generally blind spots below the rear window.

START-UP PROCEDURES

--If students will all be driving the same type of EV on the job, go over the starting procedure according to the operator's manual.

--If students will be driving more than one type of vehicle, use the start-up proceudres A-F below. Explain to the students that there may be minor differences between these procedures and the specific ones for their particular vehicle--they should check the operator's manual once on the job.

A. Transmission in "neutral" (:park" on automatic transmissions).

B. Depress clutch if manual transmission.

--This facilitates turning engine over on cold days and keeps the vehicle from lurching forward if not in "neutral."

C. Start engine per manufacturer's recommendations for setting choke/starting aids on hot or cold engine.

D. If engine sputters, or won't start right away, avoid re-engaging starter until engine is completely stopped.

--For diesels and heavy gasoline engines, a variety of starting aids exist. If many students will be operating such vehicles, use operator's manual to explain uses and procedures.

E. Once engine starts, check:

--Charging system.

--Oil pressure.

--Dash indicator lights (out in five seconsds?).

--Gauges (stabilized in satisfactory range?).

F. Release parking brake before attempting to move vehicle.

PRECAUTIONS BEFORE MOVING

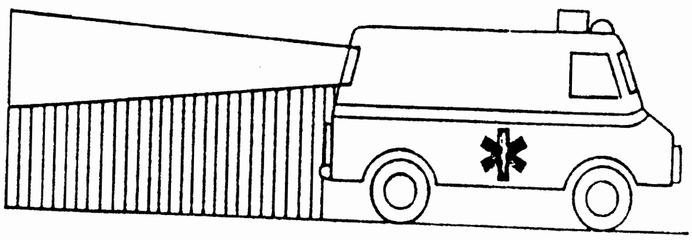
A. Standard, audible signal from last crew member to ensure all are aboard.

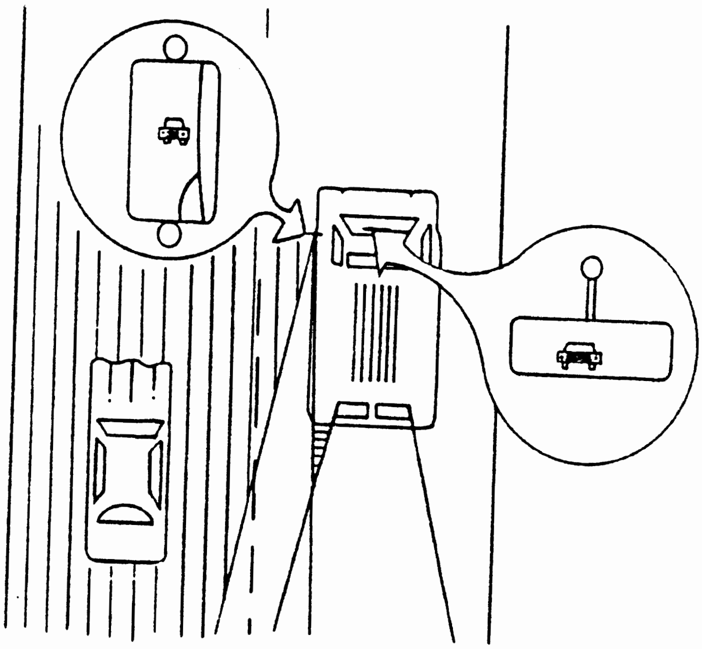
B. Only one other person (besides operator) in front seat or control cab.

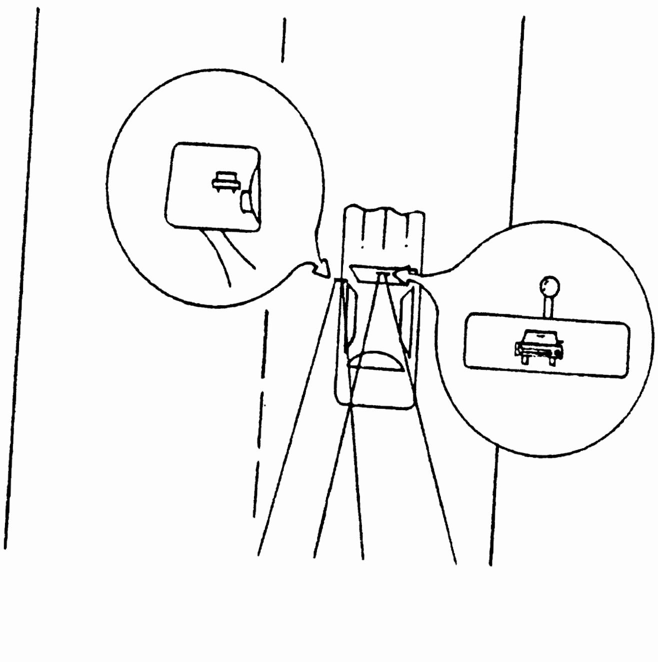
C. Station doors opened, no obstacles in vehicle's path.

--If station doors are set on timers, students should find out what the timing intervals are. Point out the dangers of timed doors.

Blind Spots







REVIEW EXERCISES

1. List two advantages of careful route planning.

   Travel time can be cut to a minimum.

   Careful route planning minimizes the amount of "accident exposure."

   The driver can devote his full attention to the driving tasks.

2. List three examples of the kinds of facilities whose location could be essential to route planning.

   Schools
   Factories
   Shopping Centers
   Civic Auditoriums, Concert halls
   High-density work areas
   Hospitals
   Churches

3. Indicate which of the following statements are true and which are false:

   a. All communications with the dispatcher should be conducted using 10-codes. (Depends on local policy.)

   b. Communications should be completed before starting a run, if possible. (True.)

   c. The EV operator should always inform the dispatcher if he will be leaving the vehicle. (True.)

   d. If a second crew member is present, he should conduct communications. (True.)

   e. The microphone should always be placed on its clamp by the receiver as soon as communications are ended. (False.)

4. List the three items of information that must be obtained from the dispatcher before responding to any emergency call.

   Description of emergency
   Address (location)
   Indication of priority

Answer the following true/false questions:

1. You should inspect your vehicle once a week, at the end of a shift. (False.)
2. Loose objects such as paper cups, newspapers, flashlights, etc. should be removed from the passenger compartment or secured. (False.)

3. Springs and shock absorbers are part of the suspension system. (True.)
4. If the gas gauge indicates below 3/4 full, it is a good idea to have the tank filled. (True.)
5. If you are working a daylight shift, it is not necessary to have a vehicle with a burned-out headlamp serviced. (False.)
6. When a vehicle tends to wander due to steering problems, it is safe for emergency operation. (False.)
7. A tire with a bubble by the rim does not have to be replaced as long as the tread-wear indicator is not showing. (False.)
8. If your lights are dim, the vehicle is safe for emergency operation. (False.)
9. If the vehicle swerves when you apply the brakes, it could mean that the wheels are not braking evenly. (True.)

List two key indicators of problem/malfunction for each of the following items:

a. Tires

--Tread-wear indicator visible
--Uneven tread wear
--Breaks, cracks, bubbles in sidewalls
--Pressure does not meet manufacturer's specifications

b. Steering

--Wheel turns more than 1/8 turn without response
--Vehicle wanders
--Unusual noises
--Jerky on wheel turn

c. Belts

--Cracked, frayed
--Loose, depresses more than one inch at center
--Tight, glazed surface, frayed

d. Seat belt

--Not bolted to floor
--Badly frayed
--Will not hold adjustment
--Will not pull out fully

e. Brakes

--Grab
--Pull to one side
--Spongy
--Squeal, scream

AMBULANCE DRIVER TRAINING
UNIT SUMMARY

Unit IV , Physical Forces and Emergency Vehicle Control

Description:

Laws of physics and roadway characteristics which affect the control and driving of the emergency vehicle.

List of Lessons:

1. Physical Forces
2. Roadway Characteristics

Attachments:

(x) Review Questions

AMBULANCE DRIVER TRAINING

Lesson Outline

Unit IV , Physical Forces and Emergency Vehicle Control

Lesson 1 , Physical Forces -- A Review Est. Time 1 Hour

****

Description/Purpose:

Forces affecting emergency vehicle handling: friction, inertia and momentum, and centrifugal force. Also, a discussion of weight transfer as it relates to speed and directional control.

Topical Outline:

- Introduction
- Major Physical Forces
  - Friction
  - Momemtum and Inertia
  - Centrifugal Force
- Weight Transfer

Objectives:

Students will:

--Demonstrate their knowledge of the concepts of velocity, centrifugal force, inertia, and friction.

--Demonstrate their knowledge of how acceleration, deceleration, and turning affect vehicle weight distribution.

--Will be fully acquainted with the causes of and countermeasures for brake fade.

References:

Student Handout Material:

(x) attached

Examples of resistance to motions in vehicles/coefficients of friction of various roadway surfaces.

Teaching Aids:

Copy of handout.

Instructor's Notes for Lesson Content

INTRODUCTION

A. While driving, operator can control velocity and direction only.

1. Velocity control is control of the EV's rate of motion or speed.

--Acceleration, deceleration, braking.

2. Directional control is the control of the direction the EV will travel.

--Steering, turning, "tracking" curves in the road.

B. Several physical forces influence the amount of control the operator has. If the limits created by the physical force are not exceeded, the operator can fully control both the EV's velocity and direction. If they are exceeded, control will be lost.

--Have the students think of examples where the operator could exceed their limits and lose control.

--Driving too fast for weather, road, or tire conditions.

--Accelerating too hard.

--Braking inappropriately.

--Changing direction too abruptly.

--Tracking a curve at too high a speed.

C. The key for EV operators is to know the conditions under which these limits are reached and, thus, when ability to control the vehicle will be lost.

MAJOR PHYSICAL FORCES

The most important physical forces for EV control are friction, momentum and inertia, and centrifugal force.

Friction

A. What is friction?

1. Friction is the resistance to slipping.

2. Friction occurs whenever two surfaces "rub" together.

B. Friction occurs throughout the EV.

--Have students think of examples.

--Operator's hands and the steering wheel.

--Engine parts rubbing together.

--Gears meshing.

--Tires and the road surface.

--Brake shoes or pads rubbing on drum or disc.

--Point out that without friction, vehicle control would be impossible. Friction enables the EV to stop, accelerate, and change direction.

C. For vehicle control, the most important areas of friction are:

1. Between tires and road.
2. Between the brakes and the wheels.

D. Friction between the tires and the road.

1. If there were no friction between the tires and the road, the EV would slide all over the place. Vehicle control would be impossible.

2. The amount of friction between the tires and road depends on many things, some of which the EV operator can control.

   a. Tire size, tread, type, inflation, etc.

      --Best to follow vehicle manufacturers' specifications here.

   b. Amount of rolling the tires do. Friction is:

      (1) <u>Greatest</u>--when the wheels and vehicles are stationary.

      (2) <u>Very Good</u>--when the wheel is rolling on a dry, smooth road surface.

      (3) <u>Least</u>--when the wheel is locked <u>or</u> spinning.

E. Friction at the brakes

1. The shoes pressing on the drums (or the pads clamping the disc) create friction and slow the wheel.

2. The friction at the brake surfaces generates heat.

   --Like rubbing sticks together to make a fire.

   --Rubbing your hands together to warm them up.

3. As heat increases, braking ability goes down.

4. Brake fade is one of the worst consequences of heat due to excessive, hard braking.

   a. When sustained (hard) braking heats up the brakes sufficiently, the pedal-force requirements go up dramatically. In extreme cases, during hard application of brakes, the brakes may suddenly "disappear." The vehicle will continue forward as if no brakes were being applied. At best it's a scary situation, at worst it's deadly.

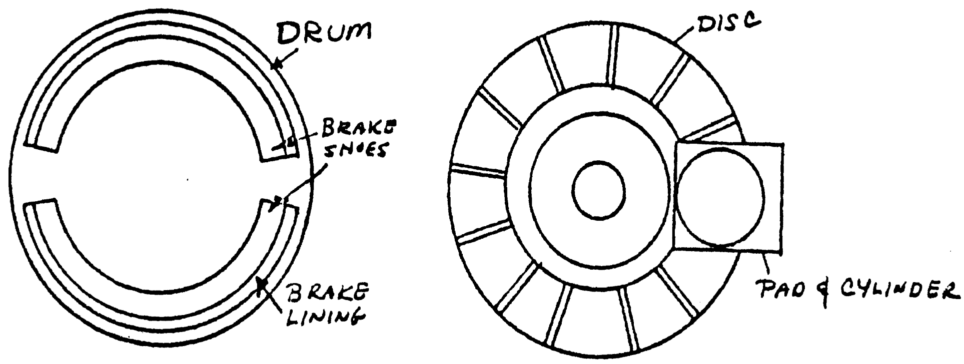
   b. Brake fade can occur in a variety of ways. In all cases, however, the cause is excessive heat.

      --If the heat reaches 700°F or more, the bonding material of the brake lining melts and acts like a lubricant.

      --For some brake lining materials a gas is generated under high heat conditions. The gas can also act as a lubricant.

      --If the brake fluid becomes too hot it will expand and reduce braking effectiveness.

      --When the brake lining materials are more than one-half gone, the metal frame holding the lining material heats excessively and transfers the heat to the fluid.



      (1) DRUM BRAKES--almost 90 percent of the total drum surface is in contact with the brake shoe at one time. Thus, only about 10 percent of the surface can be cooling off at one time. The brake drums can heat up and expand to the point where it is impossible for the shoes to make good contact with the drums.

      (2) DISC BRAKES--since the pad makes contact with only about 15 percent of the disc surface, about 85 percent of the disc surface is cooling. Disc brake design

--The biggest cause of brake fade in disc brakes is worn pads which allow heat to transfer to the hydraulic fluid. Disc pads that are 50 percent worn have a 300 percent greater chance of causing fade.

--In extreme cases, the heat can cause the disc to warp, leading to uneven braking.

F. Velocity Control and Friction

1. Accelerating

   a. Spinning the wheels reduces friction. Acceleration is slowed.

   b. Spinning the wheels smooths the tires. The friction between the tires and road surface will be less in the future.

2. Braking

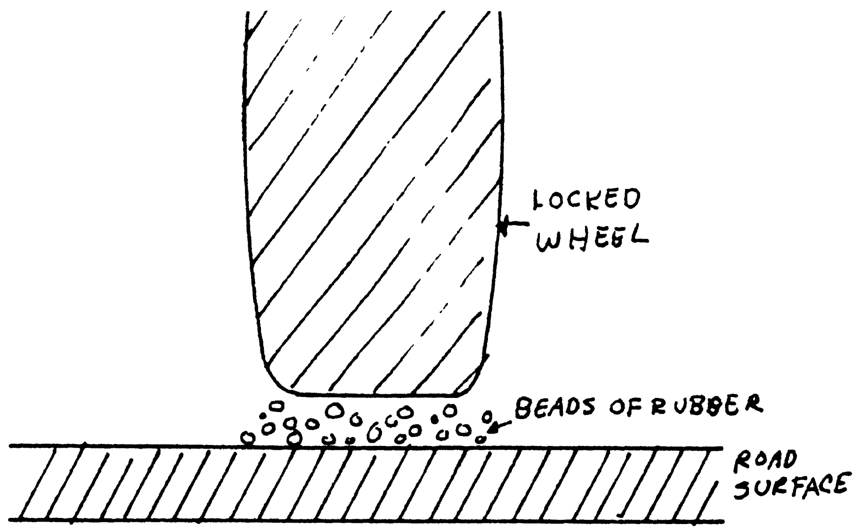
   a. Shortest stopping distance is achieved by braking so that wheels do not lock up and skid.

      --Best braking point is just short of locking the wheels.

      --Difficult to hit exactly that point.

      --May have to pump or jab the brakes.

   b. Locking the wheels. One of the reasons locked wheels have less friction than rolling wheels is illustrated below.



Little beads of rubber come off the locked skidding tires and act as ball bearings for the vehicle to slide on.

G. Changing direction and friction

1. Friction between the tires and road surface is required, if the operator is to control the EV's direction.

2. Tires <u>must</u> be rolling to change the EV's direction.

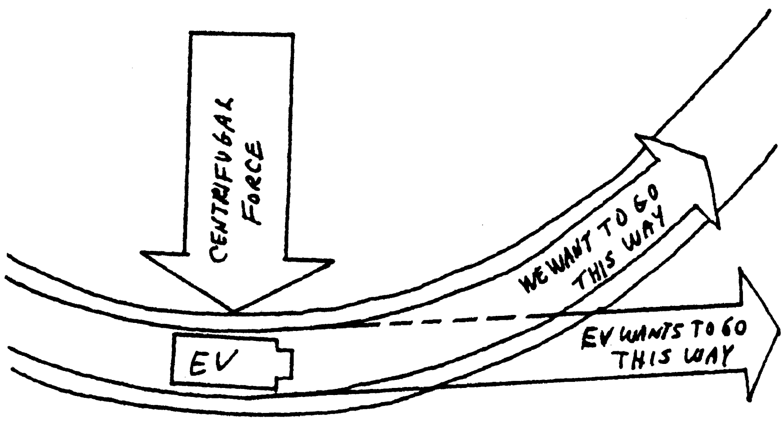
   --If brakes lock the front wheels, turning the steering wheel will have no impact on the direction the EV travels.

   --Directional control is possible only <u>after</u> brakes are let off and the front wheels begin to roll again.

<u>Centrifugal Force</u>

A. Centrifugal force is the force that tends to push a vehicle traveling around a curve away from the center of the turning radius.

   --The child twirling a bucket full of water around his head illustrates this force. The water stays in the bucket.



   --Drivers can feel the centrifugal force when the vehicle negotiates a curve. It is a "push" from the inside of the curve, outward.

--Ask the students what other physical force makes the vehicle tend to go straight as in the illustration above. (Answer: inertia.)

1. Higher speed, greater centrifugal force.

   --Centrifugal force increases four-fold as speed doubles. For example: given a 3,000-pound vehicle entering a 500-foot radius curve:

--At 30 mph, centrifugal force equals 350 pounds.

--At 60 mph, centrifugal force equals 1,400 pounds.

2. Tighter curve, greater centrifugal force.

   --As the curve's radius is decreased, the centrifugal force at a given speed is greater and greater. Thus, the above 500-foot curve can be traveled at more than 60 mph. But control will be lost in a 250-foot curve at less than 50 mph.

--Ask the students what force helps overcome centrifugal force. (Answer: friction. Also, gravity.)

--Emphasize that directional control is impossible if the front wheels are locked. This applies on <u>any</u> road surface, but students may have noted it on icy roads.

<u>Momentum and Inertia</u>

A. Momentum is the product of a vehicle's mass (weight) times its velocity (speed).

B. Inertia is the force that makes a moving EV tend to stay in motion in the same direction.

C. As momentum increases, it is harder to overcome the effects of intertia.

--Explain how larger (heavier) EVs, having greater mass, will have greater momentum at a given speed. Ask the trainees what this menas in terms of velocity and directional control.

D. Momentum and inertia affect velocity control.

   --With increased momentum, stopping distance increases.

   --With increased momentum, brakes must work harder, friction and heat must increase.

E. Momentum and inertia affect directional control.

   --With increased momentum, inertia will be harder to overcome. Therefore, changing direction is more difficult.

   --As momentum increases, the track the EV will follow must be wider.

--Draw a curved road on the chalkboard. Illustrate the way the track must widen as speed increases.

WEIGHT TRANSFER

Definition

A. Every time an EV accelerates, decelerates, or changes direction, the weight distribution of the vehicle shifts.

B. This shift of weight is called weight transfer.

C. Effective use of weight transfer is critical for safe handling of an EV.

--Weight transfer wins or loses on the race track.

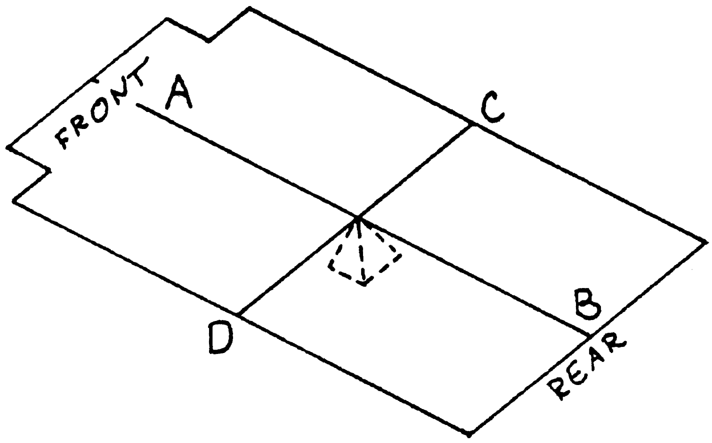
--Weight transfer will keep you alive on the road.

--In a moving vehicle if the EV operator changes the velocity, the direction, or both, weight can transfer to the front or rear, either side, or to any corner.

--Specifically where the weight transfers to, depends on the kind of change the operator makes.

Effects of Changing Velocity on Weight Transfer

--Ask the students to predict what will happen to the downward force of the vehicle for each of these actions.



Imagine a fulcrum under the vehicle's center of gravity.

A. Accelerating

--Downward force at B (rear) is increased.

--More weight and traction at rear tires (unless wheels are spinning).

B. Braking or decelerating

--Downward force at A (front) is increased.

--More weight on the front tires.

--Possibly better steering control due to increased "bite" of front tires.

Effects of Changing Direction on Weight Transfer

A. We are all familiar with the way a vehicle leans in a curve. This lean is because of increased downward force on one side of the vehicle.

--Ask the students to predict what will happen to the downward force in the vehicle during right and left turns.

B. Right-hand turns.

--Downward force at D (left side) is greater.

C. Left-hand turns

--Downward force at C (right side) is greater.

--Ask the students to describe the forces which make the vehicle lean left in a right turn and lean right in a left turn.

--Centrifugal force and inertia "push" the vehicle away from the center of the curve.

--Thus, the vehicle leans to the outside of the curve.

--If appropriate for this group of students, explain the special considerations applying to vehicles with a high center of gravity or with "live" loads.

--With a high center of gravity, the "lean" is more pronounced and the possibility of rolling over increased.

--Vehicles with "live" loads, such as when loaded with patients and attendants, who are unrestrained, can be pushed from the intended track as weight shifts.

--Ask the students what happens in a high speed sharp right-hand turn if the brakes are suddenly applied.

--Because of the centrifugal force, most of the weight is on the left-side tires.

--When brakes are applied still more of the vehicle's weight transfers to the front.

--Thus, most of the weight is on the front left tire.

--Two possibilities are: (1) the left front tire can tear off the rim and (2) the front left tire will act like a pivot and the vehicle will spin out of control around that tire.

The Suspension and Weight Transfer

A. The EV's suspension works to balance the forces (during a change in direction or velocity).

--Smooth out weight transfer (make it more gradual).
--Keep all four wheels firmly on the ground.
--Keep the vehicle level.

B. When changing the vehicle direction, good drivers work with the suspension, not against it.

--They slow up or widen the track if the vehicle is leaning too much.

--They avoid abrupt changes in direction or velocity which could shift vehicle's weight suddenly and cause the suspension to overreact (possible loss of control).

Student Handout

EXAMPLES OF RESISTANCE TO MOTION IN VEHICLES

	2575-LB CAR		5125-LB CAR	
	Pounds of drag	Per pound of car weight	Pounds of drag	Per pound of car weight
Rolling resistance	50	0.02	67	0.01
Moderate braking	400	0.16	800	0.16
Dry-pavement skid	1800	0.70	3500	0.68

Pounds of drag resistance per pound of car weight is the drag factor

COEFFICIENTS OF FRICTION OF VARIOUS ROADWAY SURFACES

DESCRIPTION OF ROAD SURFACE	DRY				WET			
	Less than 30 mph		More than 30 mph		Less than 30 mph		More than 30 mph	
	From	To	From	To	From	To	From	To
PORTLAND CEMENT								
New, Sharp	.80	1.20	.70	1.00	.50	.80	.40	.75
Travelled	.60	.80	.60	.75	.45	.70	.45	.65
Traffic Polished	.55	.75	.50	.65	.45	.65	.45	.60
ASPHALT or TAR								
New, Sharp	.80	1.20	.65	1.00	.50	.80	.45	.75
Travelled	.60	.80	.55	.70	.45	.70	.40	.65
Traffic Polished	.55	.75	.45	.65	.45	.65	.40	.60
Excess Tar	.50	.60	.35	.60	.30	.60	.25	.55
GRAVEL								
Packed, Oiled	.55	.85	.50	.80	.40	.80	.40	.60
Loose	.40	.70	.40	.70	.45	.75	.45	.75
CINDERS								
Packed	.50	.70	.50	.70	.65	.75	.65	.75
ROCK								
Crushed	.55	.75	.55	.75	.55	.75	.55	.75
ICE								
Smooth	.10	.25	.07	.20	.05	.10	.05	.10
SNOW								
Packed	.30	.55	.35	.55	.30	.60	.30	.60
Loose	.10	.25	.10	.20	.30	.60	.30	.60

Review Exercises

Write a brief description of each of the following terms:

a. Velocity:

Rate of motion or speed.

b. Centrifugal force:

The force that pushes an object (vehicle) away from the center of its turning radius.

c. Inertia:

Inertia is the physical force that causes a moving object (vehicle) tend to stay in motion, in the same direction.

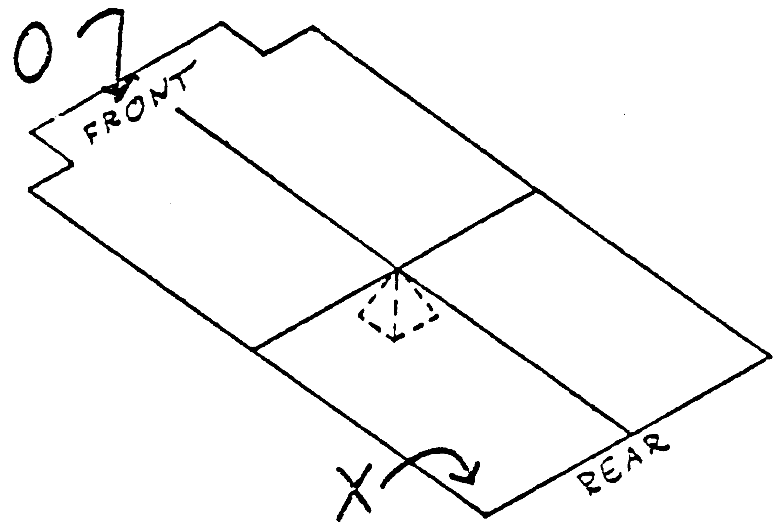
d. Friction:

The resistance to slipping; or, the rubbing together of two surfaces.

On the drawing below:

a. Put an "X" on the place that the downward force would be greatest if you were accelerating through a right turn.

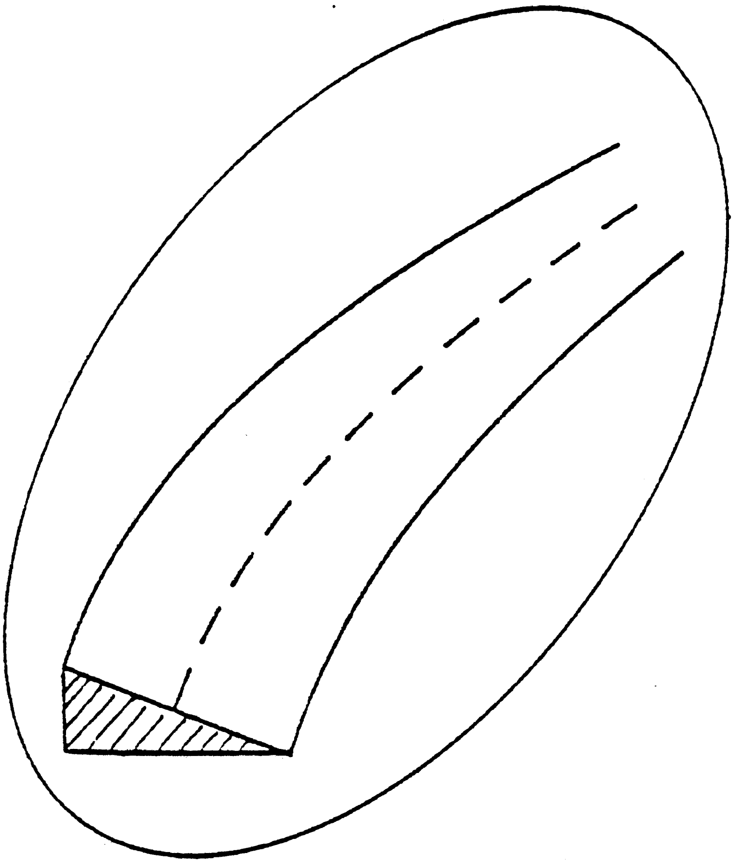
b. Put a "O" on the place that the downward force would be greatest if you were braking.

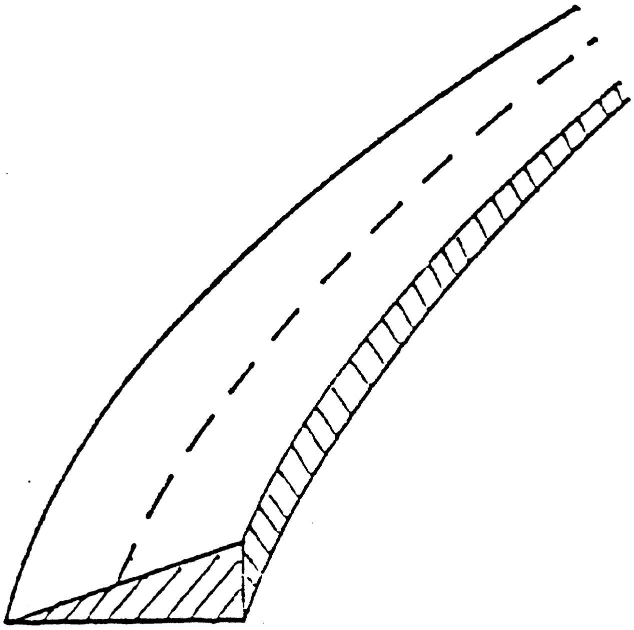


State the primary cause of brake fade.

Heat, due to extended, hard braking.

Circle the drawing below that illustrates a properly banked road.





AMBULANCE DRIVER TRAINING

Lesson Outline

Unit IV , Physical Forces

Lesson 2 , Roadway Characteristics Est. Time 2 Hour

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Description/Purpose:

A discussion of roadway geometrics, design, signs and signals as they affect vehicle control and driving.

Topical Outline:

Roadway Nomenclature and Construction

Signs and Signals

Reading the Roadway

Curves and Limits

Problem areas

Objectives:

To acquaint the student with roadway construction and features.

To discuss placement of warning signs and signals.

To require students to "read" the roadway for operational clues.

To discuss curves and critical speeds.

To discuss problem areas in the local area.

References:

Michigan Manual of Uniform Traffic Control Devices

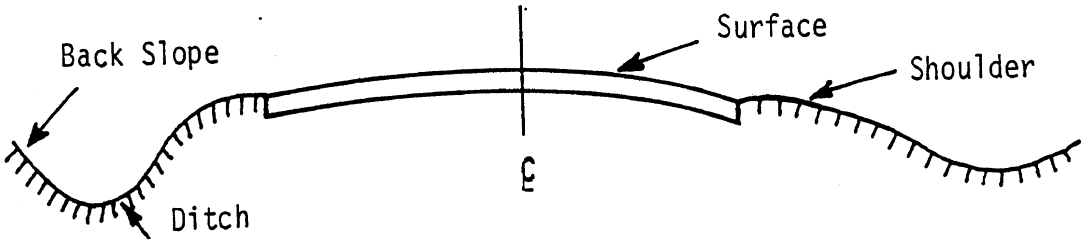
Student Handout Material:

Teaching Aids:

Instructor's Notes for Lesson Content

A county or local traffic engineer can be helpful in preparing this section. Use of the engineer as a guest lecturer for portions of this section is recommended.

Roadway Nomenclature and Construction



Surface - Paved
    Concrete
    Asphalt type
    Brick
  - Unpaved
    Gravel
    Dirt

Shoulder - Paved
  - Gravel
  - Dirt
  - Grass
  - Wide
  - Narrow

Ditch - Shallow
    Deep

Back Slope - Steep
    Gradual

The traveled surface is either paved or unpaved. Improved unpaved roads have a gravel surface. Unimproved unpaved roads have just a dirt surface. Each type of surface has advantages and disadvantages and affects emergency vehicle control.

The condition of repair of the surface is also a factor. Repaired, paved surfaces are rougher than new surfaces. The driver must be alert for potholes, washboard effects, undulating surfaces, etc., and gauge speed accordingly.

Surface loose material covering precipitation must be noted. Gravel on pavement, loose gravel on gravel roads, wet brick, wet pavement, wet leaves on pavement can reduce traction. The effects of ice and snow are well known, but should be emphasized. Shoulder width, condition, and material are factors. Narrow shoulders cannot be used as a traffic lane nor will they permit full refuge of the parked vehicle. Surface construction, particularly if dirt or sod, may not support the weight of the vehicle.

Signs and Signals

Signs and signals are for reasons--even for emergency vehicle operators.

Signs are placed generally according to the 85th percentile speeds, i.e., at such a distance based on the prevailing speed such that a driver driving at the speed limit will have adequate reaction time before the hazard is reached. Driving in excess of the speed limit compromises the reaction time.

A review of the Michigan Manual of Uniform Traffic Control Devices should be made and those devices critical to emergency vehicle operation and the placement of the devices should be discussed.

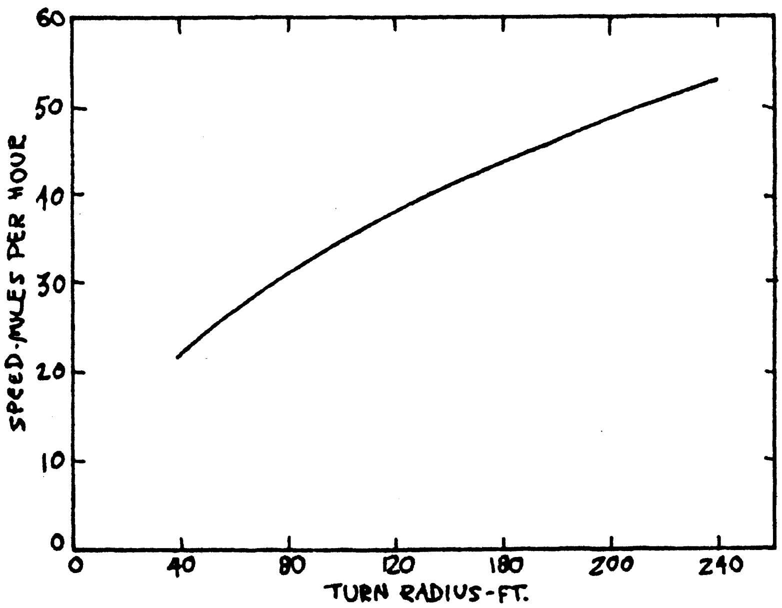
Reading the Roadway

Activities are designed to have the student point out relevant features of the roadway which could affect emergency vehicle control. Slides or pictures of roadways (with problems) should be shown to have the students react to. Problem areas include grades, shoulders, roadway surface, environmental conditions, signs, signals, etc.

Curves and Limits Imposed by the Laws of Physics

A. In turns, centrifugal force quadruples as speed doubles. When the centrifugal force is high enough (0.8g) vehicle cannot follow curve on the intended track.

B. For any curve, there is a maximum speed for traveling through the curve successfully.



--If students will be driving EV's with a high center of gravity (anything other than a sedan or station wagon) indicate that the line on the chart does not apply to those vehicles. A correct line for those vehicles would be somewhat below (depending on the specific vehicle) but parallel to the existing line.

C. The tighter the curve, the slower the EV must go.

D. It is operator's job to control speed. If speed in a curve is to great, physics will win!

--Ask the students:

--How fast can a sedan go around a curve 120 feet in radius? (Answer: about 40 mph)

--How fast around a city intersection with an effective radius of 50 feet? (Answer: about 24 mph)

Curves in the Local Area

A. Gain familiarity with all road conditions and layouts in the area. EV operators should look for:

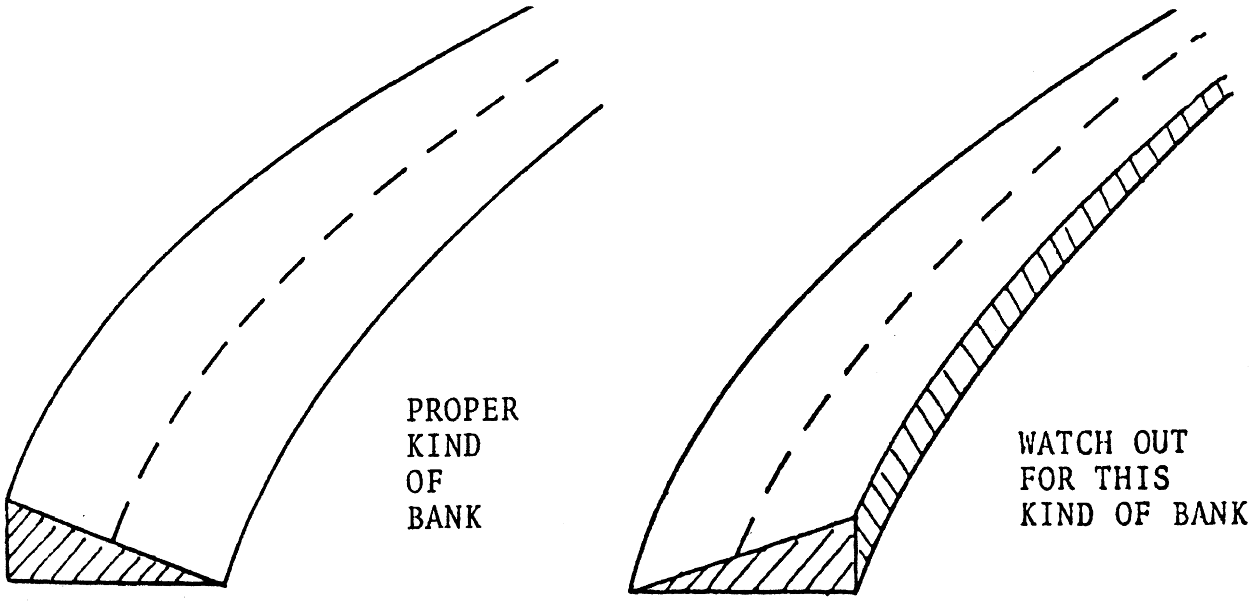
1. Bank of the curve.

   --The road should slant down toward the inside of the curve.

   --Some older roads are banked the opposite way.

--Explain to students the problems with roads having a high crown.

--Relate the bank of the curve to the effects of centrifugal force.



2. Road Surface

   --Narrower?

   --Ruts, cracks?

   --Non-solid edges?

   --Change in surface material (e.g., concrete to blacktop)?

   --Vehicles don't have nearly as much traction on blacktop as they have on concrete.

   --Bumpy roads reduce the amount of time tires are in contact with the road surface.

3. Curves leading to potentially dangerous situations:

   --Curves that crest hills.

   --Curves that lead to intersections.

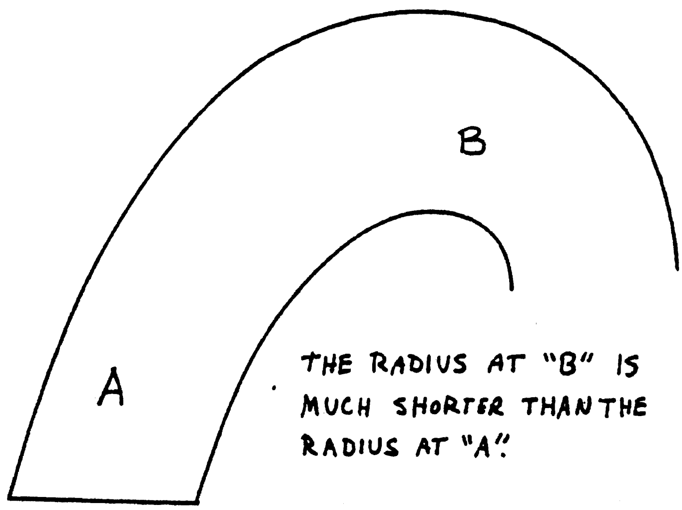
--Curves that lead to population pockets (towns, schools, factories, etc.).

4. Curves having a decreasing radius.

--Because of land availability or restrictions, highway designers often lay out curves in a decreasing radius pattern.

--Such turns start out with a relatively large radius which tightens as the vehicle penetrates the curve.

--Ask the students where they might commonly expect to find decreasing-radius curves. (Answer: entry and exit ramps on expressways and on older roads.)



a. On decreasing-radius curves the maximum entry speed is too fast for the later (tighter) portion of the curve.

--If speed is too high for the tighter portion of the curve, physics will win, and vehicle control will be impossible.

--Decreasing-radius curves can sometimes be identified by the series of black, greasy tire tracks at that point in the curve where other vehicles have left the desired track in panic brake lockups.

b. When approaching a decreasing-radius curve, operator should select an appropriate entry speed for the entire curve.

--You can's select an appropriate speed, unless you know the road configuration in advance. Know the area!

B. The EV operator must know about the road, <u>in advance</u>, if he hopes to be able to negotiate any curve at highest possible safe speed.

--Good idea to practice negotiating curves in the area during early morning (or other low traffic) hours.

Problem Areas:

Obtain from or have a resource person (traffic engineer, police traffic services officer, etc.) present data on high accident locations, and on location and/or conditions which are likely to cause emergency medical vehicle operators problems.

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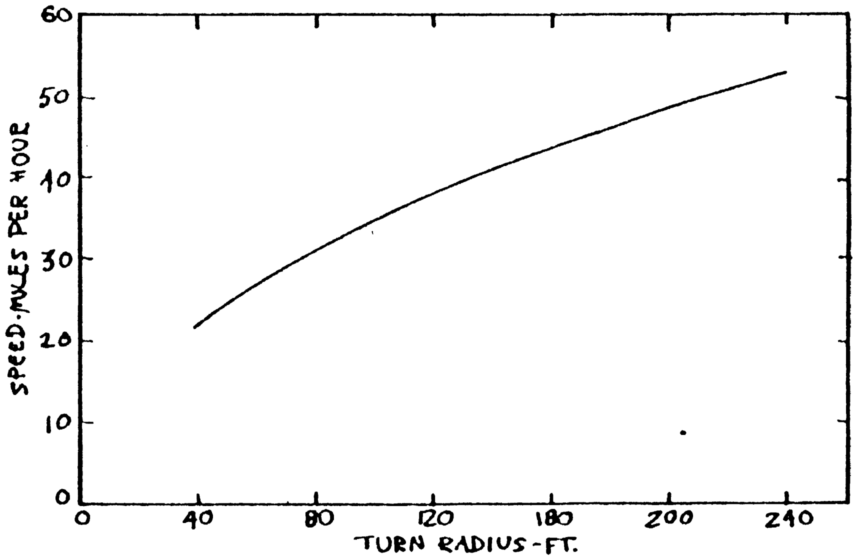
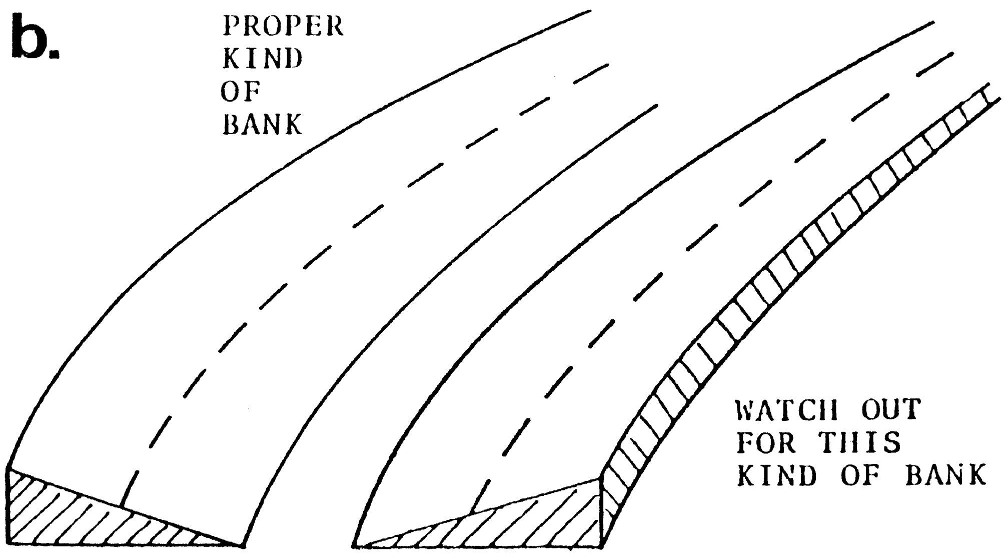
a.



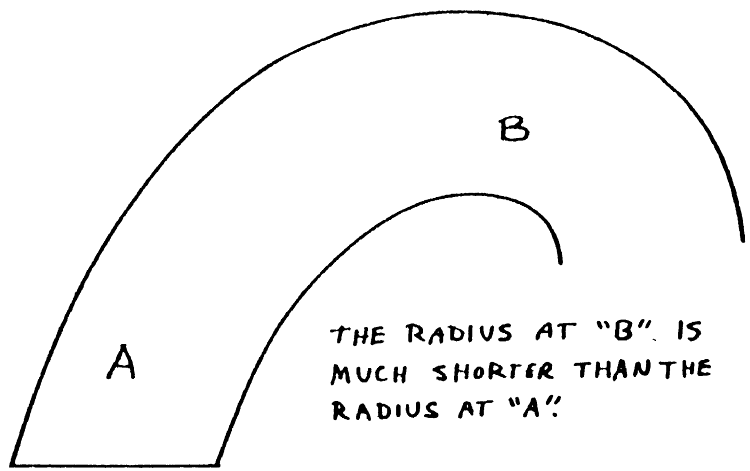
MAXIMUM SPEED FOR TRAVELING CURVES

b.



BANKED ROADS

c.



DECREASING RADIUS CURVE

AMBULANCE DRIVER TRAINING

UNIT SUMMARY

Unit V , Driving the Emergency Vehicle

Description:

A review and discussion of driving tasks as they apply to the operation of the emergency vehicle on both emergency and non-emergency runs.

List of Lessons:

1. Use of Lights and Siren
2. Basic Control Tasks: Starting, Braking, and Parking
3. Driving Techniques
4. Adverse Driving Conditions
5. High Speed Driving
6. Vehicle and Driving Emergencies

Attachments:

(x) Review Questions

Unit Introductory Statement

A. An ambulance operator's primary responsibility is the safe transport of the sick and injured. Safe means:

1. Not risking an accident.
2. Smooth driving:
   a. Driving that will not stress or traumatize the patient.
   b. Driving in a manner that will permit the crew to provide medical case to the patient.

B. No medical emergency, however severe, justifies driving in a manner that tisks loss of control of the vehicle or that relies on the operators of other vehicles or pedestrians to react ideally.

--Most EV accidents do not occur when EV is in emergency mode.

AMBULANCE DRIVER TRAINING

Lesson Outline

Unit V, Driving the Emergency Vehicle

Lesson 1, Use of Lights and Siren Est. Time 1 Hour

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Description/Purpose:

Techniques and implication for using the lights and siren to clear traffic.

Topical Outline:

General Guidelines for Lights and Siren Usage
  Siren-Induced Hypnosis

Objectives:

Students will properly utilize lights and sirens according to learned principles.

Students will recognize siren-induced hypnosis and take appropriate countermeasures.

References:

Student Handout Material:

Teaching Aids:

Instructor's Notes for Lesson Content

General Guidelines for Using Lights and Sirens

A. Ride with driver's window partly open at all times.

--Enables operator to hear other EV's, trains, approaching traffic, etc.

--Particularly important at intersections and railroad crossings.

B. In general, when activating siren, let up slightly on accelerator.

--Motorists respond in strange ways to a sudden siren. This gives the operator a bit more time and room to take appropriate action. Do not rely on the siren to clear the traffic.

--Watch for the reaction of other vehicles to the siren and be prepared to maneuver accordingly.

--Others drivers often have difficulty in determining the location of the siren.

--Presume that other drivers cannot hear the siren and maneuver accordingly.

--Particularly important in high-sensity traffic areas.

C. Turn siren off in high noise environments.

--Radio communication will be more difficult.

--EV operator won't hear anything else with his own siren fully on.

--To be effective, a siren must be about 10dB higher than background noise in the other vehicles. In high noise environments a siren is only adding to the problem because other drivers are not apt to hear the signal anyway.

D. Vary the siren to avoid hypnotic effects.

--Explain to students the importance of learning to recognize the early signs of hypnosis.

1. "Hypnotized" EV operators sometimes become vague and inattentive.

2. "Hypnotized" EV operators tend to take unnecessary risks.

Preclude hypnosis by allowing short periods of siren silence.

Preclude hypnosis by varying the intensity of the siren.

E. Do not use the siren when it is unlikely to be effective.

--When a road is lightly traveled, there is no reason to leave the siren operating.

--Use for warning pedestrians.

--Use in slow speed, low-background noise situations.

AMBULANCE DRIVER TRAINING

Lesson Outline

Unit V , Driving the Emergency Vehicle

Lesson 2 , Basic Control Tasks: Starting, Backing, Parking Est. Time 1 Hour

****

Description/Purpose:

Techniques for starting the vehicle, moving into traffic, backing up, and parking.

Topical Outline:

- Basic Control Tasks
  - Starting the Vehicle
  - Moving into Traffic
  - Backing up
  - Parking
    - Angle Parking
    - Perpendicular Parking
    - Parallel Parking

Objectives:

Students will demonstrate proper starting techniques for their respective vehicles.

Students will maneuver their vehicles into traffic in the correct manner.

Correct backing techniques will be demonstrated by students.

Students will show the ability to correctly park their vehicles in the three parking modes: angle, perpendicular, and parallel.

References:

Student Handout Material:

(x) attached

Angle parking

Perpendicular parking

Parallel parking

Teaching Aids:

Overhead projector

Transparencies

Vehicles

Instructor's Notes for Lesson Content

BASIC CONTROL TASKS

A. Directional and velocity control are accomplished by steering accelerating, and braking.

B. These basic control tasks are all present in two slow-speed activities--backing and parking.

1. Relatively simple tasks.
2. Good performance requires practice.

--Tell the students that they will have the opportunity to practice and build skill in these tasks later in the course. Mention that this lesson provides some pointers and tips for accomplishing these tasks safely.

Starting the Vehicle

1. Read the manufacturers directions for starting the vehicle.

2. Pre-set the starting controls after the last run to minimize time. I.e., battery switch off; ignition switch off; master light control off; all radio, light, siren, etc., switches on.

3. Adjust vehicle to driver at beginning of shift. I.e., seat, mirrors, etc.

4. Vehicle should be ready to go.

5. Starting:
   a. battery switch on
   b. start engine
   c. warm it up for 15-30 seconds
   d. turn on motor switch (lights, siren, etc.)
   e. check gauges
   f. check brakes
   g. ready-to-roll

6. When returning to base, pre-set as in step 2, above.

7. When at the scene, either leave engine running or shut down to pre-set conditions.

   --If near the vehicle and only out a short time, leave running.

   --If leaving vehicle, shut down to pre-set condition and lock all doors to prevent theft or unauthorized use.
   --The battery switch is an effective anti-theft device.

Moving the Vehicle into Traffic

1. From base

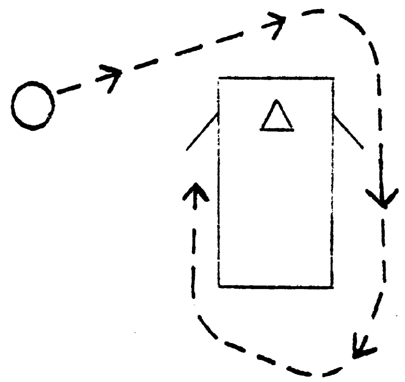
   a. enter the vehicle and start
   b. open door and be sure it is completely open
   c. check that all are aboard and secured
   d. pull forward slowly
   e. establish your presence - lights
   f. ask to enter traffic - siren

      --if you have a signal at the driveway, wait for the green before pulling out.

   g. be sure all see you and stop
   h. pull out into traffic slowly. Watch for other cars.

2. From a scene:

   a. enter vehicle--make a circle tour to see if all is clear all around the vehicle



   b. enter vehicle
   c. start vehicle, if necessary
   d. check brakes, etc.
   e. if you must back up, station one attendant or observer to guide you
   f. secure all doors, patient, etc.
   g. back up if necessary
   h. load guide attendant
   i. re-check if all secure
   j. establish your presence - lights
   k. ask to enter traffic - siren
   l. final visual check - all clear
   m. proceed slowly

NOTE: steps k and l only if emergency run

Backing up

Backing mishaps account for a large proportion of EV accidents.

Most backing accidents are relatively minor. Even minor accidents, however, can have wide-ranging consequences:

--Keep EVs out of service (while repairs are made)

--Cause the operator a lot of paperwork (time)

--Cost taxpayers money--EV operator's are taxpayers too!

--Create a bad public image.

Techniques to minimize backing accidents require common sense. Take a few extra seconds--it's well worth it.

A. Park so backing is minimized or eliminated. To do this, the operator must plan ahead:

--Ask the students what kinds of planning they could do. Include at least the following points:

--Don't park head-in if departure will be hurried.

--Select places that require least backing.

--Before entering a vehicle to be backed, survey intended path of vehicle.

B. When vehicle must be backed:

1. Station a crewmember outside vehicle to direct, if possible.

   --Crewmember should be to left rear of vehicle.

2. Check for pedestrians and obstacles
3. Back SLOWLY (as if you expected to hit something)
4. Constantly check mirrors for changes in the traffic situation of obstacles in EV's path.
5. When backing out of an alley, hidden driveway, etc., sound horn or "back-up alarm" for warning.

   --Points 4 and 5 are especially important for larger EVs.

6. When turning while backing, check front fender to avoid front collision.

   --About 90 percent of the time operator should be looking to the rear.

--If convex mirrors are legal in your state, tell the students:

--Properly positioned and adjusted, convex mirrors can be helpful in eliminating blind spots.

Parking

Three types: angle, perpendicular, and parallel.

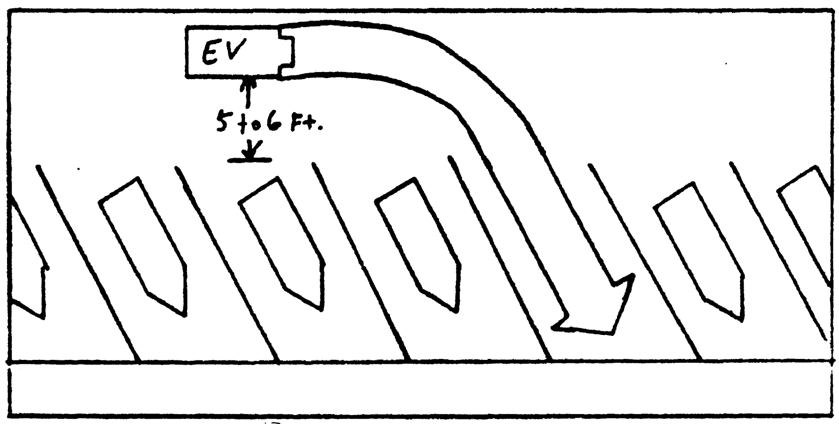
--Parking is a basic control task, but requires many driving skills.

--Parking, when performed under stress, can be difficult and time consuming.

Suggest note taking.

A. Angle Parking

(Present transparency)



Procedure:

--Slow to no more than 10 mph.

--Keep sedan 5 to 6 feet from rear of other cars; appropriate distance for larger EVs is approximately 1/3 their length.

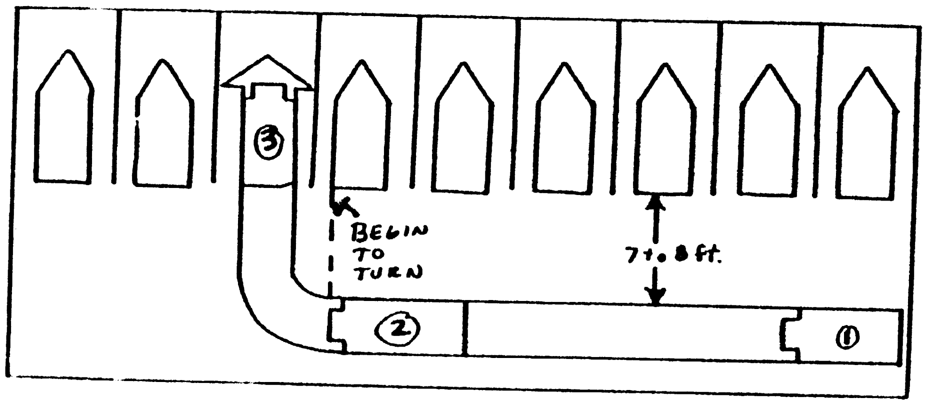
--Begin turning wheels when EV's front wheels have cleared vehicle beside intended space.

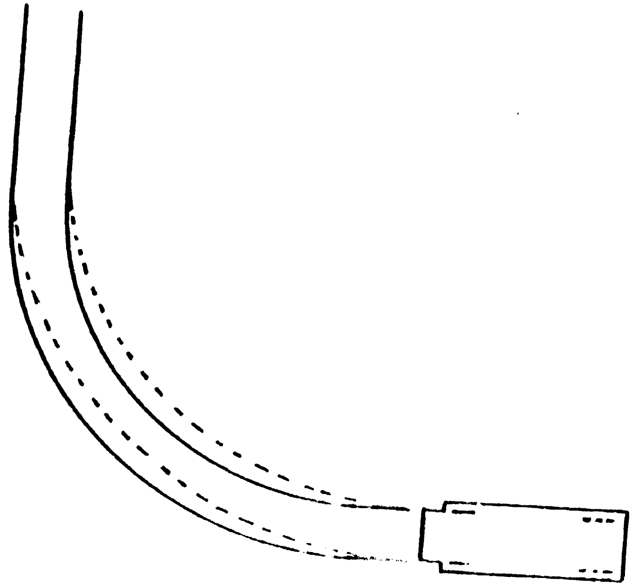
--REMEMBER: Front bumper and rear quarter panel will extend beyond the track of the wheels; the larger the EV the further the extension.

B. Perpendicular Parking

1. Sedans and vans

(Present transparency)





Procedure:

--Slow to no more than 10 mph.

--Keep EV 7 to 8 feet from rear of parked vehicles.

--Begin turning wheels when EV's front bumper is in line with edge of vehicle closest to intended parking space.

--REMEMBER: Rear wheels track to the inside of front wheels, so to avoid mishap, enter the space straight, not at an angle.

2. Long wheel-base vehicles (Large EVs such as fire apparatus almost never have to perform this maneuver).

--Large vehicles usually are backed into perpendicular space.

C. Parallel Parking. Parallel parking requires a space at least 25 percent longer than EV. Operator must learn when to turn the wheels.

(Present transparency)

--The procedures shown in the transparency work best for ordinary sedans, but by extension can be applied to larger EVs. Use the transparency to explain the parallel parking procedure.

D. Parallel Parking on Slopes (Special Considerations)

1. Set brake
2. Leave vehicle in gear (if manual transmission)
3. If EV is large or heavy, place chocks.
4. Always position the front wheels so that if the vehicle starts to roll:
    a. Wheels will hit the curb (and prevent rolling)
    b. Vehicle cannot roll through traffic lanes.

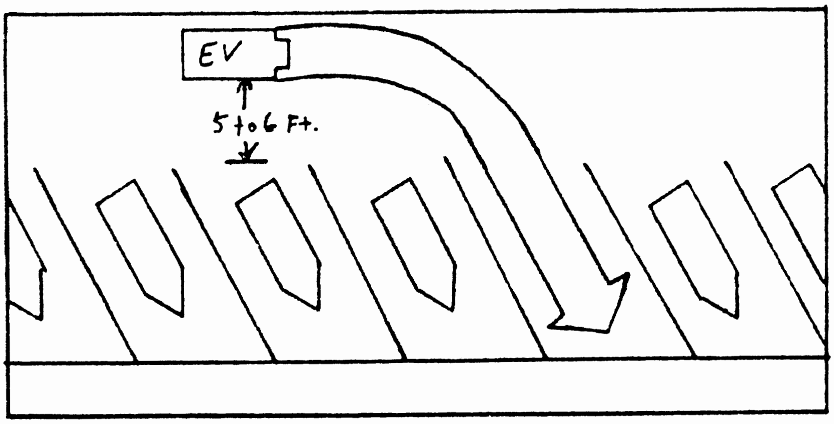
Considerations: Backing and Parking in the Emergency Mode

A. Backing or parking in emergency mode must be done quickly.

B. Requires skill to do it fast without mishap.

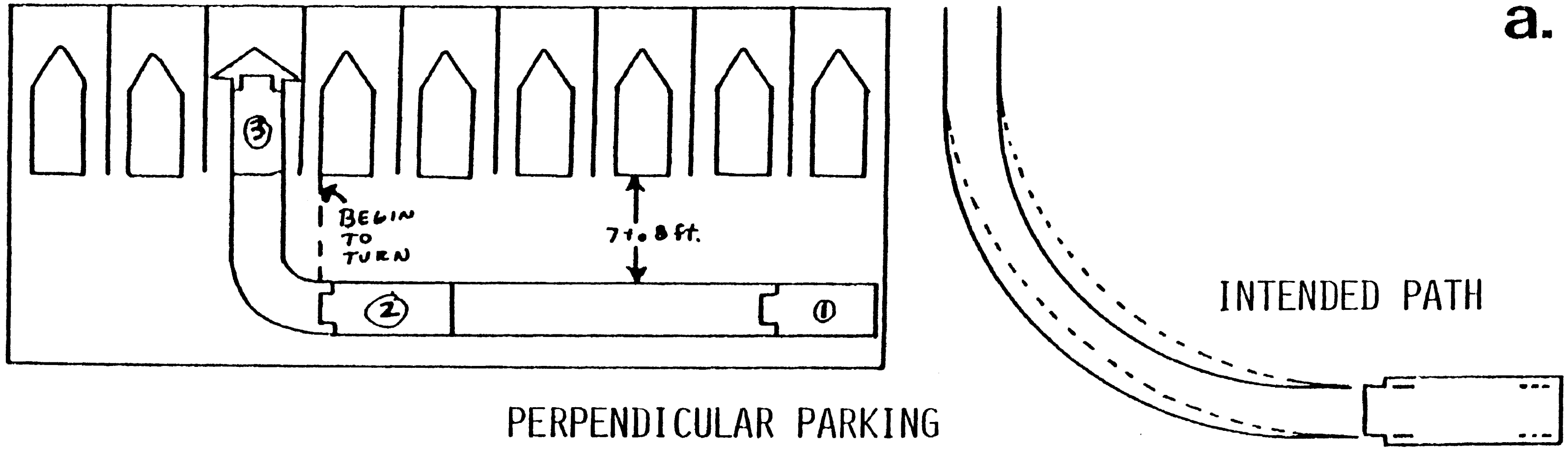
--Ask students what they can do to back or park most safety in emergency mode.

--Not push themselves beyond their own level of skills. Also, take time to do it properly; avoid the chance of a mishap which would greatly delay performing their mission.



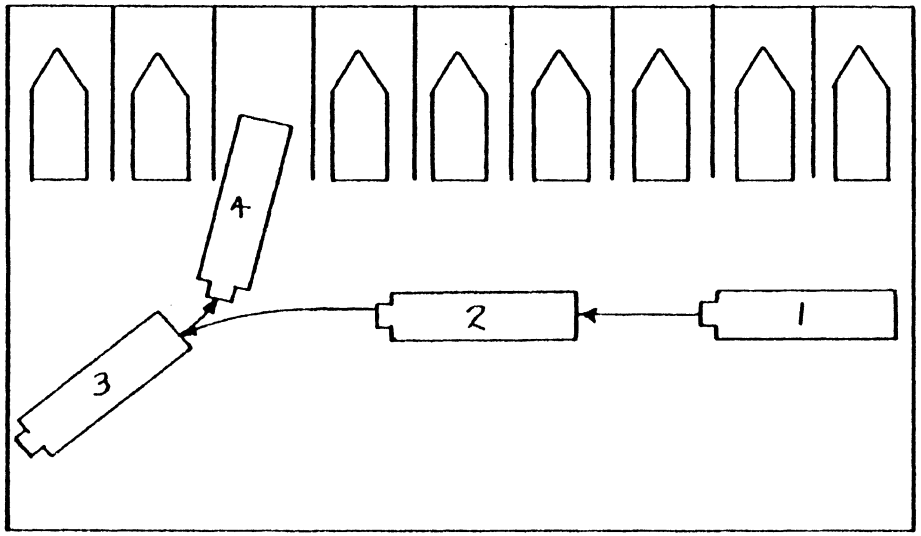
ANGLE PARKING

a.

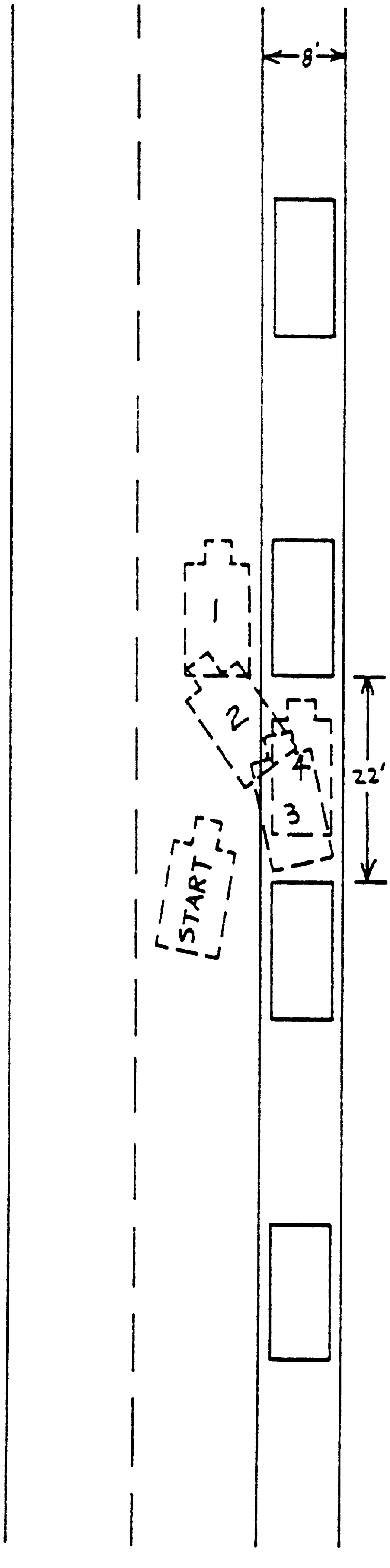


PERPENDICULAR PARKING
(SEDANS AND VANS)

b.



PERPENDICULAR PARKING
(LONG WHEEL-BASE VEHICLES)

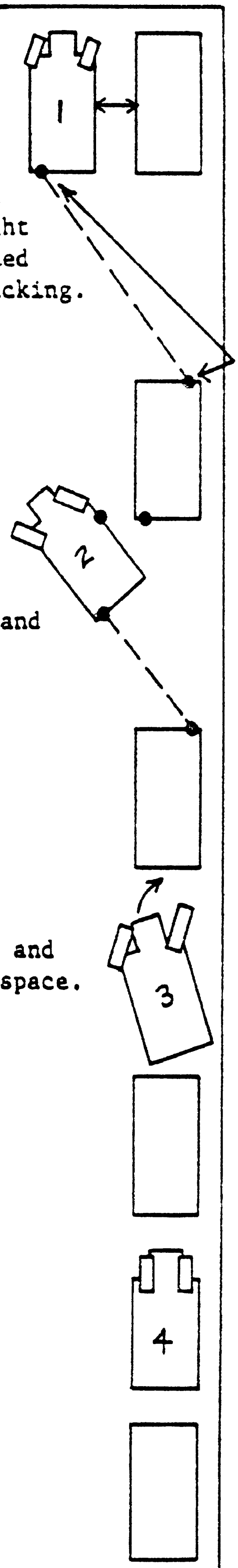


Stop 1 1/2' to 2' away from parked vehicle both vehicles even. Turn wheels right and aim left tail light towards right headlight of parked vehicle, while backing.

When passenger door is even with rear bumper of parked vehicle, turn wheels left and guide into space.

Turn wheels right and align vehicle in space.

Final position



AMBULANCE DRIVER TRAINING

Lesson Outline

Unit V , Driving the Emergency Vehicle

Lesson 3 , Driving Techniques Est. Time 2 Hour

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Description/Purpose:

Driving techniques for operating the ambulance in various types of traffic situations, including urban driving, negotiating intersections, turning around (U-turn, turn-abouts, etc.), following another vehicle (following and stopping distance), passing vehicles, and expressway operation.

Topical Outline:

1. Operation of the Ambulance

   Driving to the Patient

   At the Scene
   - Parking Considerations
   - Directing Traffic
   - Leaving the Scene

   Driving with Patient Aboard
   - Article: "A Tragic Case of Too Much Speed"

2. Urban Driving

   Introduction

   Urban Driving in the Emergency Mode

3. Negotiating Intersections

   Introduction

   Negotiating Intersections in the Emergency Mode
   - Handling Hazardous Situations

4. Turning Around to Reverse Direction

   Turnabouts
   U-Turns
   Two-Point Turnabouts
   Three-Point Turnabouts
   Turnabouts in Emergency Mode

5. Following Another Vehicle

   Safe Following Distance

   Estimating Following Distance
   - Car Lengths
   - Two-Second Rule

   Increasing Following Distance
   - Practice Exercises

   Following Distance in Emergency Mode

Topical Outline (Continued)

6. Passing Another Vehicle

How Long Does it Take to Pass?

Considerations Before Passing
- Vehicle Characteristics
- Road Information
- Traffic Situation

Executing a Passing Maneuver

Being Passed

Avoiding Mishaps When Passing

Passing in Emergency Mode

7. Expressway Operation

Entering and Exiting Freeways

Discussion Questions

Driving at the Limit on Expressways

Expressway Operation in the Emergency Mode

Objectives:

Students will:

--Know the proper way to drive to a victim

--Know when it is inadvisable to drive in the emergency mode with a patient aboard

--Know when smooth, low-speed transport is called for

--Demonstrate knowledge of their states' statutes regarding motorists' clearing a path for emergency vehicles

--Demonstrate knowledge of proper methods and time intervals for crossing an intersection, turning left, and turning right at an intersection

--Demonstrate the ability to perform correctly the following turnabout maneuvers: U-turn (various types) three-point turns, and two-point turns

--Demonstrate the ability to utilize the two methods of estimating following distance

--Know when to increase following distance

--Know when it is safe to pass, and when it is unsafe to pass

--Demonstrate the ability to correctly enter onto and exit from an expressway

References:

Student Handout Material
(x) attached
- Time Gaps at Intersections
- Hazard Detection
- Passing at an Intersection
- U-Turns (two pages)
- Two-point Turnabouts
- Cloverleaf
- Three-Point Turnabouts
- Stopping Distances at Various Highway Speeds
- Following Distance at 50 mph/ Two-Second Rule
- Entering and Exiting Freeways

Teaching Aids: Overhead Projector; Transparencies; Vehicles

Instructor's Notes for Lesson Content

OPERATION OF THE AMBULANCE

Driving to the Patient

A. When an ambulance operator receives a call from the dispatcher, he must obtain all relevant information.

--Especially important is the dispatcher's preliminary assessment of whether or not the condition is a true emergency.

--Review these points:

--Description of emergency

--Address (location) and other identifiers

--Indication or priority

B. The operator should drive to the scene with all due speed consistent with safe arrival.

--Proper use of lights and siren is essential.

--The operator must never drive so fast that vehicle control is compromised

--Routine transports are not considered true medical emergencies

C. All ambulances should come to a full stop at red lights, stop signs, and railroad crossings, regardless of the nature of the emergency.

--Tell the students what the laws in this state stipulate.

D. Generally, the basic and emergency mode operation techniques presented in Part 1 apply to ambulances. There is, however, an additional consideration, vehicle dynamics. Ambulances are larger than sedans (heavier, higher). Therefore, due to vehicle dynamics:

1. Be particularly aware of (and careful on) decreasing radius curves.
2. Following distance should be increased.

   --Larger, heavier vehicles have greater stopping distances than sedans.

--If you know the specifics of the type of ambulance the students will drive, present a comparison of the dimensions of an ambulance to an ordinary sedan and a description of the effects of a high center of gravity.

At the Scene

A. Parking Considerations

1. Ambulance should be positioned for most convenient access to victim or patient.

2. Ambulance should be positioned to minimize disruption to any traffic.

   --Ambulance should be protected from damage.

3. Special care should be exercised when parking on hills.

   --Always set the parking brake
   --Beware of stretchers that can roll.

4. If more than one ambulance is at the scene, they should be parked in the head-and-taillight position (ladder), if possible.

--Draw a simple illustration of this technique on the chalkboard.

--This technique is most effective on the highway or in rural areas.

B. Directing Traffic

If the Police have not arrived at the scene, the operator may need to direct traffic or assign someone at the scene to do so.

--This can be important for avoiding further injuries.

--If it is safe to do so, flares or reflectors should be placed as soon as possible.

C. Ambulance should not leave the scene until:

1. Patient is secured
2. All doors are closed and locked.
3. Crew gives an audible "okay" (indicating all are present and prepared).

Driving with a Patient Aboard

A. A high-speed transport, with its associated sudden starts and stops, can:

1. Frighten the patient
2. Put a stabilized patient into shock.
3. Disrupt ongoing medical treatment

Driving with a Patient Aboard (Continued)

--Emphasize the following point:

4. Aggravate certain medical conditions sufficiently to cause DEATH OR PERMANENT DISABILITY TO THE PATIENT

   --Spinal injuries, serious fractures, and heart attacks are examples of such injuries.

B. In almost all cases, the transport should be conducted:

1. At speeds below the legal limit
2. With headlights on
3. With emergency lights on
4. With siren OFF

   --Except in the rare case when exemptions will be exercised (e.g., traveling over the legal limit).

5. Obeying all stop signals and red lights.
6. Coming to a FULL STOP at all railroad crossings.

C. There are certain medical conditions that may require "emergency mode" transport.

--These "emergency mode" transports only constitute about five to seven percent of the total.

D. These conditions include:

1. Uncontrolled hemorrhage.

   --Such as internal bleeding in chest or abdomen.

2. Uncontrolled cardiovascular or respiratory impairment.

   --Such as congestive heart failure, wounds of the heart, or progressive pulmonary edema.

3. Complicated impending childbirth.

   --Any case in which operative intervention is required.

Discuss the following:

--In any of the above cases, the ambulance should proceed to the hospital as quickly as possible. However:

--Due regard for the safety of others must be exercised.

--The ambulance should still come to a full stop for red lights, stop signals, and railroad crossings.

--Allow the students a few minutes to read over the article. When they have finished, conduct a brief discussion based on the article.

A TRAGIC CASE OF TOO MUCH SPEED

About 4 am Indian Rocks Beach Fire Department emergency medical technicians were sent to the Frank Utnage residence to treat a possible heart attach. Two firefighters, David Crane and Lt. James Terry, were the initial respondents to the call. Michael Signorelli, an off-duty firefighter, also responded because he lived two blocks from the Utnage residence.

The two men started cardio pulmonary resuscitation on Utnage and prepared him for transport to a nearby hospital. The ambulance arrived and Signorelli volunteered to go to the hospital with the ambulance crew.

Leaving for the hospital at a high rate of speed, the ambulance was followed by Utnage's wife and son-in-law, Bob LaDisa. To keep up with the ambulance, LaDisa had to maintain speeds in excess of 70 mph. Traveling at this speed, LaDisa fell behind.

About 4:30 am Drs. Robert and Janet Pettyjohn were awakened by the sound of a crash in their front yard--the ambulance had failed to take a curve (posted 35 mph limit) and had wrapped around the tree in front of the Pettyjohn residence. The Pettyjohns ran out to the macabre scene, just as Bob LaDisa and Mrs. Utnage pulled up. Mrs. Pettyjohn kept Mrs. Utnage from the scene. She was later taken to University General Hospital and treated for shock.

Five people died: The ambulance driver, Charles Kozmar, 28, married and the father of two children; ambulance attendant Robert Lovett, 25, married and father of three children; Candy DeMarco, 20, an EMT trainee, married and mother of one child (investigators were not sure why she was with the ambulance); firefighter Michael Signorelli, 23; and Frank Utnage, 64, the heart attack victim.

The impact of the H&H Ambulance Service vehicle, leaving Indian Rocks Road and sliding into the tree, tore the vehicle apart. The fiberglass top was torn off the 1973 Chevrolet van, the driver's side and floor were buckled and the equipment scattered down the road. Police estimated the speed of the ambulance at the time of impact was 55 mph.

People were scattered all over Pettyjohn's yard. Dr. Pettyjohn, chief of emergency medicine at the hospital since 1973, said the accident was the worst he had ever seen. The doctor said everyone except Mrs. DeMarco appeared to have been killed on impact. The girl had a faint pulse, but by the time she was removed from the vehicle she was dead.

Director of the Division of Environmental Control of the Pinellas County Health Department, George McCall, said ambulances should not exceed posted speed limits. "There is never any reason for an ambulance to drive faster than speed limits allow. There is little to be gained and much to be lost in that kind of performance and this is a perfect example.

"There is no excuse at all for that kind of driving. Whatever the (medical) problem was, it wasn't good enough reason to be driving like that. Instead of one alive at the hospital, there are five dead."

There are no Largo city ordinances or Florida state statutes governing the speed of emergency vehicles. It would be difficult to nationalize emergency vehicle speed limits. What is needed is an emergency vehicle driving course to instruct drivers in safe driving and handling of the vehicles in various situations. This should reduce the number of emergency vehicles involved in accidents.

URBAN DRIVING

Introduction

A. Even in normal, non-emergency conditions, operating an EV in urban areas requires a high degree of skill.

--EV operators, public servants, must present good examples to other motorists and pedestrians.

--At any time EV may be called into emergency service. Accidents or delays could make EV unavailable for service.

B. Keys to successful urban driving.

1. Keep alert.

--Children
--Alleys
--Exhaust from parked cars
--Cross walks

2. Don't anticipate other motorists' actions.

a. Motorists sometimes signal turns or lane changes when they don't mean to.

--In spite of how they signal, note direction motorists looks, way vehicle is pointing, whether they slow properly, etc.

b. Motorists may enter or cross traffic without sufficient gap.

c. Motorists may try to beat a light, going through as it changes.

--Point out to the students that effective drivers are constantly thinking "What if . . . " They have a general action plan in mind <u>before</u> a child pops out or a motorist pulls a crazy or unexpected stunt.

<u>Considerations: Urban Driving in the Emergency Mode</u>

A. Speeds in excess of limit are rarely justified--only in the most extreme emergency.

--Too much chance of unexpected motorist or pedestrian action that could lead to an accident.

--Reasonable speed allows more time to react to such actions and more opportunity to control the EV if evasive action is required.

B. Urban driving in emergency mode requires effective use of lights and sirens to:

1. Warn motorists and pedestrians of the approaching EV.

2. Clear traffic and/or help the operator negotiate through heavy or blocked traffic.

C. Typical motorists' reactions to lights and sirens in urban areas:

1. Generally, motorists will try to pull to the right and slow down or stop when they detect an approaching EV.

--Most motorists are more than willing to pull over to miss a light or save a life.

--Clarify the state's requirements for motorists to yield the right of way to EVs.

--Some newer statutes require motorists to pull to the curb. Many divided roads (or one-way streets) have curbs on both sides. Consequently, in some states, motorists may pull to the left.

2. Some motorists, however, will do senseless, unexpected things. A good EV operator is always aware of these possibilities.

--Ask the students what kinds of unexpected things motorists might do. Have them note at least the following:

--Stop dead in the middle of a lane, blocking the EV's forward progress.

--Try to compete (race) with the EV, or beat the EV through an intersection.

--Nothing at all. They will keep traveling at the same speed, apparently unaware of the EV's presence.

--Remind the students that these persons may be truly unaware of the EV's presence; radio or air conditioner on; and failure to check the rear-view mirror can contribute to this.

a. Confused motorists:

--The best way to handle confused drivers is to lay off the siren, give them a chance to think

--Tap horn or flash lights to try to establish eye contact.

--Once eye contact has been established, give hand or verbal signal indicating what action motorist should take. Be cautious--you can't totally depend on motorists understanding hand signals.

--May need to yell out instructions.

--As the students will be driving ambulances, point out that if the siren is not being used (to avoid patient stress) it is unwise to yell, as this could also cause patient stress.

b. Unaware motorists:

--Beware of startling unsuspecting motorists; they could respond hazardously.

--Vary siren pitch and duration.

--Use headlights, horn, or spot to get attention.

--Have partner use P.A. to get attention.

--Be patient, keep signaling.

--Avoid passing on the right, unless it's the only way.

--In extreme cases, it may be necessary for a crew member (never the driver) to get out of the vehicle and direct traffic.

D. If traffic is blocked:

--Explain that traffic blockages are often unavoidable, particularly during rush hours. Ask the students what can be done to reduce the chances of encountering blocked traffic. (Answer: Route planning, including alternate rush-hour routes.)

1. Slow down before reaching blockage.

   --Gives a better view.
   --Easier to detect what effect the signaling equipment is having.

2. Use siren intermittently.

3. Be patient.

   --If traffic is unable to move, it is not good to keep the siren wailing constantly.

   --It could do some harm. Everyone involved is likely to become irritable and impatient.

4. Don't travel in opposing traffic lanes unless you know traffic is cleared for at least one block.

NEGOTIATING INTERSECTIONS

Introduction

Intersections are the most accident-likely areas.

--Write the following statistics on the chalkboard.

--ACCIDENTS AT INTERSECTIONS:

All Motor Vehicles	Emergency Vehicles
37%	50%

--Explain why over half of all EV accidents occur at intersections. Ask students to think of possible reasons. Include the following:

--Many intersections restrict visibility.

--EV operators can misjudge traffic situation and clearance.

--Emergency mode:

--Some motorists become confused at multi-lane or crowded intersections (especially when they have to respond to an EV).

--Many motorists don't hear or see the approaching EV. Their "responses," therefore, are oftne totally unpredictable.

--Two or more EVs, responding to the same call, often "meet" at intersections.

Techniques for Negotiating Intersections

A. Before crossing an intersection EV operator must make sure there is an adequate gap in traffic.

1. From a full stop, EV needs about four seconds to cross an intersection 30 feet wide (2 lanes).

   --For larger vehicles, time varies according to size, accelerative capability, etc.

2. Cars approaching from either direction should be about six seconds from intersection.

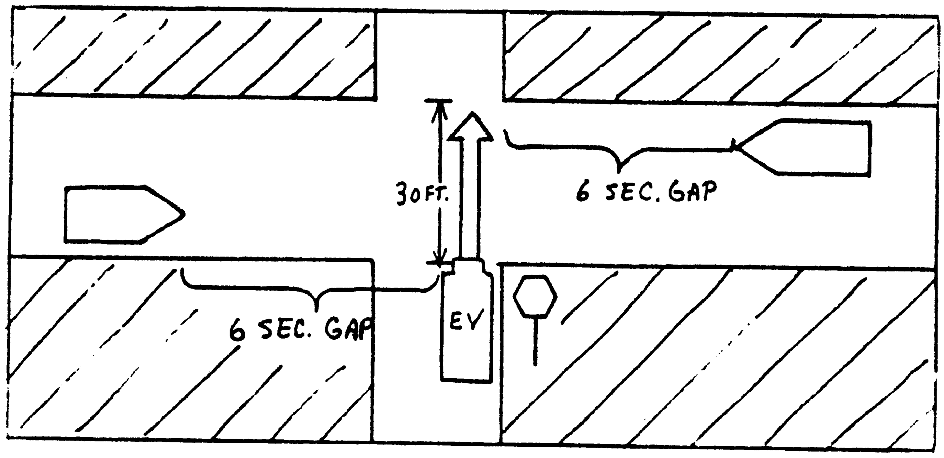
   --Operator should look left, then right, then left again before crossing an intersection.

(Present Transparency)

B. Right turns at an intersection.

1. From a stop it takes about six seconds to turn right and accelerate to 30 mph.

2. When the operator begins the turn, any vehicle approaching the intersection from the left should be at least seven to eight seconds away from the intersection.



--If a right turn is started with an eight-second gap, the vehicle approaching from the left will be a safe two seconds behind the EV once the turn and acceleration are completed.

3. In faster cross traffic, a larger gap is required for safety.

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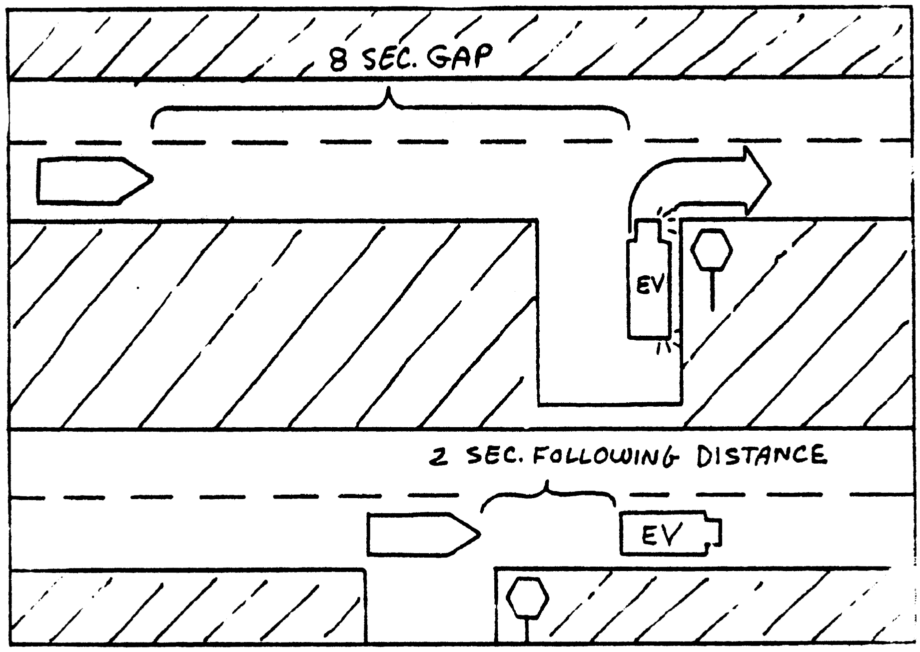

C. Left turns at intersections.

--Left turns require a larger gap than right turns because of the need to cross traffic lanes.

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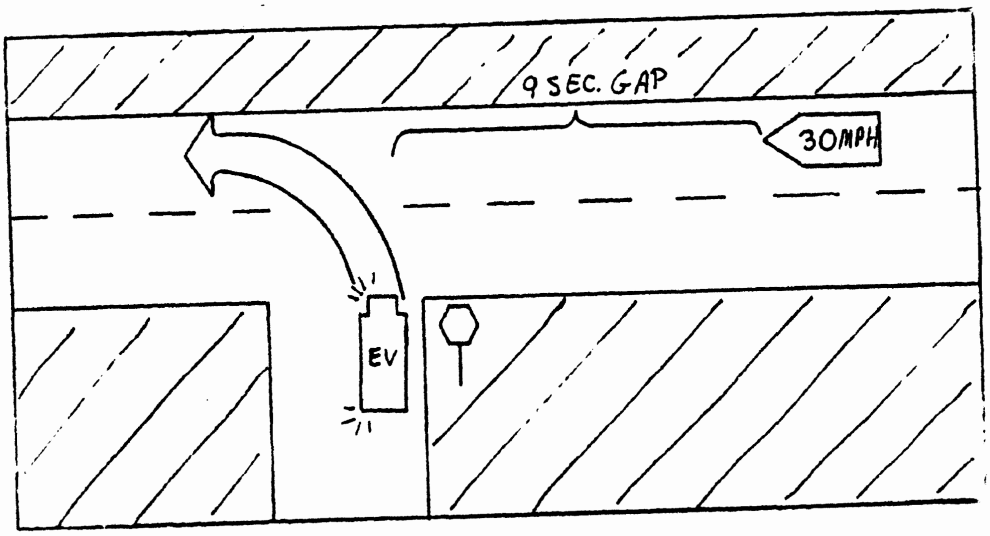


D. Gaps for turning at various cross-traffic speeds.

--Using following table, present the information that is relevant to this particular class of students.

Speed of Cross Traffic	Sedan L	Sedan R	Van L	Van R	Large Truck L	Large Truck R
30 mph	9	8	10	9	11	10
40 mph	10	9	11	10	12	11
50 mph	12	11	13	12	14	13
55 mph	13	12	14	13	15	14

Considerations: Negotiating Intersections in the Emergency Mode.

A. Siren should be turned off for a short while just before entering an intersection. This will:

   1. Allow operator to hear other EVs.

   2. Lessen the chance of a "panic" reaction by motorists at the intersection.

B. Provide as much information as possible to other motorists.

   1. EV operator should use all means of signaling, including:

      a. Lights

      b. Siren

--Ask the students why lights and siren alone may not be sufficient warning for motorists.

--Windows up, air conditioner, radio on, etc.

--Sirens don't varry around corners very well.
--Low sun or glare can make emergency lights useless.

c. Turn signals
d. Lane position
e. Eye contact or hand signals

2. Signal intent at least 100 feet in advance of an urban intersection (200 feet in the country).

C. Check for traffic control indicators in advance of intersection.

--Lane markings
--Signals
--Stop or yield signs
--Crosswalks

D. Check for hazards well in advance of intersection.

1. Make sure driver's window is partly open--this will enable detection of other EVs, if in the vicinity.

2. Stay especially alert--search for:

a. Actual hazards.

--Ask the students to think of examples of actual hazards.

--Bad road surface
--Motorists in your lane

b. Potential Hazards

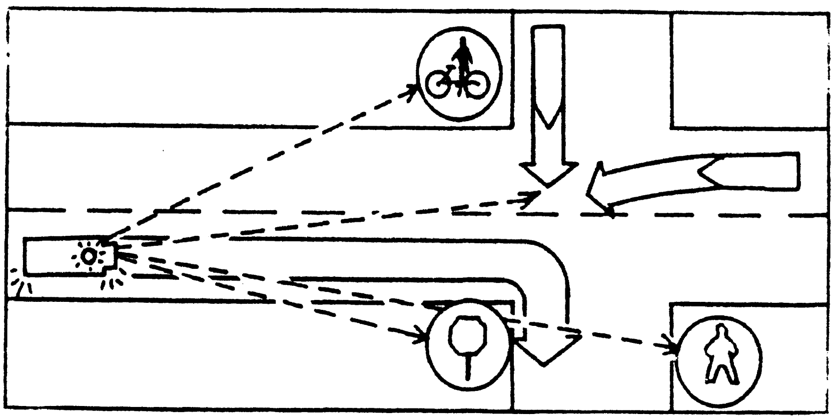
--Ask students to think of examples of potential hazards.

--Bicyclists, pedestrians

E. Practice--you decide

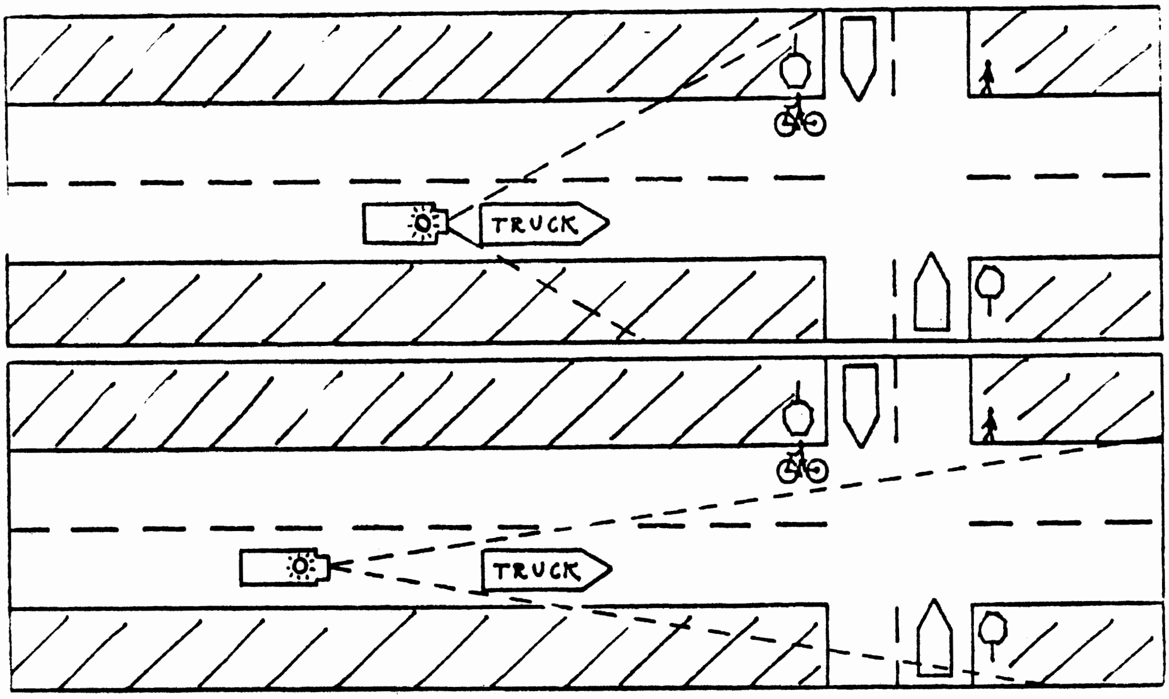
1. What are the hazards in the following situation?

(present transparency)



--Two moving vehicles are potential hazards
--Pedestrian and bicyclist are potential hazards.

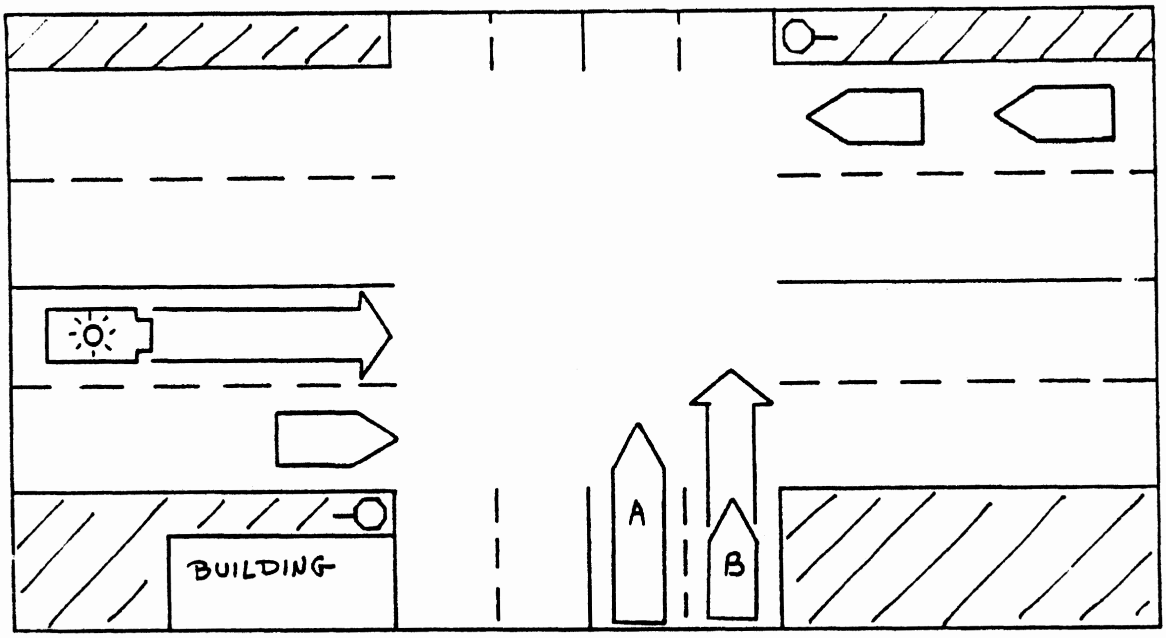
2. What are the effects of following too closely when approaching an intersection?



--Top picture: EV operator has limited his field of vision--he cannot see any of the potential hazards: bicyclist, pedestrian, or either vehicle that will cross the intersection.

--Bottom picture: All potential hazards and one of the stop signs can be seen by this EV operator who is following at a safer distance.

3. Vehicle "A" is a large truck. Why is this EV operator in trouble? What problems does the building create?



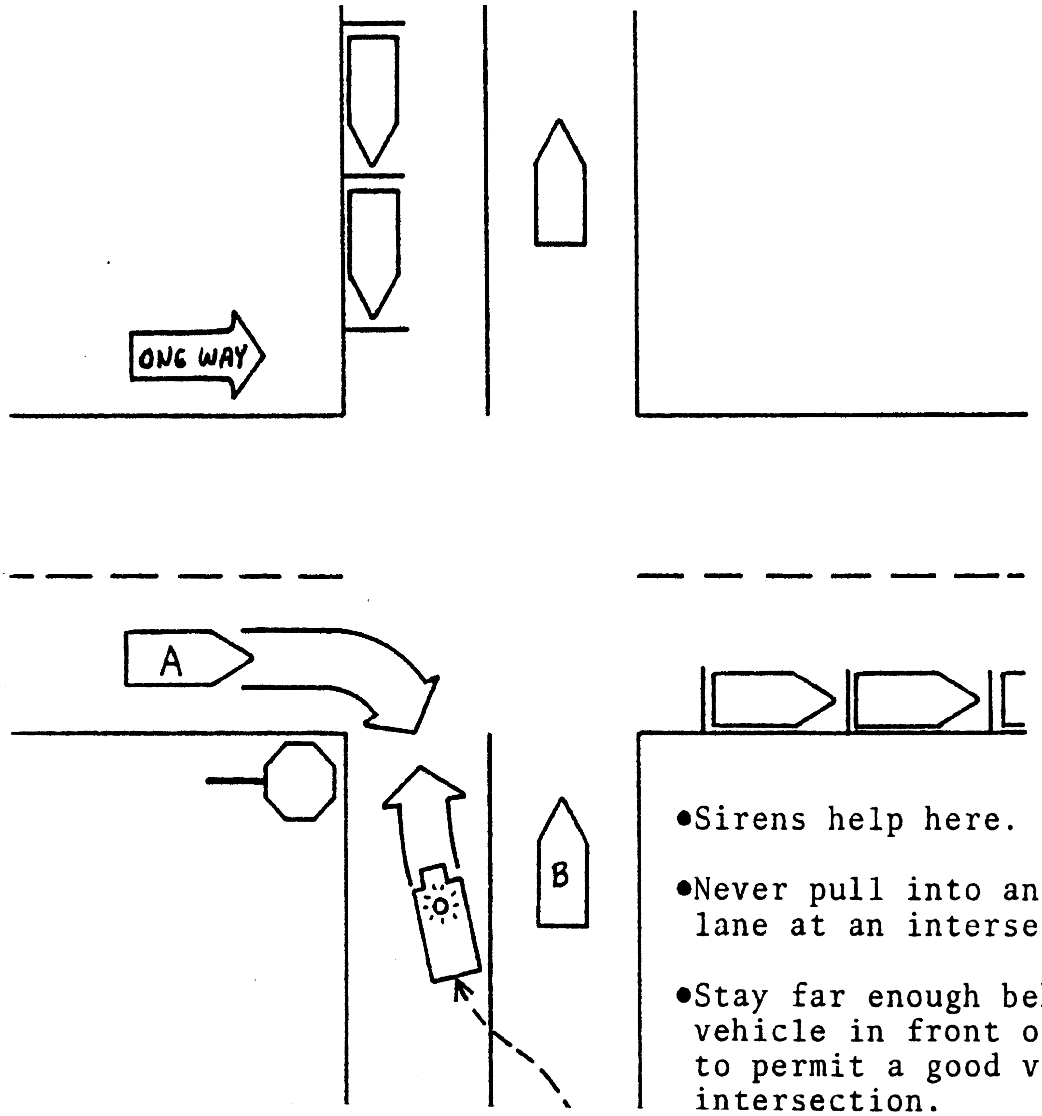
--Vehicle B does not see or hear EV. (The building blocks most of the siren sound.)

--If the EV does not slow down almost to a step at the intersection, a collision is probable.

--One useful trick is for the EV operator to look under the wheels of truck A. He might see B in time to take appropriate action.

4. Driver "A" looks left before turning right. He doesn't expect any oncoming traffic from the right. How cna the EV operator avoid such problems?

(Present transparency)



•Sirens help here.

•Never pull into an oncoming lane at an intersection.

•Stay far enough behind the vehicle in front of the EV to permit a good view of intersection.

5. How would you handle this situation -- discussion.

Situation:

It can be hazardous when one EV operator follows another EV operator through an intersection. A motorist who has waited at the intersection and yielded to the first EV will, in many cases, proceed to drive through the intersection when the first EV has passed, not expecting the second EV to be so close behind, or perhaps not expecting it to be there at all. WHAT SHOULD AN EV OPERATOR WHO IS FOLLOWING ANOTHER EV DO?

--Stop at the intersection, or slow until you are sure of other motorists' reactions.

--Use different siren pitch or warble than the lead EV is using.

TURNING AROUND TO REVERSE DIRECTION

Turnabouts

A turnabout is the fastest way to turn around to the reverse direction.

A. Any kind of turnabout can create a hazardous situation when performed on a street.

--Turnabouts are illegal in some states unless the EV is in the emergency mode.

--In congested areas, going around the block may not only be safer, but also faster.

B. Choosing a safe location for a turnabout is important; choose an area with good visibility. You should have a clear view of the entire path of travel and all traffic lanes.

--Avoid hills, curves, and blind intersections.

C. Types of turnabouts (in order ot increased hazard potential).

1. U-turns
2. Two-point turns
3. Three-point turns

--the Y-turn and bootleg turn should be avoided--they are hazardous.

U-turns

A. U-turn is the least hazardous type of turnabout.

B. U-turn is easiest to perform but requires a wide roadway and good visibility.

C. U-turn is illegal in many areas. EVs are not exempt from this law unless they are in the emergency mode.

--Using the appropriate turning radius of the EV's the students will operate on the job, indicate the number of 12' lanes required for a U-turn. For example, about 40' is required for a U-turn in a sedan.

-Make this point to the students.

The fewer traffic lanes crossed, the safer the U-turn.
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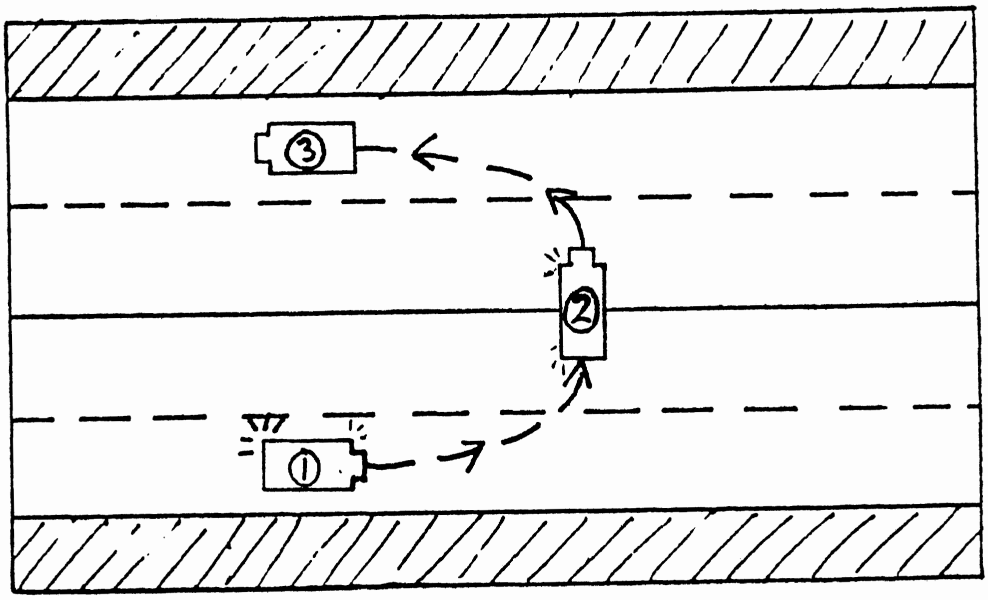

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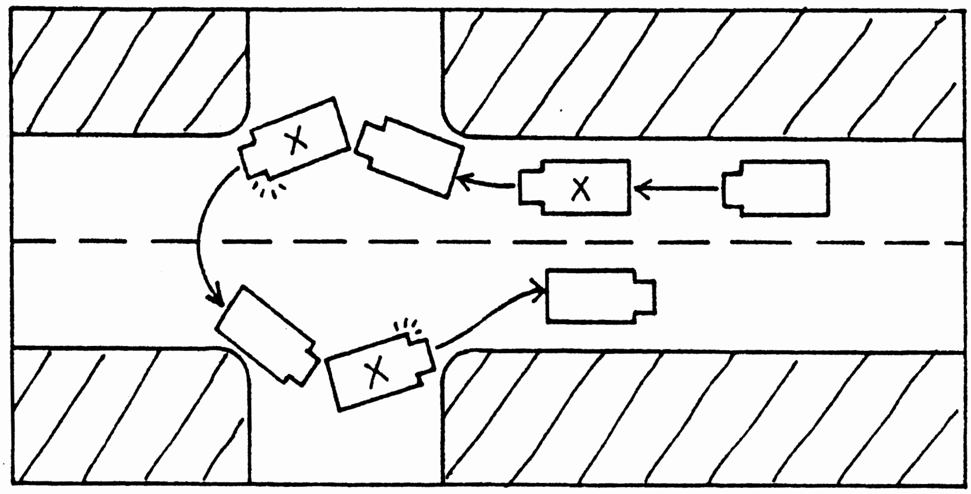

U-Turn using intersection. Check Traffic at X.

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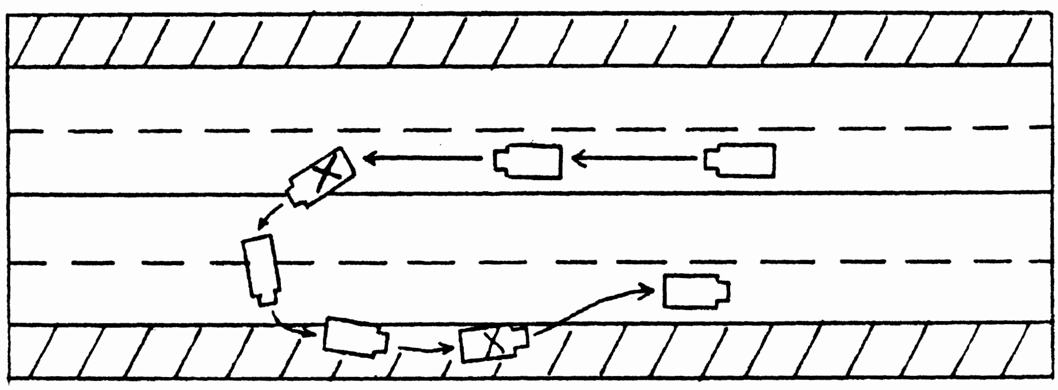
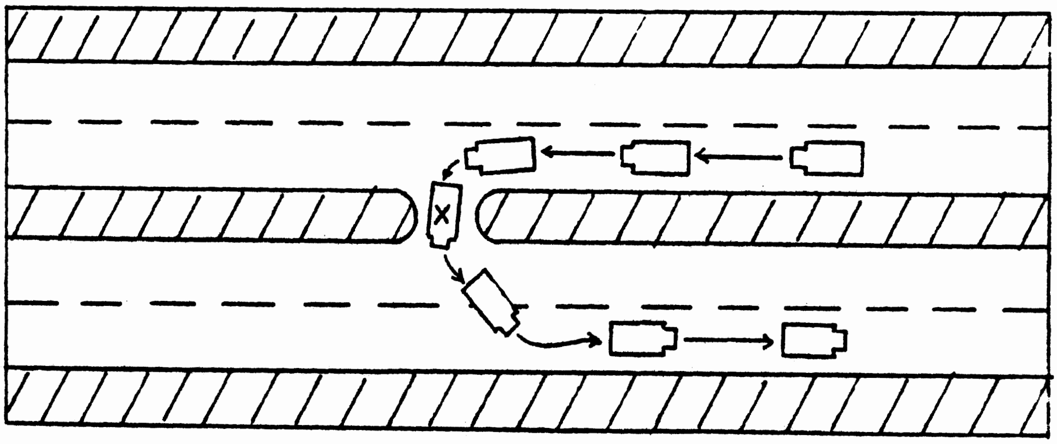
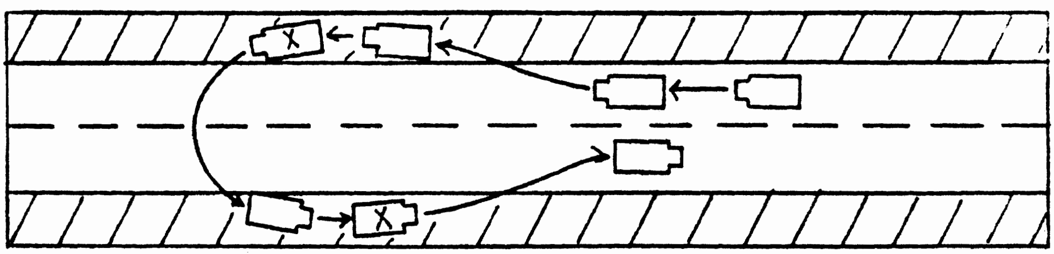


Check Traffic at X.



10' Median - Check Traffic at X. (Vehicles with a long wheelbase may need to execute this turn from the outer lane).



Check Traffic at X. Heavy EV's--watch out for soft shoulder!

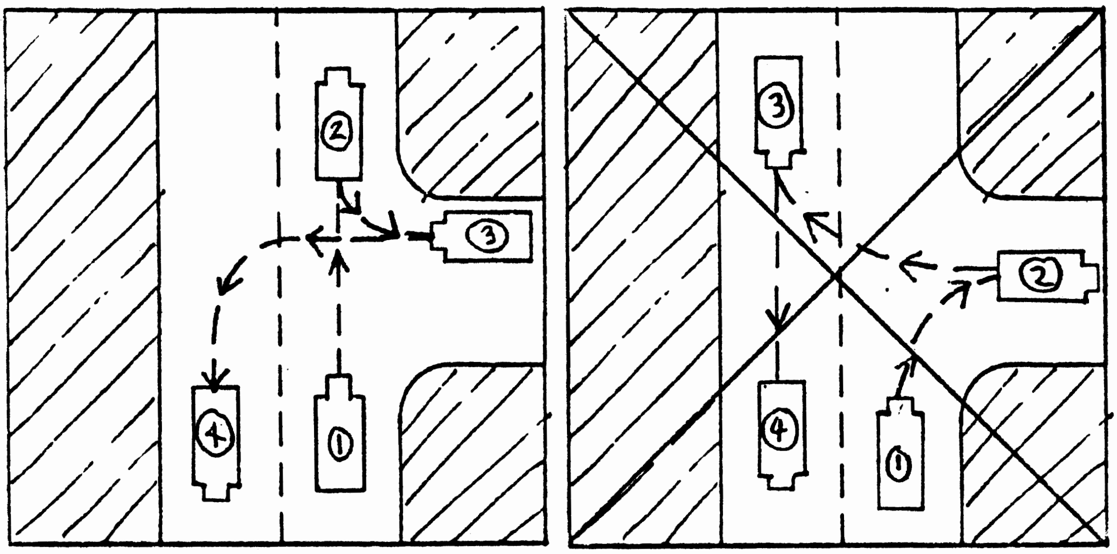
Two-Point Turnabouts

A. These turns are made when the road is too narrow, or restricted visibility won't permit a U-turn.

--The type of turnabout made depends on whether there is a side road or alley on the right or left side of the road.

--Driveways are private property. Don't use them. (They may not support the weight or larger vehicles)

B. Right Side-Road Turnabout (Present transparency)



Good Not Good

Right Side-Road Turnabout

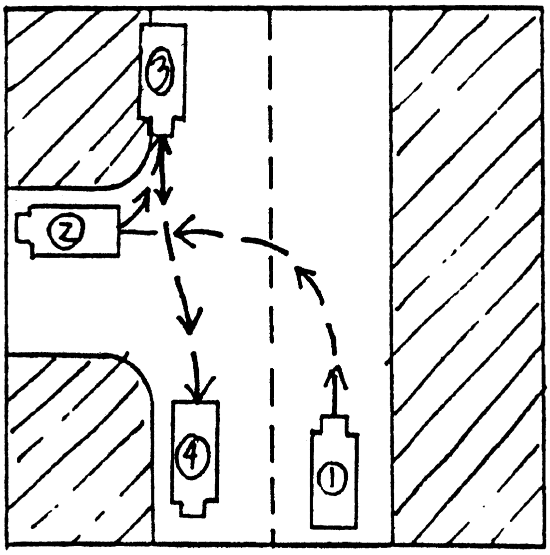
--Ask the students why one method is good and one is not good. (Answer: backing into side-road eliminates necessity for backing across two lanes of traffic.)

C. Left side-road Turnabout:

Left side-road turnabout is more hazardous than the right side-road turnabout.

(Present transparency)

--Explain turn. Note that at position 3 the EV is partially off the road. This minimizes the hazard of backing into traffic.



Left side-road turnabout

Three-Point Turnabouts

A. These are the most hazardous turnabouts

B. They should be used only when:

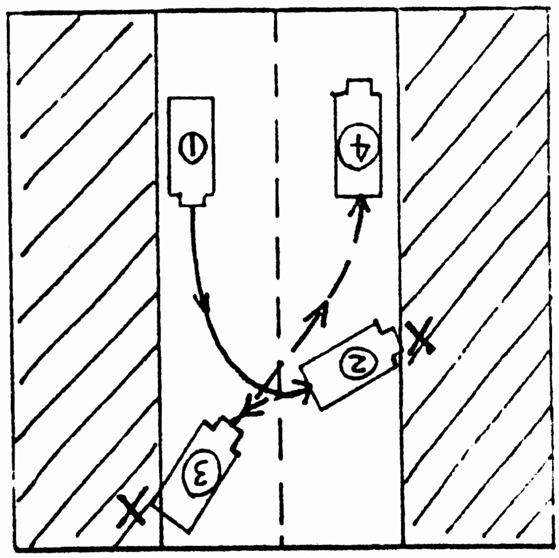
1. The road is too narrow for a U-turn
2. There are no alleys or side roads on either side
3. Traffic is light

C. Y-turnabout. The front and rear of the EV will extent over the curb during the maneuver.

--If curb is high, it could damage undercarriage.

--Big disadvantage is that traffic is crossed three times.

(Present transparency)



Y-turnabout

D. Bootleg-turnabout. This is faster than the Y-turnabout, but harder to perform well.

--The EV only crosses traffic once in a bootleg-turnabout.

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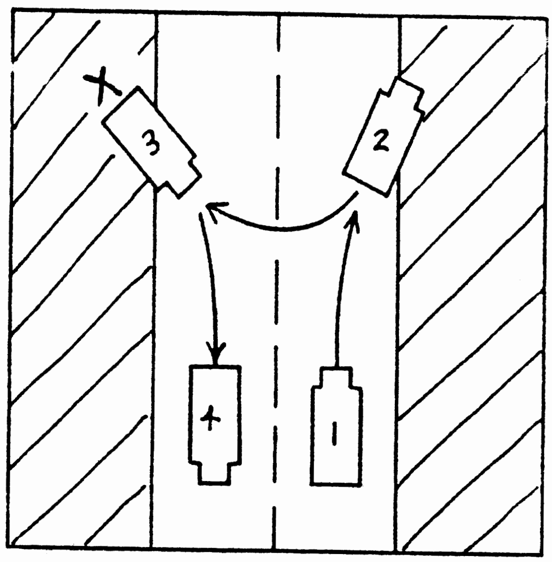


Bootleg-turnabout

Considerations: Turnabouts in the Emergency Mode

A. In emergency mode, if any exemptions are being exercised (e.g., U-turn where illegal), emergency signaling equipment must be activated.

B. Emergency mode may dictate performing more hazardous types of turnabouts.

FOLLOWING ANOTHER VEHICLE

In 1974, approximately 150,000 disabling injuries and 500 deaths resulted from accidents caused by vehicles that were following too closely. Three things the operator must learn to be able to follow at appropriate, safe distances:

A. What is a safe following distance?

B. Techniques to help judge or estimate following distance

C. When to increase following distance

What is a Safe Following Distance?

An EV operator is following at a safe distance if he can:

A. Stop without mishap if the vehicle in front comes to a sudden stop, or

B. Take evasive action (steer around) to avoid mishap if the vehicle in front comes to a sudden stop

--Tell the students that evasive actions will be covered more fully in a later unit.

Estimating Following Distance

--Ask the students what information they need to estimate appropriate following distance.

--How stopping distance relates to vehicle speed (and weight).

--Relationship between stopping distance and following distance.

--Guidelines to make judgment of the appropriate following distance easier.

A. What is stopping distance?

--Write the following equation on the chalkboard:

  Reaction Distance
+ Braking Distance
= Stopping Distance

1. Reaction Distance is the distance a vehicle travels from the time the driver recognizes the need to stop until brake pedal movement begins.

a. Average drivers require about 3/4 second to react.

--Factors influencing reaction time are:

--Driver alertness (fatigue, drugs, allergies, etc.)
--Driver capability (vision, performance under stress, etc.)

b. Distance traveled in 3/4 second will be greater as vehicle speed is increased.

2. Braking distance is the distance traveled from the first brake pedal movement until the vehicle comes to a full stop.

--There is no "average" braking distance. Braking distance varies greatly according to:

--Vehicle speed (higher-speed--greater braking distance)

--Vehicle weight (heavier vehicles tend to require greater stopping distances).

--Road surface, both composition (asphalt, concrete, etc.) and condition (icy, rutted, etc.).

3. Stopping Distances for various types of vehicles at various speeds are shown in the chart on the next page.

a. All stopping distances on the chart assume driver uses 3/4 second to react.

b. All stopping distances on the chart are based on "hard, dry surfaces."

--Ask the students to use the chart to estimate the total stopping distances for each type of vehicle at 70 mph.

--Sedans--about 530 feet
--Light trucks--about 560 feet
--Heavy 2-axle--about 610 feet
--3-axle--about 680 feet (more than 1/8 mile)

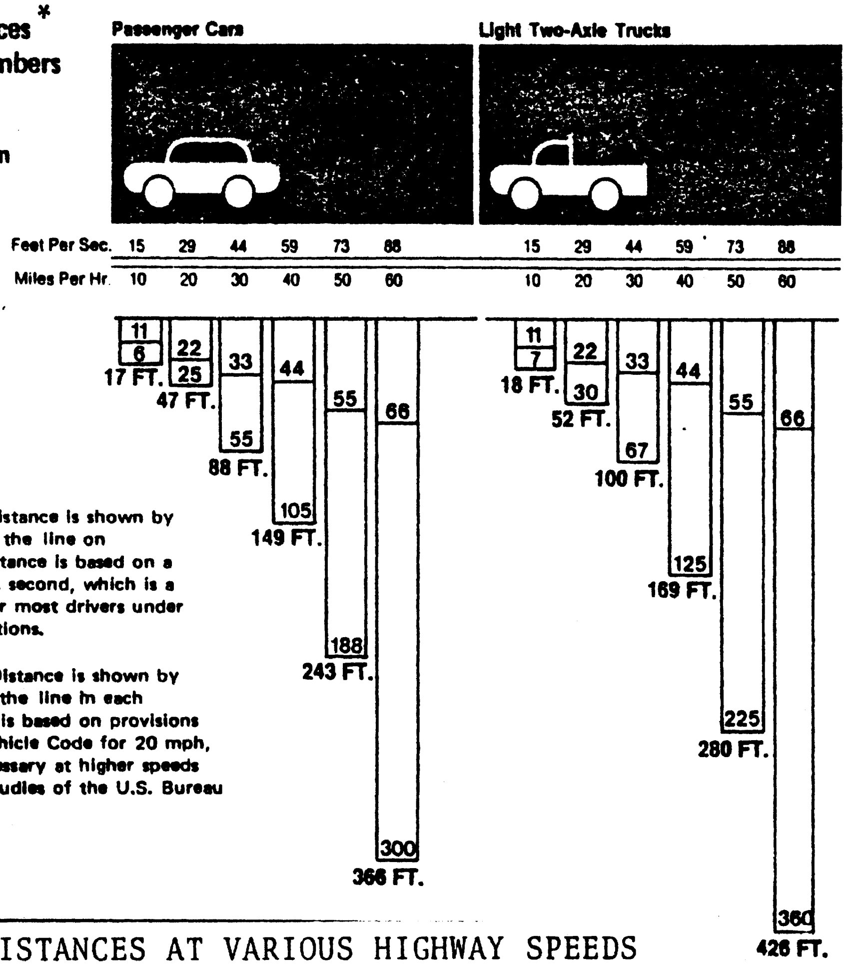
Summarize as follows:

--The heavier the vehicle, the longer it will take to stop.

--The higher the speed, the longer it will take to stop.

Total Stopping Distances* are Shown by the Numbers Below Each Bar

All Distances Are Based on Hard Dry Surfaces

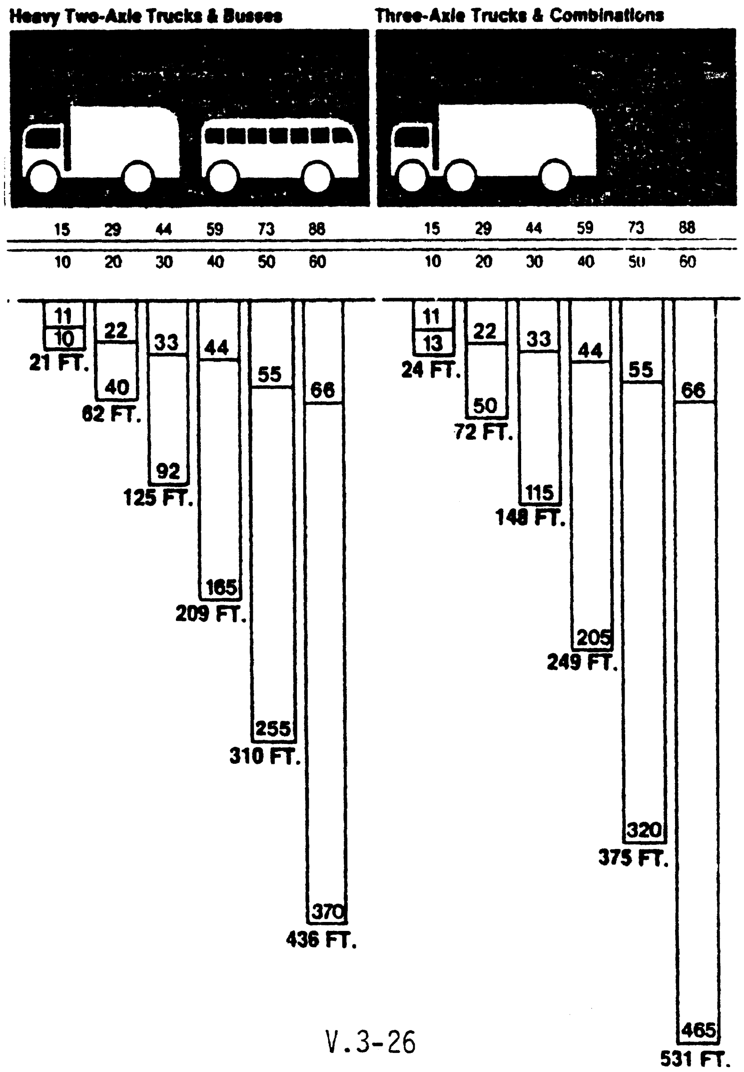


Driver Reaction Distance is shown by the number above the line on each bar. This distance is based on a reaction time of ¾ second, which is a typical reaction for most drivers under most traffic conditions.

Vehicle Stopping Distance is shown by the number below the line in each bar. This distance is based on provisions of the Uniform Vehicle Code for 20 mph, adjusted when necessary at higher speeds to conform with studies of the U.S. Bureau of Public Roads.

STOPPING DISTANCES AT VARIOUS HIGHWAY SPEEDS

*Adapted from Employers-Commercial Union Companies



--How to tell when the EV is far enough behind:

1. Following at the full stopping distance (as shown on the chart) is not only unnecessary, it is also impossible!

   --If an EV were traveling that far behind a vehicle in front, other vehicles would constantly pass the EV.

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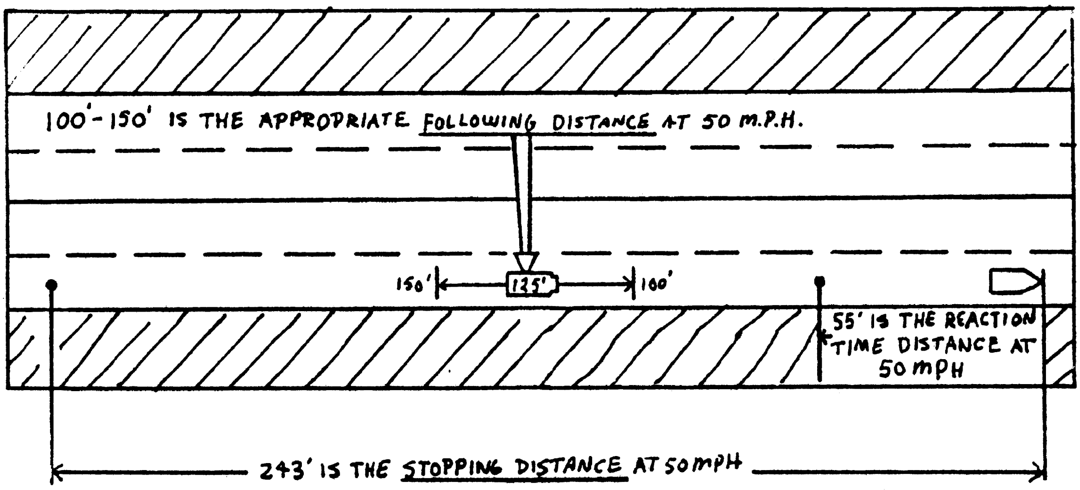

2. An appropriate following distance will allow enough time to come to a complete stop if lead vehicle panic stops (stops as fast as possible by braking).

   --Therefore, safe following distance is greater than the distance required for reaction time, but less than total stopping distance.

--Write the general rule for calculating following distances (for sedans) on the chalkboard.

MPH (Vehicle speed)

x 2

Minimum following distance (in feet).

3. Two ways to judge following distance:

--Explain that it is hard to judge when a vehicle is 125' away. It is much easier to approximate the distance in terms of car lengths or in terms of the number of seconds apart the vehicles are.

a. Estimate car lengths--one car length for every 10 mph. A full-sized car is approximately 20 feet long--estimating car lengths provides minimum following distance.

b. <u>Two-second rule</u>--keep a separation of at least two seconds between the EV and the vehicle being followed.

--Three seconds is a lot safer.

--Three seconds recommended for larger vehicles.

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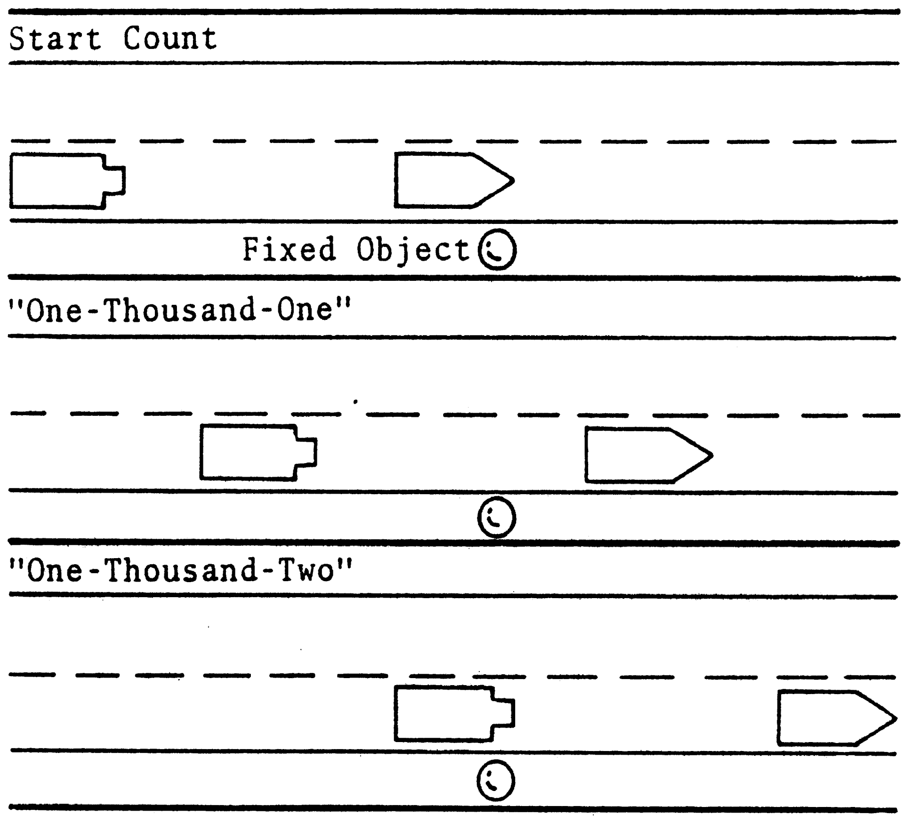


--Use the transparency to explain the two-second technique.

--Begin counting (1001, 1002, etc.) when the vehicle in front passes a market on or beside the road.

--A pole, sign, or tree would be a good marker.

--Stop counting when the EV reaches the same marker.

--Explain how using the two-second method will automatically increase the following distance as speed is increased.

--Discuss the merits of each method of judging following distance; be sure to provide the following information:

--Car Length method--focus of eyes stays constant, but proper estimates are difficult for many people.

--Two-second method--once learned, allows more precise estimates of adequate following distance, but the need to shift the focus of eyes can reduce operator's ability to detect hazards.

--It is a good idea for every operator to try both methods and select the one that works best for him. The two methods can be "checked" against each other to get a feel for appropriate following distance.

When Should Following Distance Be Increased?

A. Increase following distance by 50 percent: if vehicle ahead is unusual, EV is large and/or heavy, EV is not adequately maintained.

   --Fire apparatus would safely use a three-second rule or one apparatus length for every 10 mph.

B. Double following distance: if road surface is loose or slippery (wet, dirt, gravel) vision is obscured (rain, fog, dust, smog) or driver is not fully alert.

C. Triple following distance: if road surface is packed snow or icy.

Practice

--Select two students and give some time to answer each of the following questions. Make sure the answers that appear below are covered. Encourage class participation and discussion.

A. A police officer is driving to the station at the end of a shift. He is very tired and the road is covered with hard snow. By how much should be increase his following distance?

   --The fact that the officer is tired, and perhaps not fully alert, would indicate that following distance should be doubled. Since the road is covered with snow, however, following distance should be tripled.

B. A large fire apparatus (elevated platform) is being driven on a high-speed expressway. The operator is taking the apparatus to the city garage for service; some difficulties in the vehicle's braking system have been observed. By how much should the driver increase following distance?

   --In this instance, since the vehicle is a large, heavy apparatus normal following distance would be three seconds or one apparatus length for every 10 mph. Since the vehicle is not in good condition, following distance should be increased by 50 percent (to approximately five seconds or 1-1/2 apparatus lengths for each 10 mph.)

Considerations: Following Distance in the Emergency Mode

A. In spite of the stress and urgency of an emergency run, the laws of physics do not change. It still takes 243 feet to stop a sedan from 50 mph, and longer for larger vehicles!

B. Should following distance be decreased when traveling in the emergency mode?

--Discuss the following points. The key realization the students should reach is that they don't gain anything by reducing following distance in the emergency mode.

--Many operators' reactions and performance get worse under stress. Each operator must learn his own individual capacity to respond to stress.

--Motorists may react is crazy ways to lights and sirens. If they stop or slow drastically, the EV operator needs the full amount of following distance to respond.

--A greater following distance permits the EV operator to get the "big picture" of the traffic situation.

PASSING ANOTHER VEHICLE

How Long Does it Take to Pass?

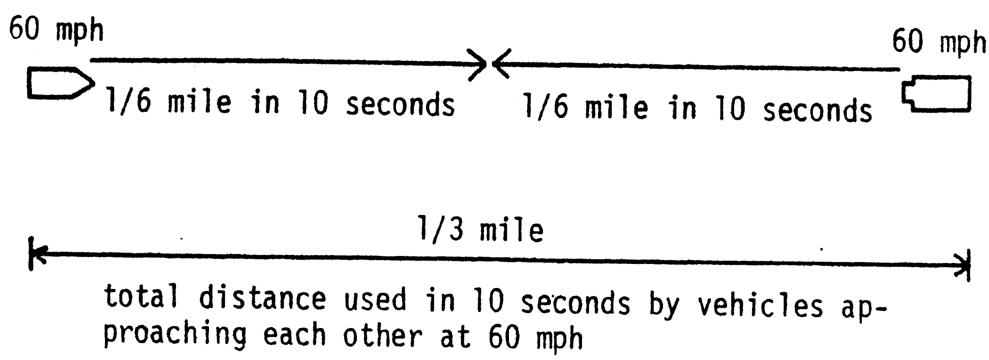
A. At highway speeds (40 to 60 mph) in a sedan, a safe pass can be completed in 10 seconds.

--Explain how passing time varies for different types of vehicles because of the variation in vehicle's accelerative capabilities.

1. Figures assume the EVs starting speed is approximately the same as that of the vehicle to be passed.

2. Figures allow a complete pass (including smooth return to the right lane).

B. In terms of distance, a 10-second pass requires 1/6 mile at 60 mph. Due to the possibility of an oncoming vehicle, operator must allow 1/3 mile of visible roadway before initiating a pass.



--Explain how the EV on the right needs a clear path of nearly 1/3 mile for a safe pass.

--Present, in general terms, the passing distance and visible roadway distance requirements for various speeds.

STARTING SPEED	PASSING DISTANCE	VISIBLE ROADWAY
30 mph	450 ft.	900 ft.
35 mph	525 ft.	1050 ft. (1/5 Mile)
45 mph	675 ft.	1350 ft.
55 mph	825 ft.	1650 ft.
60 mph	900 ft.	1800 ft. (1/3 Mile)

--Tell the students:

--Some drivers have trouble building a "mental picture" of distances.

--One way to learn to perceive those distances is to make a mental note of vehicle size and road convergence at expressway exit points when the signs indicate the mileage to the exit.

--1/10 mile markers are also useful in learning to judge distances.

Considerations Before Passing

--Before beginning discussion of this topic, list on the chalkboard the three items to be considered before passing.

--Vehicle Characteristics
--Road Information
--Traffic Situation

A. Vehicle Characteristics. Operator should be familiar with specific vehicle. If operator drives different vehicles daily, he must check out and familiarize himself with the specific handling characteristics of each vehicle.

--Familiarity with a vehicle can be enhanced by a thorough inspection every day.

1. Accelerative capacity?
2. Steering precision?
3. Braking capability?

--Braking capability can become tremendously important should the operator unexpectedly have to abort a pass.

B. Road Information: Critical to successful passing. Kind of information to look for:

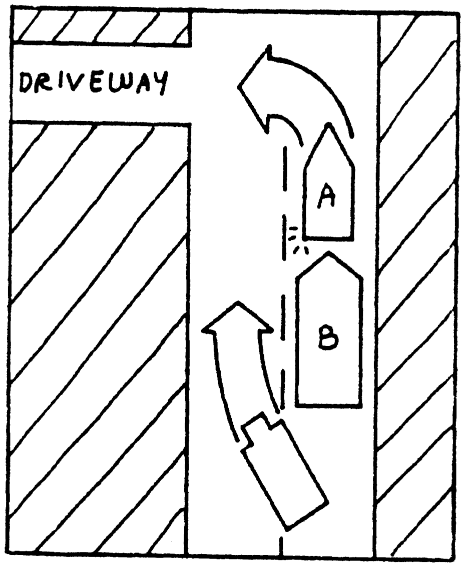
1. Informational signs: "No Passing," "Intersection Ahead," etc.
2. Road Markings: solid center-line, broken center-line, etc.
3. Road configuration: hills, blind curves in intended passing area, intersecting roads, etc.

--Emphasize the following points:

--Many road markings and signs forbid passing for no apparent reason. Usually, however, there is a good reason: hidden driveway, school, damaged road surface, poor road design, etc.

--One good way for an EV operator to become a safer driver is to become familiar with his area. It is especially important to be alert for new road markings and signs.

--A pass should never be attempted on a stretch of road where there are intersecting roads, even driveways.



--Make these points about the above illustration.

--Never pass a stopped car (or line of cars) without first determining why it is stopped.

--The EV did not take the time to determine why the truck (B) was stopped. Had he done so, he never would have attempted to pass.

--If the operator were very familiar with the area, he might have known why the truck was stopped.

C. Traffic Situation:

1. Speed of traffic flow.

   a. Passing a vehicle that is traveling at the maximum posted limit is ILLEGAL unless EV is in emergency mode.

   b. On two- and three-lane roads, when traffic flow is heavy but moving at a constant speed, there is little to gain by passing.

2. Distance of oncoming traffic. How much of the oncoming lane of traffic is visible?

--Tell the students the following kinds of things can limit visibility:

--Blind curves

--Hillcrests

--Bad weather (fog, heavy rain, etc.)

--Emphasize the following points:

--Never pull abreast of another vehicle unless you are sure the pass can be completed safely.

--On two- and three-lane roads, never pass stopped traffic unless certain there is space ahead to return to right lane.

--When deciding to pass a larger vehicle, it is sometimes necessary to pull slightly left (straddle the lane) in order to determine the traffic situation ahead.

Executing a Passing Maneuver

This maneuver assumes starting from a safe following distance.

A. Check traffic--mirrors, blind spot.

B. Signal before lane change.

C. Accelerate while changing lanes.

D. Signal before returning to right lane.

E. Return to right lane when all of passed vehicle is visible in rear-view mirror.

F. Cancel directional signal, resume cruising speed.

Being Passed

EVs are passed less often than other vehicles. When being passed certain courtesies should be extended:

A. Do not change speed while being passed.

--Operator should keep constantly aware of the position of surrounding vehicles.

--Often drivers speed up (unintentionally) as the passing vehicle speeds up.

B. If the passing driver gets into a dangerous situation, try to assist.

--Pull as far to the right as possible.

--Accelerate or decelerate as necessary.

Tips for Avoiding Mishaps When Passing

A. If decision has been made to pass, and conditions are okay, DON'T HESITATE - Conditions could worsen.

B. Stay in passing lane shortest time possible.

C. Constantly scan roadway for unmarked, intersecting roads.

--In many states it is illegal to pass if the pass will be in process when a side-road intersects from the left.

--Whether or not it is illegal, it is dangerous!

B. Be prepared to abort if conditions worsen:

--Most vehicles can slow up much more quickly than they can accelerate.

--Unless fully abreast of another vehicle, it is often safer to pull behind than to try to accelerate.

Considerations: Passing in the Emergency Mode

A. Since motorists will attempt to pull over, the need to pass may be reduced.

B. Evaluation of risk vs. gain.

1. Many passing situations are potentially hazardous, involving some risk. In the emergency mode, the gain (e.g., save a life) may justify increased risk.

2. When conditions are ideal, very little risk is involved.

--Ideal conditions:

--Vehicle in good shape.
--Road information okay.
--Traffic situation light (or okay for passing).

3. When one or more conditions are questionable, risk increases.

--Ask the students the following questions and discuss.

a. How important is saving time?

--Out-of-control fire in apartment building vs. brush fire in an isolated field?

--Armed robbery in progress vs. day-old vandalism?

--Childbirth with complications vs. epileptic seizure?

b. How much time will really be saved by passing? (How much faster will the EV be able to travel after the pass?)

c. If passing is delayed for a few moments, might conditions improve?

--Lane markings change.

--Traffic thins out.

--Road configuration improves (e.g., from curves to straight).

C. If may be necessary to execute a "running pass."

--Explain how a "running pass" works.

--Delay pulling into left lane.

--Build up speed in the right lane; activate turn signal.

--Pull out and pass at a higher rate of speed.

--Complete pass normally.

--Have students determine advantages and disadvantages.

--Advantages: time in left (oncoming traffic) lane is reduced.

--Disadvantages: if EV operator decides not to pass, EV will be following too closely--a dangerous situation until rectified.

EXPRESSWAY OPERATION

A. The term expressway as used here includes interstates, freeways, turnpikes, of any other type of limited-access multilane highway.

B. Much of expressway operation is routine, requiring little or no decision making.

--Driving on long stretches of flat, straight road often requires the operator to make a special effort to stay alert.

C. Entering and exiting expressways are maneuvers that place a big demand on the operator to make fast, accurate decisions in rapid succession.

D. Driving at the speed limit requires constant awareness of the road and traffic environment.

<u>Entering and Exiting Expressways</u>

A. <u>Cloverleaf intersections</u> can be one of the biggest problems when entering or exiting expressways (see illustration).

--One group of cars is slowing to exit while another group is accelerating to enter.

--The two groups must cross in the right-most lane.

(Present Transparency)

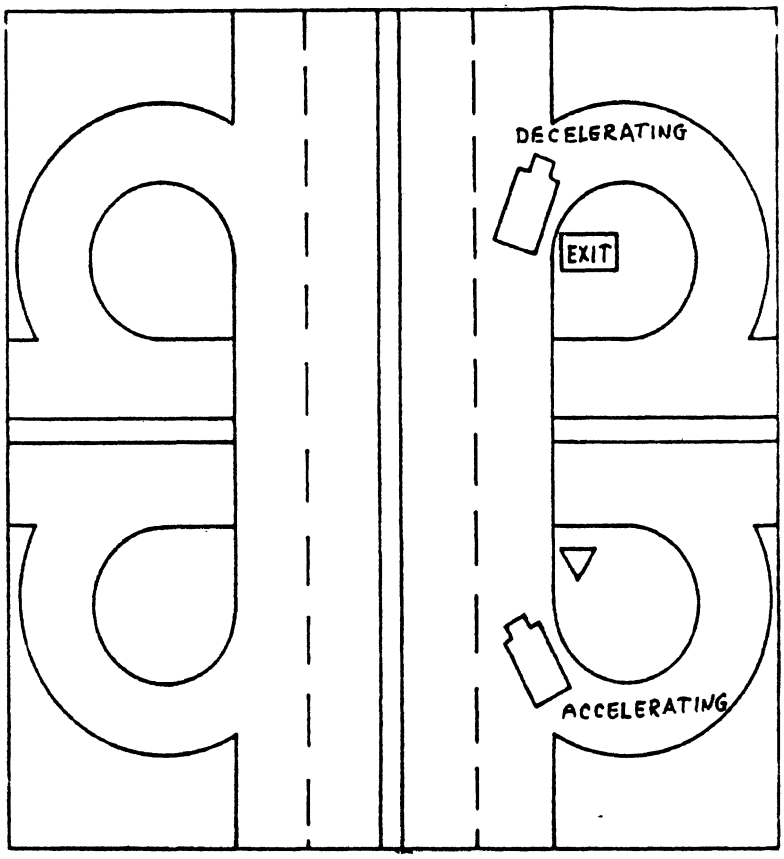
B. <u>Entering an expressway</u>

1. When on the entry ramp, stay well behind the vehicle ahead. Be prepared to stop should the vehicle in front come to a sudden stop due to traffic conditions.

2. While on the ramp, activate left-turn signal.

3. Before entering traffic, watch the traffic for a gap that is large enough to permit entry.

--Car ahead may stop while EV operator is looking back.



4. Adjust speed for merging into the selected gap.

    --Try to avoid coming to a complete stop, if possible.

    --Adjusting, even slowing greatly, is much safer.

--Explain that if there is no acceleration lane, or if the acceleration lane is very short, a "Yield" sign will probable be at the point where the ramp joins the road.

5. Yield signs.

--Ask of the students to explain what a "Yield" sign means. Be sure all students are clear on the correct definition.

--A Yield sign requires the right-of-way to be given (come to a full stop, if necessary) to any traffic that is close enough to be a hazard.

--The Yield sign does not necessarily require a full stop--often slowing down will be sufficient to allow any traffic which could be a hazard to pass.

--A Yield sign at an expressway entrance should cue the operator to the following:

--The expressway probable has a short acceleration lane or no acceleration lane

--The driver behind the EV may not be alert to the fact that the EV may come to a complete stop.

--Ask the students what can be done to avoid being rear-ended

--Check rear-view mirror frequently.

--Brake gradually to allow following driver as much time as possible to slow.

--Pump brakes so brake lights flash on and off.

C. Exiting an expressway. It is important to position the EV in the correct lane as well in advance of the exit as possible.

1. If lanes must be changed to position the EV for the exit ramp, move over one lane at a time, making sure to signal each time.
2. If the same traffic lane is used for both deceleration and acceleration, the operator may have to slow or accelerate quickly to get through and onto the exit ramp.
3. Once in the deceleration lane or exit lane, signal intention to exit.
4. Begin decelerating.
5. Once on the ramp, make sure speed does not exceed the recommended speed.

   --Because they are often curved and narrow, the speed on exit ramps will generally be 20 to 30 mph below highway speed.

   --Check speedometer. After traveling at high speed, drivers often think they are going much slower than they really are.

D. Review of entry/exit considerations

(Present transparency)

--Discuss each key point on transparency.

--Transparency:

--Signal intentions in advance, for entry and exit.

--Accelerate or decelerate in proper lane.

--Watch speed on exit ramps:

--Many exit ramps are tight or changing radius curves. OBSERVE CAUTIONARY RAMP SPEEDS.

--Check speedometer; after traveling at highway speeds, it is difficult to judge slow speeds.

--Discuss the situation illustrated on next page.

Driving at the Limit on Expressways

--Give the students a few minutes to read over the tips for driving defensively (A-E). Then go over each point and encourage discussion. Be sure to emphasize the importance of maintaining at least a two-second following distance on expressways.

Many of the high-speed roads in America have been so well designed and built that it is safer to travel at high speed on these roads than at low speed on less modern roads. Some hints for safe driving:

A. Look far ahead. Keep in mind that stopping distance at 55 mph is over 300 feet (for sedans).

   1. Operator should learn to spot potential trouble as early as possible.
   2. Look beyond the car in front.
   3. Watch for brake lights or a puff of dust or any other sign of trouble ahead.
   4. The earlier the EV operator can begin to react to trouble, the more likely it is that trouble can be avoided.

B. Match EV's speed to the cars around. Don't go over the limit, but don't go too slow either. Both can be dangerous.

C. Get away from the "pack." When a cluster of cars goes down the highway together, each driver depends on all of the others to drive carefully. Defensive driving means assuming the worst about the others on the road, and being ready for anything. If a cluster of cars is ahead, stay behind until it breaks up. If a cluster of cars comes up from behind, slow down enough to let them go by.

D. Use mirrors every few seconds. The EV operator needs to be aware of all vehicles surrounding the EV.

E. Signal lane changes well in advance. Change lanes only when sure the other lane is clear. Remember, turn signals do not grant the right to move over, Some drivers act as if they did.

DISCUSSION QUESTIONS:

You are driving the EV marked "U." You want to leave the expressway at this exit.

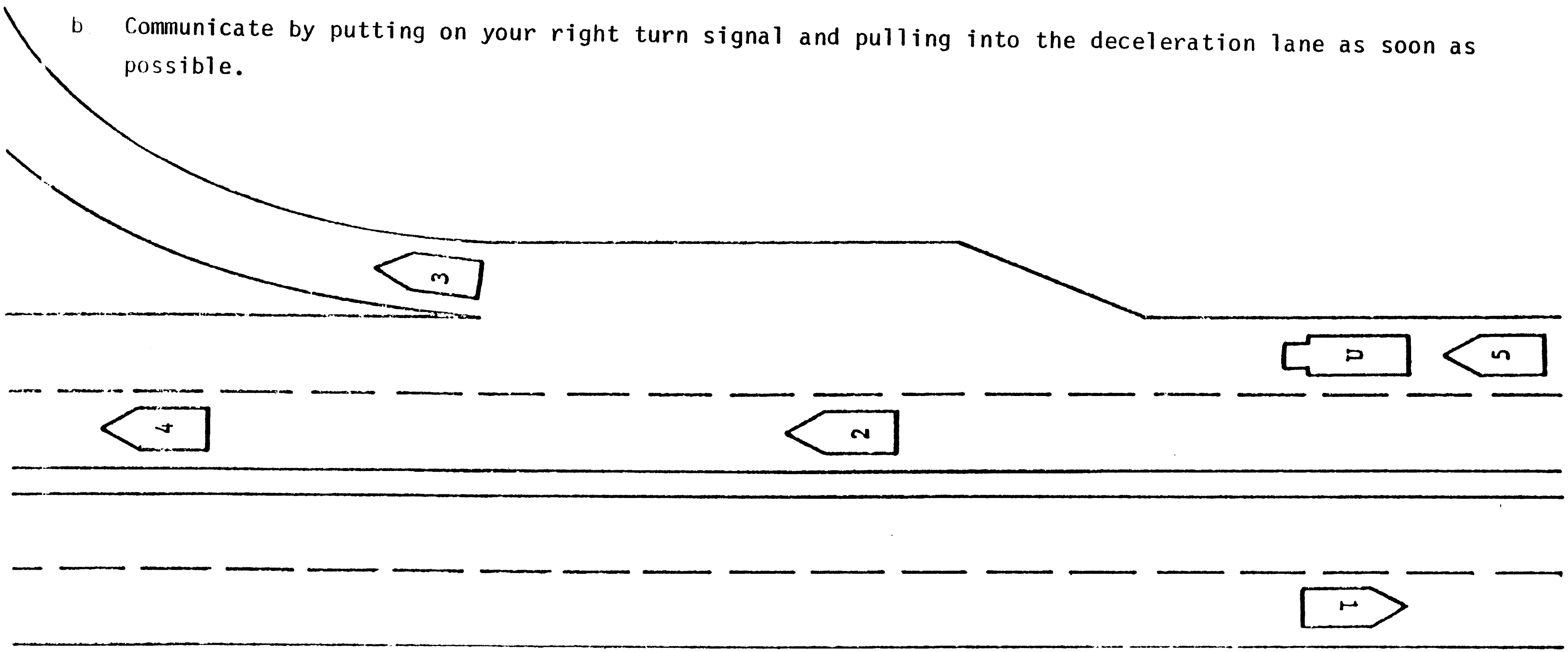
a. Circle the main things you should be observing.

b. How would you communicate that you want to leave the expressway?

Answer:

a. Car No. 3, because it is in your path; Car No. 2, because it could suddenly move toward the exit; Car No. 5, because it is close behind you.

b Communicate by putting on your right turn signal and pulling into the deceleration lane as soon as possible.



a. Make a normal entry.

b. Assess traffic-flow conditions and choose lane for emergency run or high-speed operation before activating lights and siren.

2. Avoid weaving from lane to lane with lights and siren on.

--Again, motorists can become confused. They will tend to pull right, perhaps into the EV's path.

3. Motorists may be unaware that EV is in emergency mode if:

a. EV is traveling fast (EV may be driving "ahead of siren").

b. There is low sun or glare (may obliterate lights).

B. Beltway: A continuous-loop freeway or expressway, generally surrounding a large, metropolitan area.

--Embarrassingly, EV operators often go the wrong way on beltway.

--Beltways are often identified as inner/outer loop.

--Clear communications with dispatcher required.

1. Determine proper entrance to use.

2. Determine if destination is East or West (North or South) of a given exit.

3. If accident, in East or Westbound (North or Southbound) traffic flow?

--What are the local conventions for designating direction on beltways? (E.g., When does West change to North?)

C. Local expressway

--Discuss local expressway configurations.

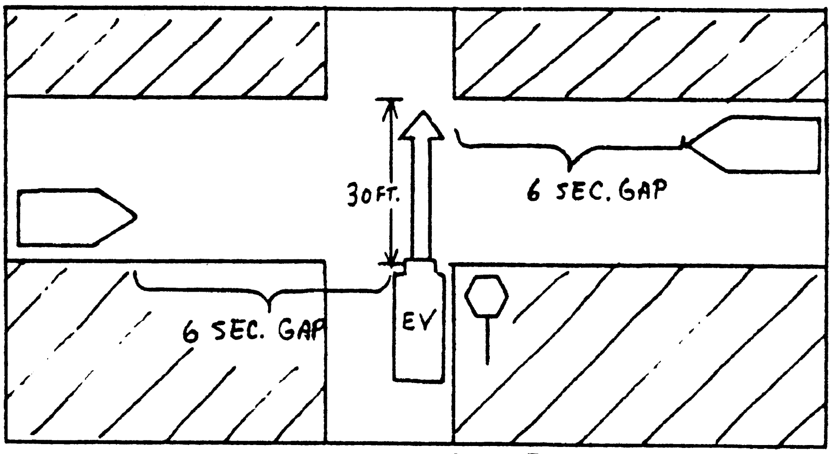
--Are there any local names used for expressways (e.g., "Parkway West")? Are the names misleading? (Does "Parkway West" refer to a direction on the expressway or to a section of the expressway?)

--Are there any limited entrance/exit points (e.g., interchanges where EV operator could not get on and off in both directions)?

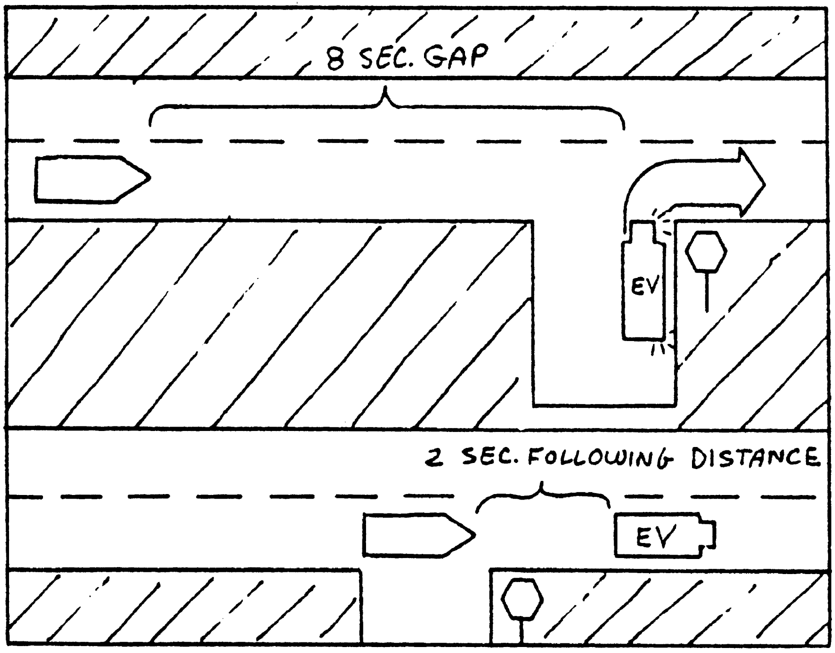
--Are there places where turnabouts can be made?

--What are the best exists for emergency facilities (e.g., hospitals)?

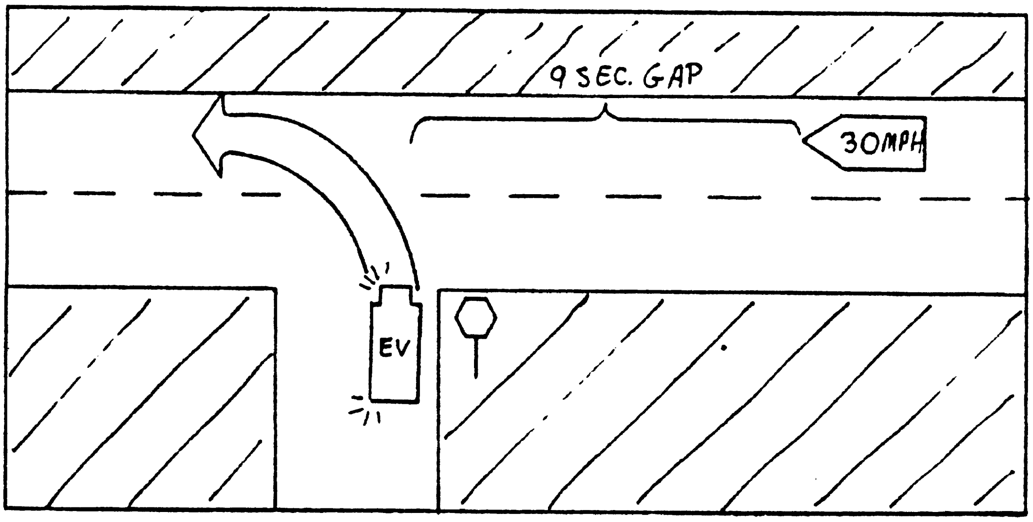
--Are there rush hour peculiarities (e.g., bottlenecks, changes in lane usage)?



6-SECOND GAP
CROSSING AN INTERSECTION **a.**

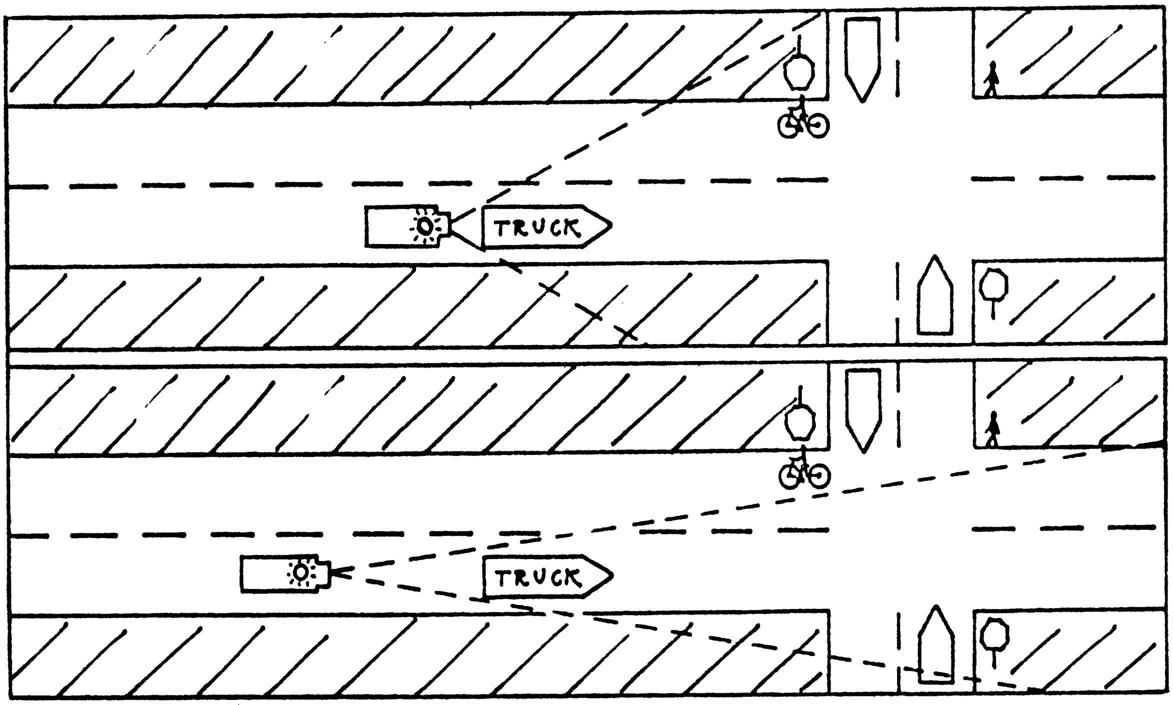


8-SECOND GAP
RIGHT TURN AT AN INTERSECTION **b.**



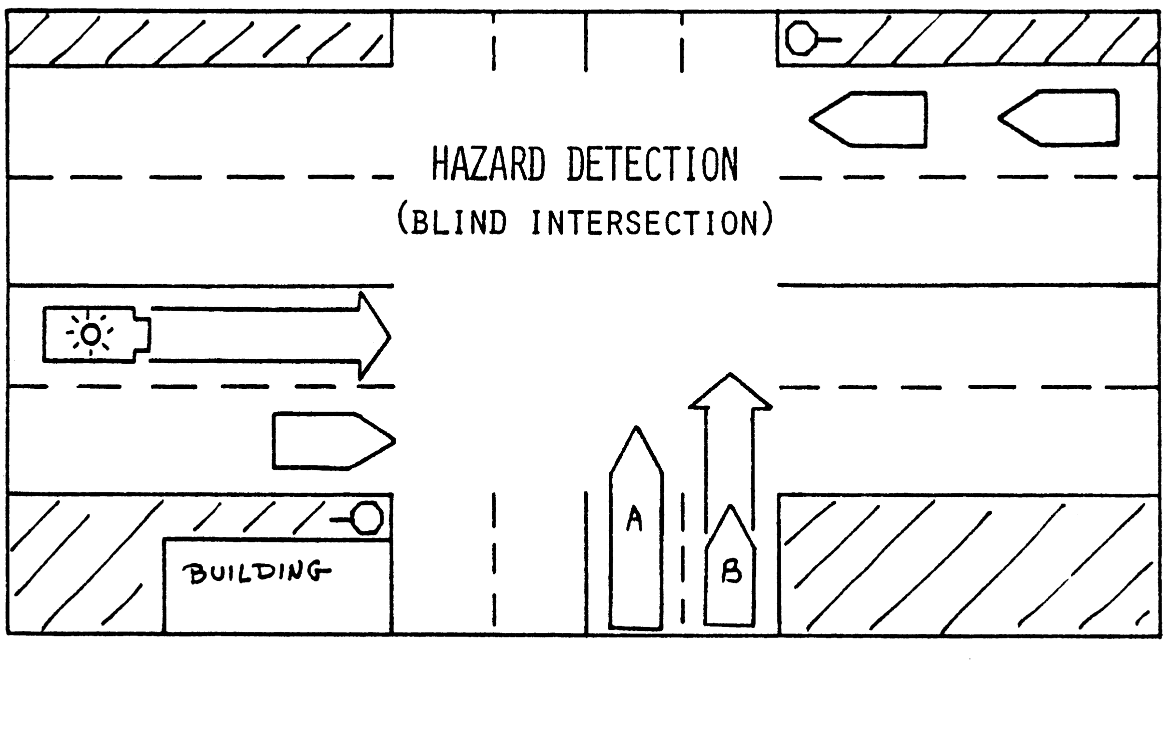
9-SECOND GAP
LEFT TURN AT AN INTERSECTION **c.**

a.

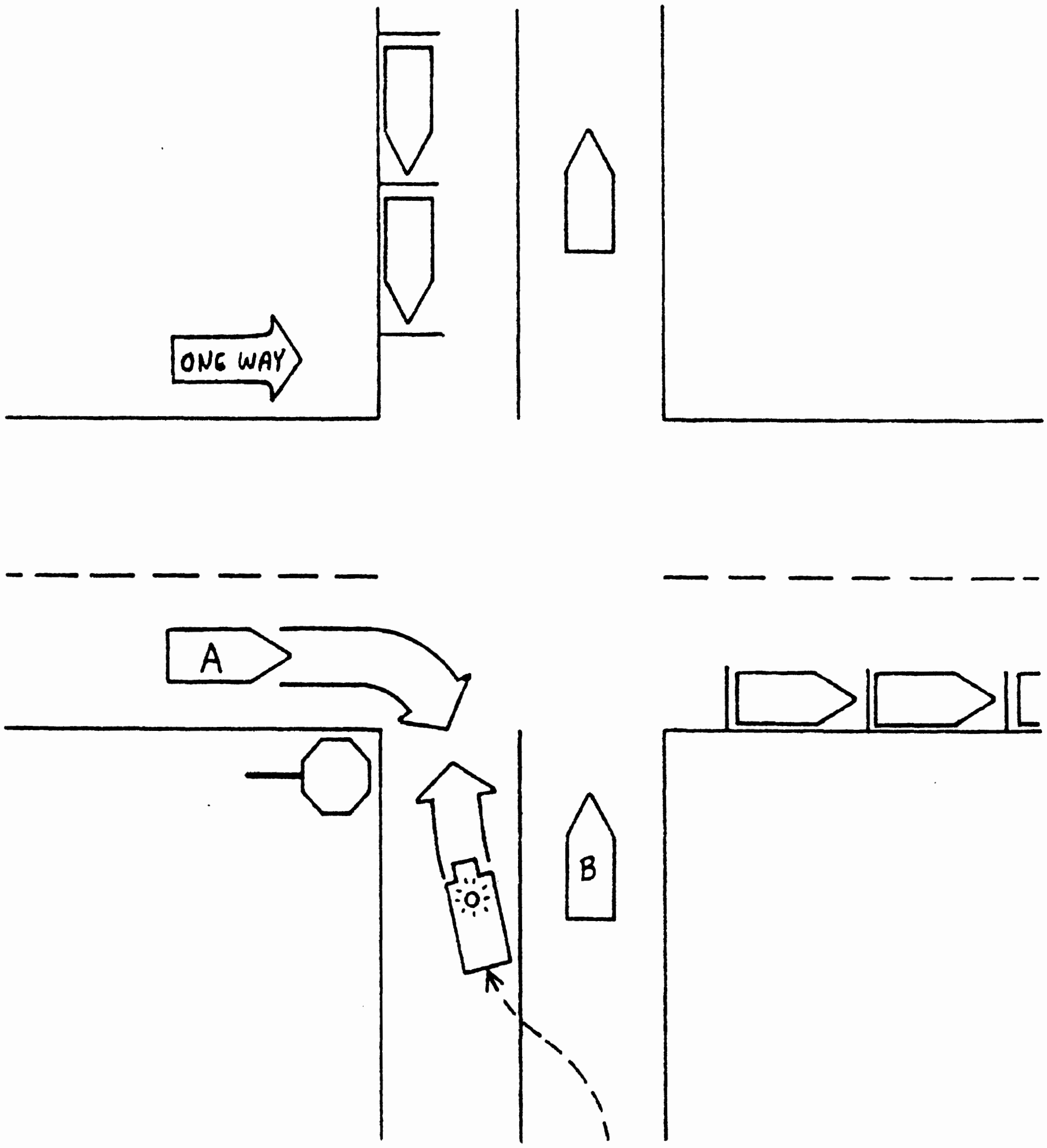


HAZARD DETECTION
(FOLLOWING DISTANCE)

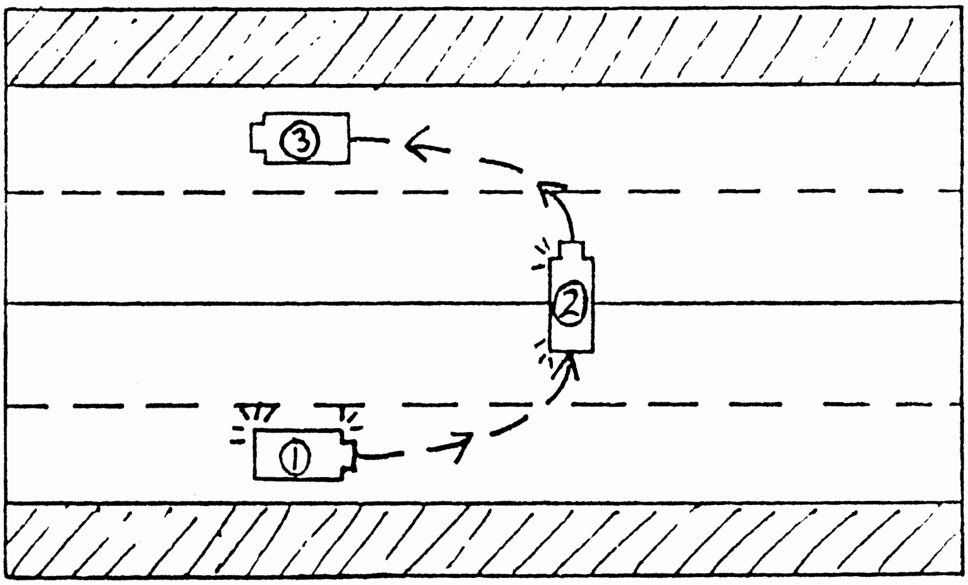
b.



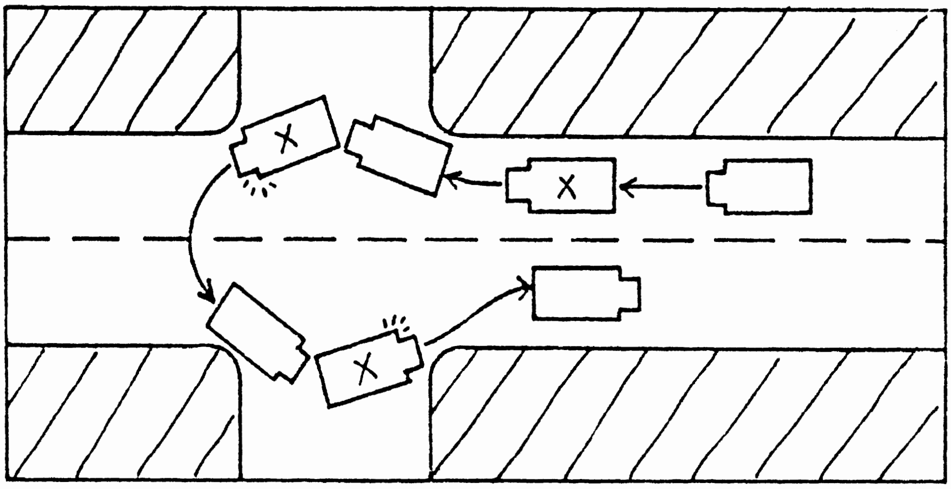
HAZARD DETECTION
(BLIND INTERSECTION)



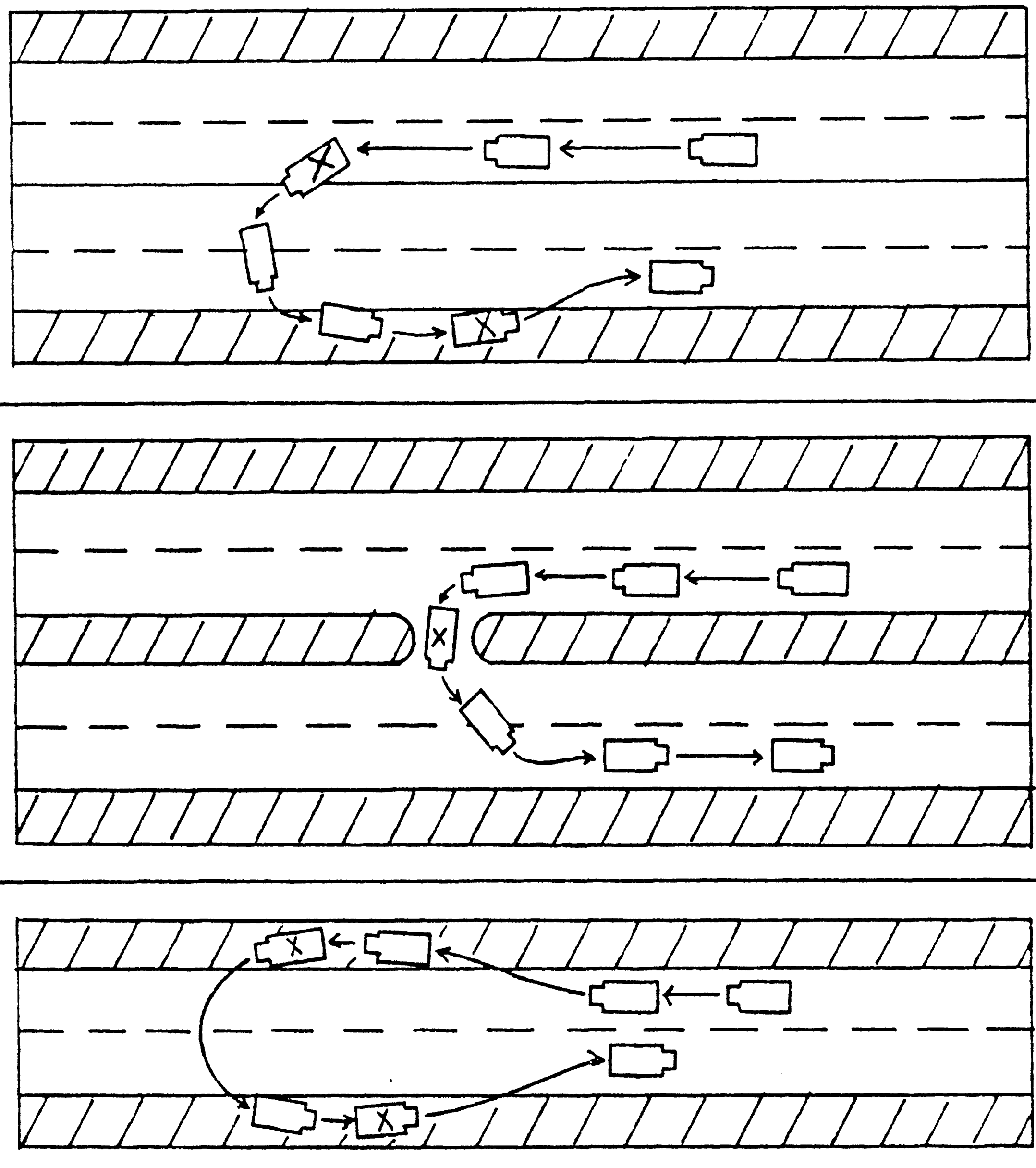
PASSING AT AN INTERSECTION



U-TURN ON A FOUR-LANE ROAD **a.**

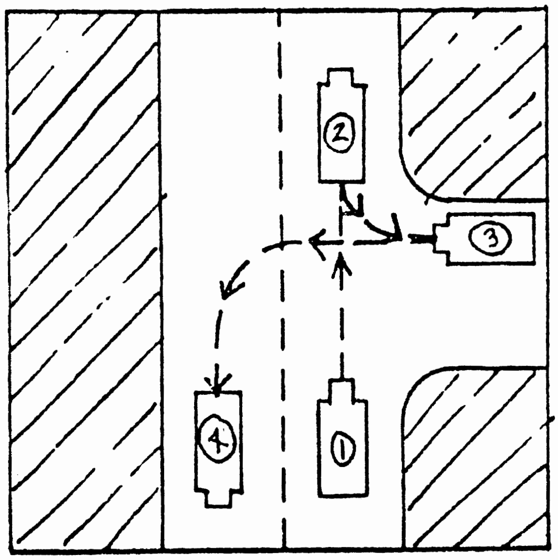


U-TURN AT AN INTERSECTION **b.**



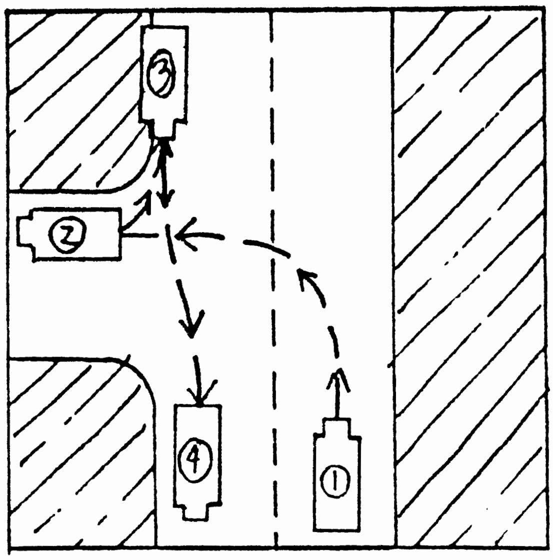
SEVERAL U-TURN ILLUSTRATIONS

a.

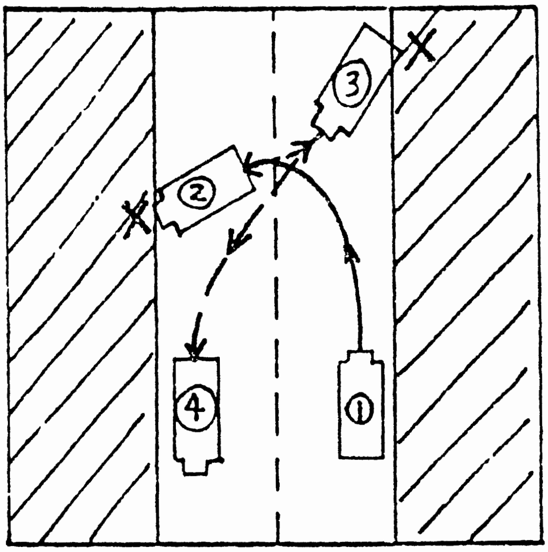


TWO-POINT TURNABOUT
(RIGHT SIDE-ROAD)

b.

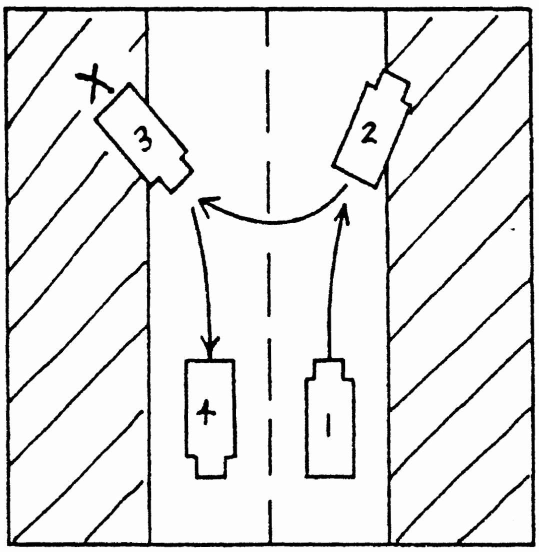


TWO-POINT TURNABOUT
(LEFT SIDE-ROAD)



a.

THREE-POINT TURNABOUT
(Y-TURN)

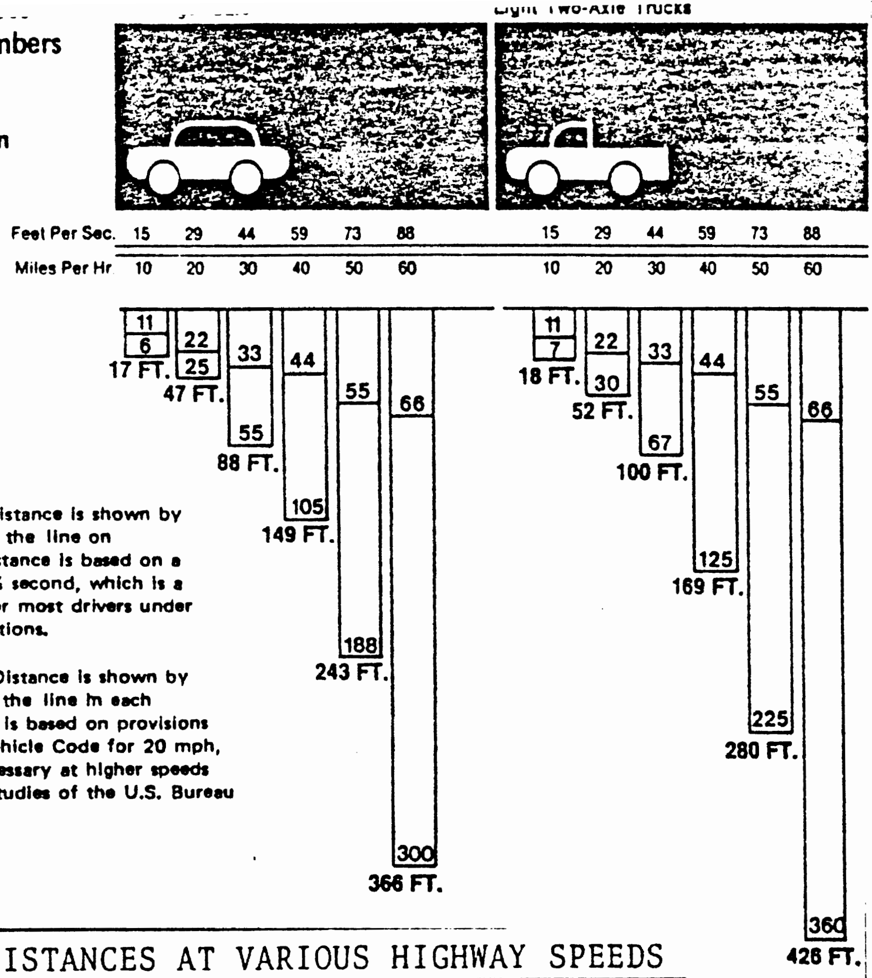


b.

THREE-POINT TURNABOUT
(BOOTLEG)

are Shown by the Numbers Below Each Bar

All Distances Are Based on Hard Dry Surfaces

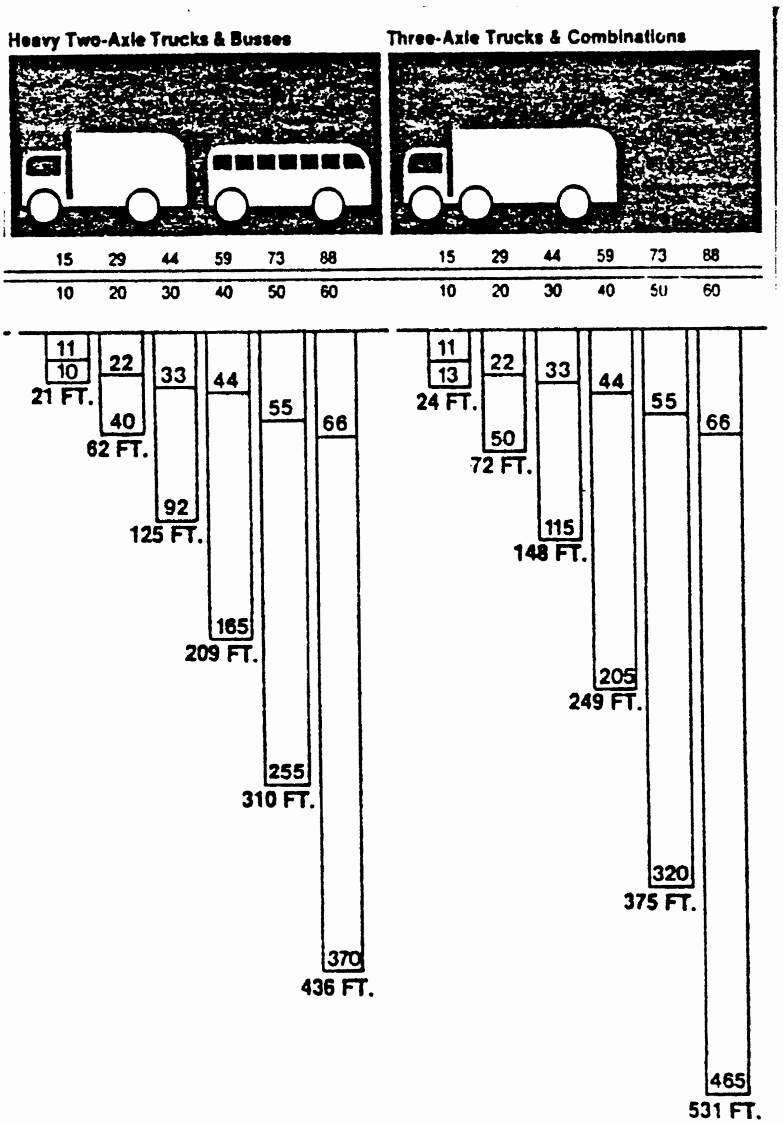


Driver Reaction Distance is shown by the number above the line on each bar. This distance is based on a reaction time of ¾ second, which is a typical reaction for most drivers under most traffic conditions.

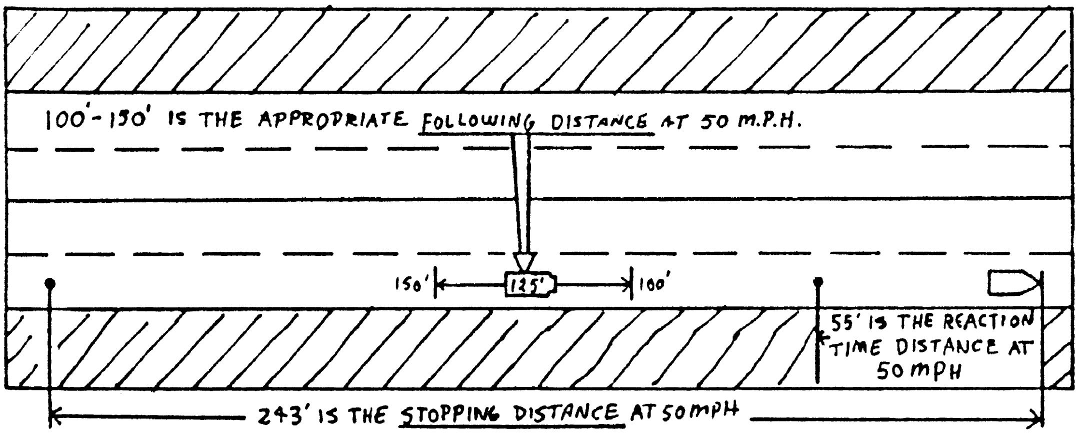
Vehicle Stopping Distance is shown by the number below the line in each bar. This distance is based on provisions of the Uniform Vehicle Code for 20 mph, adjusted when necessary at higher speeds to conform with studies of the U.S. Bureau of Public Roads.

STOPPING DISTANCES AT VARIOUS HIGHWAY SPEEDS

*Adapted from Employers-Commercial Union Companies

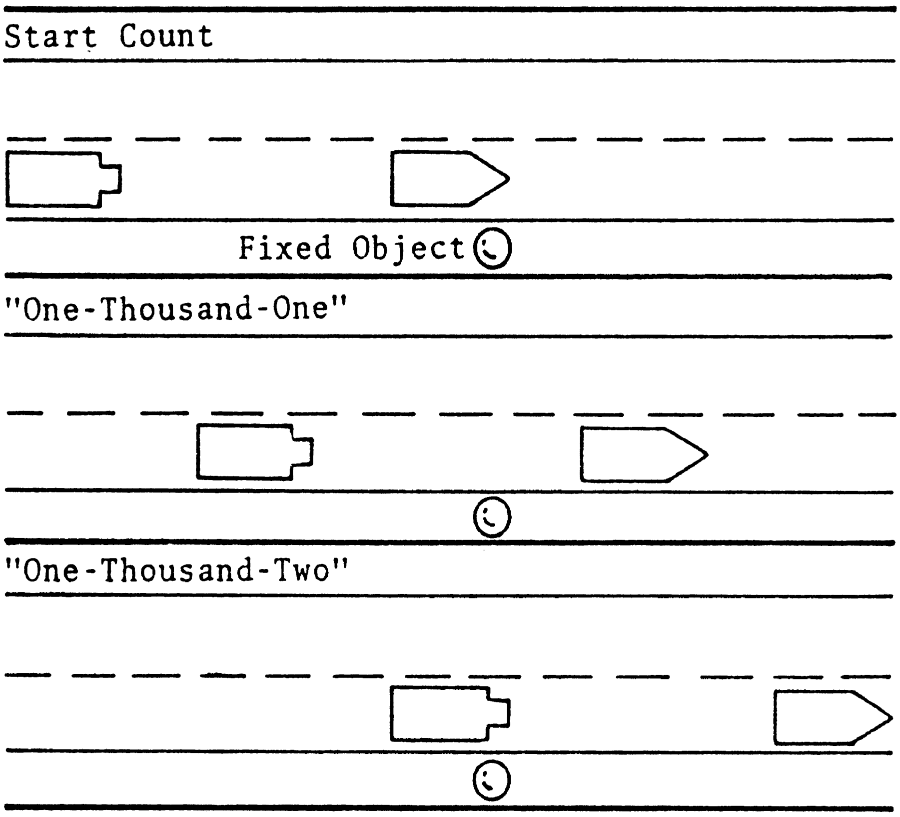


a.

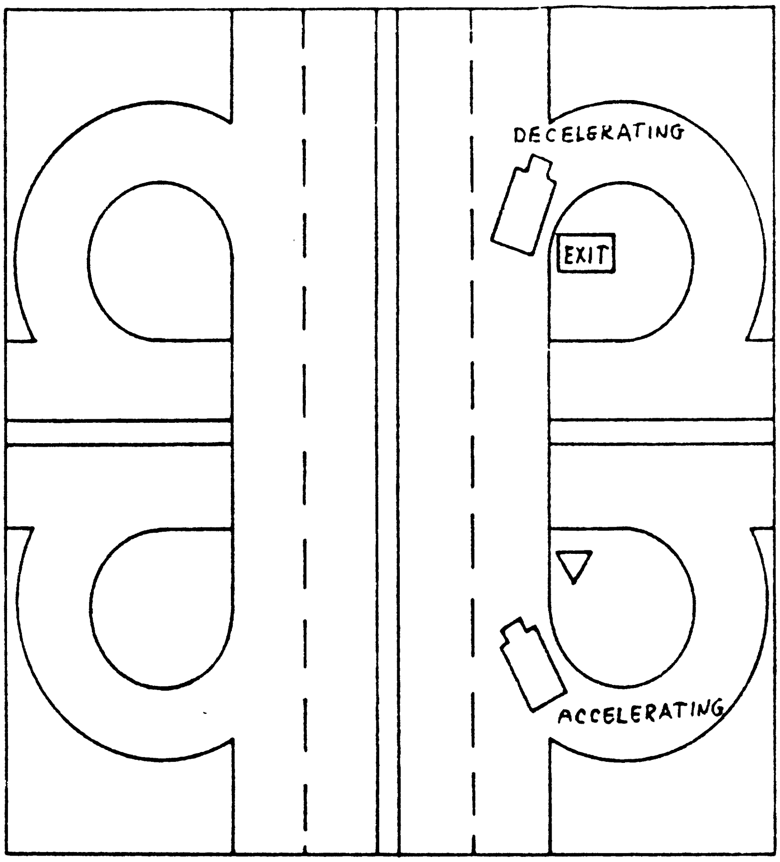


FOLLOWING DISTANCE AT 50 MPH

b.

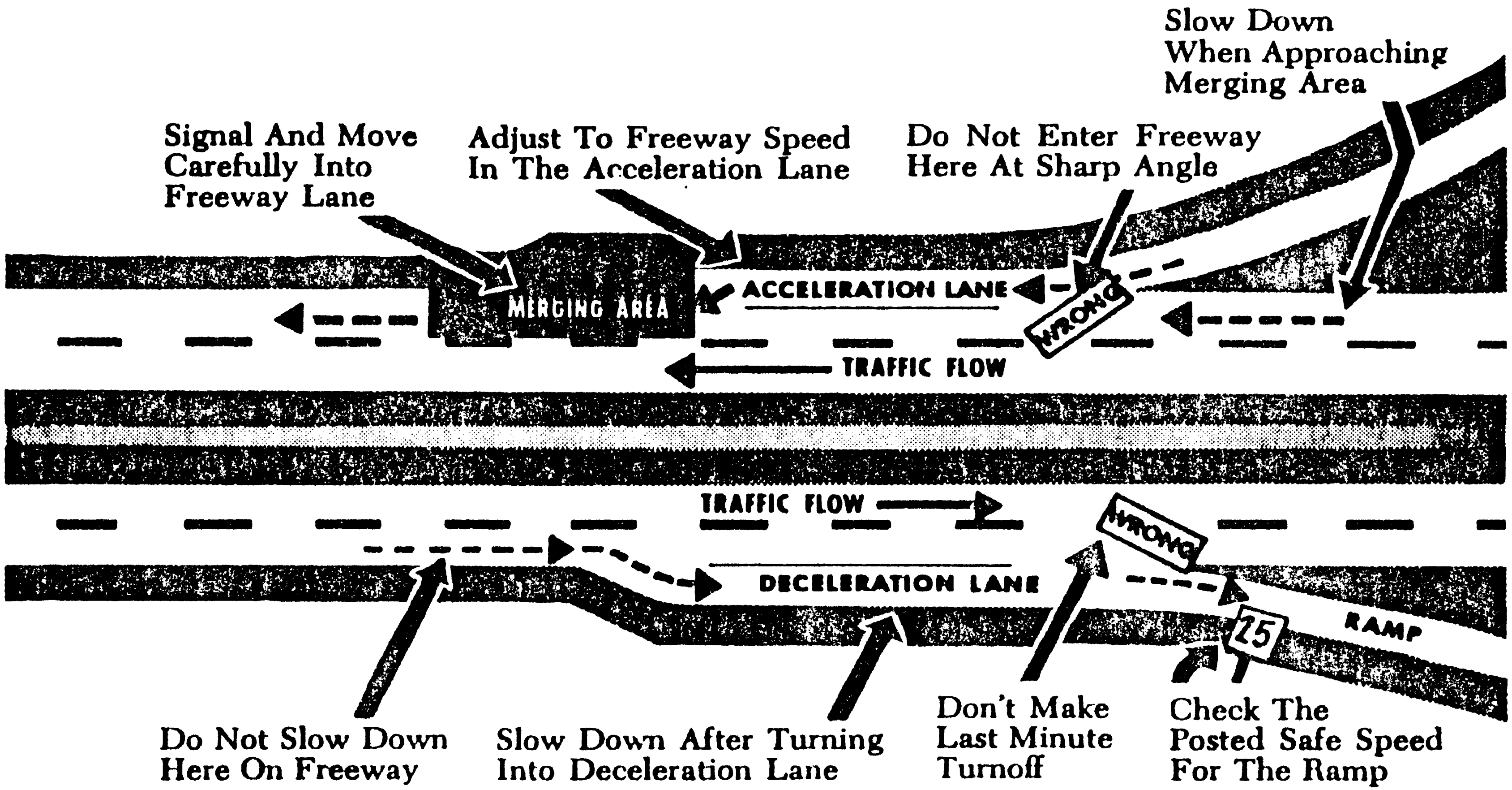


TWO-SECOND RULE



CLOVERLEAF

ENTERING AND EXITING FREEWAYS



AMBULANCE DRIVER TRAINING

Lesson Outline

Unit V , Driving the Emergency Vehicle

Lesson 4 , Adverse Conditions Est. Time 1 Hour

****

Description/Purpose:

A discussion of the procedures and techniques used when driving during adverse road and weather conditions--at night, or in wet, snowy, icy, or foggy weather.

Topical Outline:

- Introduction
- Driving in Adverse Conditions
  - Night Driving
  - Causes of Accidents
  - Headlight and High Beam Usage
  - Improving Visibility at Night
- Adverse Weather
  - Wet or Rainy Weather
  - Winter Weather
  - Poor Visibility Conditions

Objectives:

Students will identify adverse weather conditions.

Students will demonstrate their ability to handle their vehicles in the following adverse conditions: night, wet weather, winter weather, and fog.

References:

Student Handout Material:

Teaching Aids:

Instructor's Notes for Lesson Content

INTRODUCTION

--Ask the students if they can think of the "adverse conditions" that might be covered in the lesson.

--Night driving

--Weather conditions (leading to poor road condition, decreased traction, etc.).

--Poor visibility conditions (including smog, fog, mist, etc.).

DRIVING IN ADVERSE CONDITIONS

Driving techniques must be adjusted for all adverse conditions:

A. Slow down.

--Drive at a speed appropriate for conditions.

B. Increase following distance.

Night Driving

--Write the following statistics on the chalkboard:

	DAY	NIGHT
Percentage of Accidents	70%	30%
Percentage of Fatalities	53%	47%

--Ask the students what conclusions they can draw from these statistics.

--Nearly one-half of all fatalities occur at night; but less than one-third of all accidents occur at night.

--Thus, a much higher proportion of night-time accidents result in fatalities.

A. Causes of Accidents (more likely to occur at night):

1. Less light to see by. Vision is restricted. Some facts to remember:

a. Night-vision varies considerably among persons.

b. Older people's night vision is not usually as good as younger people's.

c. Eye-straining activities (during the day) can reduce night-vision.

d. Sunglasses reduce eye-strain in bright sun, but they should NEVER be worn after sunset.

e. Bright flashes of light (lightning, high-beam glare) can cause momentary blindness.

2. Drunk drivers:

a. Search for indications of drink drivers.

--Weaving across lanes.

--Delayed start at a stop sign or traffic light.

--Erratic speed.

b. Be especially alert between 11 and 3.

3. Tired drivers:

a. Allow extra space and time for other drivers to react.

b. Don't be a tired driver--begin shift well rested.

B. Using headlights and high beams:

1. Headlights:

a. Use headlights at all times between first signs of dusk and full daylight.

--Many drivers have developed the habit of putting on parking lights at dusk. This is a bad practice. As soon as daylight is noticeably diminished, <u>headlights</u> should be turned on.

b. Keep headlights clean and properly aimed.

c. Replace burned-out lights immediately.

2. High beams:

a. Dim high beams within 500 feet of approaching vehicle.

b. Dim high beams within 300 feet of overtaking or following other vehicles.

c. Avoid high beams on right curves--they tend to blind the oncoming driver.

d. Don't stare directly into high beams. Guide the vehicle by using the right edge of the road.

--Flicking high beams up and down to signal a motorist to lower his beams can be dangerous; it can momentarily blind the other driver.

C. Tips to Improve Visibility at Night:

1. Keep windshield clean, inside and out.

--Cigarette smoke builds a film on the inside of windows.

--Dirty windshields make lights "sparkle." The pupils continuously expand and contract, causing eyestrain and headaches.

2. Keep instrument panel lights dim.

3. Slow considerably on curves or when turning.

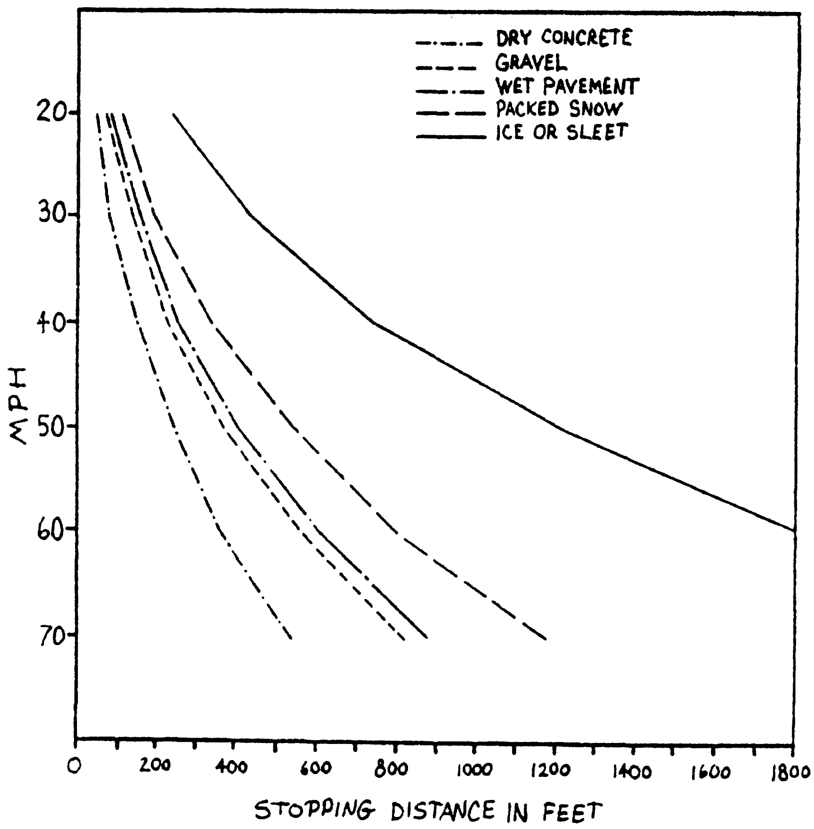
--Headlights light up less of the roadway on curves or when turning.

4. Keep eyes moving.

--Moving eyes can pick out dim objects better than tightly focused eyes.

Adverse Weather Conditions

The chart provides an indication of relative stopping distances at different speeds and in different weather conditions.



--Point out these facts to the students:

--Stopping on wet pavement takes approximately twice the distance as stopping on dry pavement.

--Stopping in ice or sleet takes about five times the distance as stopping on dry pavement.

--Coming to a complete stop on ice or sleet from 30 mph requires as much distance as coming to a complete stop from 65 mph on dry pavement.

--Ask the students what conclusions they can draw about following distances, based on the facts presented in the chart.

--In any adverse weather condition, following distance MUST BE INCREASED.

--Following distance should be increased proportionately to the severity of the prevailing weather condition.

A. Wet or rainy weather:

1. Approximately six times more people are killed on wet roads than on snowy and icy roads combined.

2. When it first begins to rain, roads are especially slippery.

--When it first starts to rain, water mixes with oil and dust to form a slippery mixture. This mixture will wash away in a while if the rain is hard and/or prolonged.

3. When possible, avoid making sudden moves with the steering wheel, brakes, or accelerator in rainy weather.

4. Driving through large areas of water can affect brake performance and the vehicle's electrical system. Precautions:

a. Slow down <u>before</u> hitting water.

b. Turn wipers on <u>before</u> hitting water.

c. Tap brakes as you exit.

--If vehicle pulls to one side, make several light brake applications to help dry the brakes.

5. Double-check mirrors; rain on rear window or mirrors can distort or obliterate images.

B. Winter Driving (including sleet, freezing rain, packed snow, and ice).

--These conditions are especially hazardous. Sometimes loss of control due to skidding cannot be prevented.

1. Advance preparation:

   a. Engine tuned.

   b. Heater/defroster in good working order.

   c. Battery charged.

   d. Emergency weather equipment.

      --Chains

      --Shovel

      --Sand

   e. Snow tires and/or chains

      --Snow tires are good; studded tires (if legal) are better; chains are best.

   f. Brakes adjusted.

--Emphasize the importance of evenly adjusted brakes. As the students what might happen on slippery roads if the brakes pulled to one side.

--Skidding and loss of control could result.

2. Tips for driving on ice and snow.

   a. Stay aware of temperature. "Wet" ice and freezing rain are the most treacherous of all driving conditions.

      --Wet ice and freezing rain occur when the temperature hovers around the freezing point (28°F to 40°F).

      --Bridges freeze several degrees before road surface.

   b. Don't make any sudden moves with the steering wheel, brakes, or accelerator unless absolutely necessary.

--Tell the trainees that the procedures for correcting skids will be covered in the <u>Contingency</u> portion of this unit.

C. Poor visibility conditions, including fog, mist, smog, etc.

1. Drive slowly, but keep moving.

2. Turn lights (low beams only) and wipers on.

3. Use four-way flashers if traveling 15 mph or more <u>below</u> speed limit.

4. Watch for cars ahead that are moving very slowly.
5. Watch the rear-view mirror carefully.
6. Avoid decelerating suddenly.
7. If you must pull off the road, use four-way flashers.
8. Do not pass.
9. Use defroster to minimize fogging on inside of window.

--Point out to the students that patches of fog, etc. are extra hazardous.

--Occurrence of patches of fog and their density are unpredictable.

--Vehicles ahead entering a patch of heavy fog may brake hard and suddenly.

AMBULANCE DRIVER TRAINING

Lesson Outline

Unit V, Driving the Emergency Vehicle

Lesson 5, High Speed Driving Est. Time 1 Hour

****

Description/Purpose:

Techniques for driving in excess of the safe operating speed limit when necessary.

Topical Outline:

- Driving at High Speed
  - Introduction
  - Negotiating Curves at High Speed
    - Entry
    - In the Curve
    - Exit
  - Slowing from High Speed
    - Techniques

Objectives:

Students will:

--demonstrate knowledge of how to properly handle their vehicles in high-speed operating conditions.

--demonstrate their understanding of vehicle handling characteristics during high-speed curve driving situations.

References:

Student Handout Material:

(x) attached

Apex of Curve

Teaching Aids:

Overhead Projector

Transparency

Instructor's Notes for Lesson Content

DRIVING AT HIGH SPEED

The coverage in this lesson in the Driving Unit is keyed to operation of the EV in the emergency mode at speeds in excess of the limit. The techniques presented are useful at any speed, however. In fact, they can (and should) be practiced at slower speeds (during low-traffic times) as part of an ongoing program for developing the necessary skill for applying them at high speed.

Introduction

A. Some emergencies may require high-speed EV operation.

--This is greatly dependent on local policy. The following, however, should be noted for the students:

--An ambulance or rescue vehicle with a stabilized patient abroard should NEVER travel over the posted limit.

--Large, heavy fire apparatus are especially difficult to control at high speed. Thus, operation at speeds over the posted limit requires a high degree of skill and sound judgement.

B. This lesson provides knowledge and techniques needed for:

1. Driving on curved and winding roads at the highest possible safe speed.

2. Slowing down from high speed.

C. The primary rules are:

--Write the rules on the chalkboard. Circle "know" in rule 1.

1. Don't try to negotiate a curve faster than you know you can. Observe posted speed limits and allow for conditions which make lower speeds necessary, i.e., wet pavement, ice, etc.

2. Avoid brake fade.

Techniques for Negotiating Curves at High Speed

The entire curve must be considered. Following are the three points which are critical when negotiating curves:

1. Proper speed and vehicle position for entry to curve.
2. Maintaining speed in curve.
3. Proper speed and vehicle position for exit from the curve.

A. Entry

1. Brake or decelerate to the proper entry speed before entering the curve.

   --Proper speed is different for every curve.

   --For any curve, the entry speed can be increased somewhat by entering the curve on the "high" or outside of the curve.

2. Enter the curve as far to the outside as possible.

   --Entering on the outside of the curve effectively increases the radius of the track for the EV. The greater the radius, the faster the turn can be safety negotiated.

3. Begin turn as early as possible.

   --Inexperienced drivers invariably go "too deep" into curve before starting to corner vehicle.

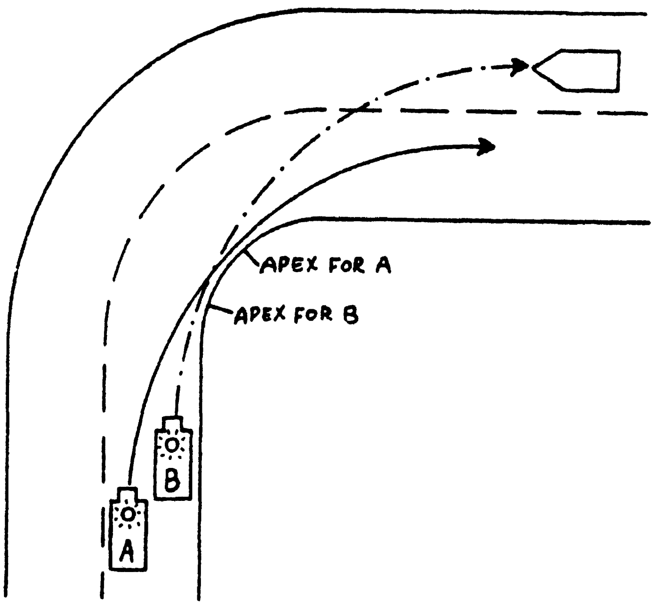
4. Establish an apex (when beginning the turn) at last part of inside road edge (or center line) that can be seen from the entry point.

   --The apex is the point on the inside of curve where vehicle comes closest to road edge or center line.

   --Generally, the further along the curve the apex is, the better.

--Be sure students understand illustration.

(Present transparency)



Key points:

--The assumed speed and radius of vehicle track for both A and B are identical.

--A has started entry:

--Early.

--On the high (out) side.

--Apex for A is further along the curve than apex for B.

--B is going to have a serious accident.

B. <u>In the curve</u>

1. If the maximum <u>safe</u> speed for a curve has been attained, the EV will feel "comfortable." Experienced drivers say such vehicles are "in the groove." This feeling can only be learned by experience.

   --The maximum "safe" speed for traveling any curve is not the maximum "possible" speed.

   --At the maximum possible speed, the "feeling" will not be comfortable. It will feel as though the suspension is straining.

   --The maximum possible speed is not safe. At that speed vehicle control becomes so critical that a relatively small event (e.g., some sand or gravel on the road) can cause complete loss of control.

2. EV should be in the groove by the time the apex is reached.

   --The EV's suspension <u>is set</u> for cornering in a constant radius turn.

   --The EV is close to the inside edge of the curve.

--Ask the students how they will know if they are going too fast and have missed the groove.

--Vehicle will be close to spinning out (again, detecting that point can only be learned with practice).

--Ask the students what you do if you miss the groove.

--STAY OFF the accelerator and brake.

--Scrubbing action of tires will slow vehicle.

--EV will have room to drift from inside to outside to curve.

3. Once in the groove, apply slight power in curve to maintain speed:

   --Scrubbing action of tires will slow EV unless power is applied.

   --Apply power carefully. Too much power can (1) result in loss of steering control, or (2) cause rear wheels to spin and lose rear-end traction.

4. Never try to gain speed beyond the established maximum <u>safe</u> speed for the curve.

   --For most combinations of vehicle characteristics, road conditions, radius of curves, and speed, an increase of just 3 mph over the safe speed will cause <u>complete</u> loss of control.

C. <u>Exit</u>

1. To another curve.

   a. Keep it slow and steady.

   b. Drift to farthest (outside) portion of lane.

   c. Adjust speed for next curve.

      --If the radius for the next part of the curve is tighter (shorter than the radius being traveled by the vehicle, operator must slow down before tightening the EV's turning radius.

      --If possible, let scrubbing action of tires do slowing down. Avoid hard braking if at all possible.

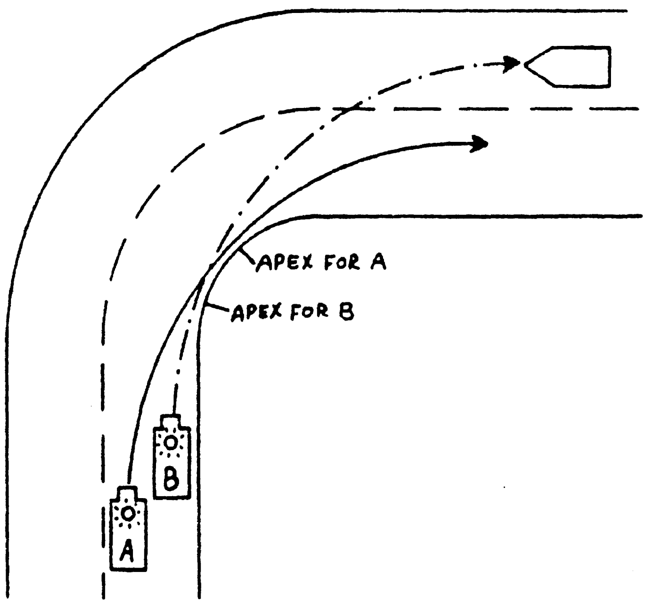
   d. Establish an apex for the next curve.

2. To a straight

   a. Establish the widest (outside) position and the latest possible apex.

   b. Accelerate out of the curve after the apex has been reached.

      --Proper exit from a curve to a straight is where good drivers gain time.



APEX OF CURVE

Slowing From High Speed

A. Braking distance increases dramatically with increased speed. When speed is doubled, braking distance more than quadruples.

--The purpose of this chart is not to have students learn these distances. It is to show the relationship between speed and stopping distances.

STOPPING DISTANCE AT HIGH SPEED

Speed, in mph	Distance in feet (with good brakes, dry concrete in sedan)
40	149
50	243
60	366
70	497
80	708

3. If EV has disc brakes, to stop as fast as possible:
   a. Always use a smooth braking motion.
   b. Apply maximum pressure short of locking the wheels.
   c. Keep the pressure on until the EV has slowed to the desired speed.

      --Even with good disc brakes, excessive braking in this fashion can lead to brake fade. If pedal pressure must be increased to maintain constant rate of deceleration, brake fade may be occurring. EV operator should switch to the technique used for drum brakes.

      --NOTE: Air brakes should not be pumped.

4. If EV has drum brakes, to stop as fast as possible:
   a. Smooth braking action.
   b. Pumping the brakes is mandatory. The goals is to allow the brakes time to cool.
   c. Smooth, rapid pumping to the point just before the wheels lock is the best bet.
   d. The pumping action should be of sufficient duration and force to transfer the vehicle weight to the front wheels without locking up the wheels.

AMBULANCE DRIVER TRAINING

Lesson Outline

Unit V , Driving the Emergency Vehicle

Lesson 6 , Vehicle and Driving Emergencies Est. Time 2 Hour

****

Description/Purpose:

Techniques for handling vehicle and driving emergencies such as evasive maneuvers, skids, loss of control, vehicle breakdowns, and other unusual driving situations.

Topical Outline:

Handling Contingency Situations

Precautions

Techniques

Evasive Steering
Emergency Braking
Evasive Acceleration
Unavoidable Collisions
What Would You Do? Practice.

Handling Skids
Countersteering

Handling Other Contingencies

Blowout
Brake Failure
Transmission Failure
Steering Failure
Accelerator Sticks
Visibility Impaired
Wheel(s) Off the Road
Danger Signals from Instruments

If You Must Pull Off the Road

Placing Flares/Other Warning Devices

Objectives:

Students will:

--demonstrate knowledge of how to handle their vehicles in adverse driving conditions.

--demonstrate knowledge of how to control any type of skid.

--demonstrate knowledge of which types of objects absorb impact from a moving vehicle and which do not.

--show ability to effect an off-road recovery in their vehicles.

--know how to handle their vehicles in a variety of situations involving various vehicle component malfunctions.

--know the best ways to alert other motorists if their vehicle should be stopped in a trafficway.

--know how to use and place emergency warning devices, and demonstrate this knowledge.

References:

Student Handout Material:

(x) attached

What Would You Do? (practice)
Countersteering
Hydroplaning/Blowout
Disabled Vehicle: One-Way Traffic
Two-Way Traffic

Teaching Aids:

Overhead Projector
Transparencies: Flares/Fuses
Vehicle(s)

Instructor's Notes for Lesson Content

HANDLING CONTINGENCY SITUATIONS

A. Contingency situations can arise at any time. When they arise, normal traffic flow may be suddenly interrupted and the safety of all persons in the general area diminished.

B. It is a good policy to be familiar with the contingency situations that occur most often, and to understand the actions that can be taken to minimize the likelihood of death or injury.

C. The four primary causes of contingency situations:

--Ask the students if they can figure out what the four primary causes might be:

--Vehicle malfunction or failure.

--A sudden change or deterioration in the road.

--The appearance of an obstacle in the roadway.

--DRIVER ERROR; clearly a contributing factor in most accidents.

Precautions to Help Prevent Contingencies

This section addresses precautions the operator can take to minimize the chances of a contingency occurring.

A. Vehicle malfunction or failure:

1. Inspect the EV at the beginning of every shift.
2. Correct/repair malfunctions/problems promptly.
3. Monitor to detect:

   a. Noises
   --Clunks in steering
   --Dragging muffler
   --Squealing brakes

   b. New or changed vibrations
   --Alignment
   --Worn bearings

   c. Odors
   --Brake linings
   --Gas leakage
   --Fire

   d. Changes in handling characteristics
   --Too much play in steering
   --EV pulls to one side when braking
   --Brakes grab

B. A sudden change or deterioration in the road (weather, damage, construction, etc.).

1. Remain alert
2. Scan well ahead
3. Look for cues

   --Construction signs

   --Skid marks on the road surface

4. Know the area!

   --Which roads become slippery when wet

   --Which roads are in poor repair, etc.

   --Which roads are in poor repair, etc.

   --Which roads have tight (decreasing radius) curves

C. The appearance of an obstacle in the roadway (includes pedestrians, other vehicles, etc.)

1. Maintain a safe speed; one which allows maximum vehicle control.
2. Search for obvious cues.

   --"Watch Children" and "School" signs.

   --Heavy pedestrian traffic

3. Learn to spot subtle cues.

   --Toys, bikes on lawns (even though no children are visible)

   --Vapor from exhaust of parked cars

   --Back-up lights on parked cars.

D. Driver Error

1. Begin shift well-rested, with no unusual physical or mental impairment.

   --Personal problems resulting in mental or emotional strain can affect driver's performance.

2. Remain alert.
3. Avoid unnecessary risks.
4. Don't panic.

--Even under the most favorable conditions, when all precautions have been taken, contingencies will arise. Knowing what to do when they arise will minimize the risk of death, injury, and serious property damage.

General Techniques for Handling Contingencies

Hundreds of "possible" contingencies could arise. Since EV operators may spend many hours driving (and travel many thousands of miles), it is probable that sooner or later a contingency will occur. Following are general techniques that can be applied to deal with many of the possible situations:

A. Evasive steering, or a sudden or extreme change in the vehicle's direction, is often used to avoid pedestrians, vehicles, or other obstacles. This action is usually taken because it is too late to brake to a stop.

   --Animals in the roadway are often a problem--especially in rural of suburban areas. If a large animal (e.g., deer, bear) appears on the road it is usually best to avoid colliding with the animal--serious damage and injury often occur.

   --When small animals are in the roadway, however, it is often safer to collide with the animal rather than risk loss of control due to a sudden steering or braking maneuver.

   1. Scan the roadway and nearby areas for escape routes. Consider:

      a. Can the vehicle be safety steered off the right side of the road?

      b. Off the left side of the road?

      --The right side of the road is usually far safer than the left, although there are exceptions (e.g., divided highways with wide, level median).

      c. Any obstacles on the roadside?

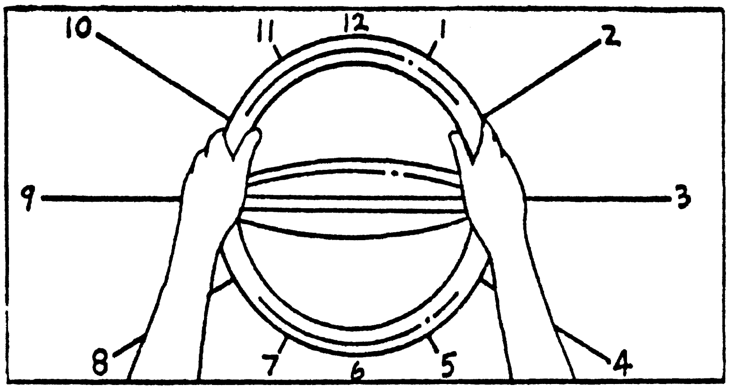
      d. Any oncoming vehicles?

      e. How stable is the road surface (e.g., gravel vs. concrete); is it likely to contribute to loss of control?

   2. Scan especially carefully when approaching the crest of a hill, rounding a curve, and when approaching intersections.

      --These situations minimize possible escape routes.

   3. Evasive steering maneuvers are performed in the following way:



a. Hands should be at 3 and 9 o'clock on the steering wheel--this will allow the largest possible turn without moving the hands.

   --The 2 and 10 o'clock position is a little more comfortable, but the 3 and 9 o'clock position allows maximal directional control.

b. Turn the steering wheel sharply in the direciton of escape route.

c. Countersteer as soon as vehicle is clear of obstacle.

d. Although it may be necessary to brake somewhat, hard braking should be avoided.

   --Hard braking can lock the wheels--locked wheels won't steer!

e. Slow down and maintain vehicle control.

--Explain that the abruptness with which en evasive steering maneuver can be made <u>safely</u> depends, somewhat, on the type of vehicle.

--<u>Sedan</u>--very abrupt maneuvers are possible <u>unless</u> wheels will curb, rut, etc.

--<u>Van</u>--depending on type. Some may be "top heavy" and could roll if maneuver is excessively abrupt.

--<u>Large truck</u>--steering ratio usually precludes excessively abrupt maneuver.

--Explain that students will have a chance to practice evasive steering later. They will develop a "feel" for their EV's handling characteristics.

B. <u>Emergency Braking</u>. If there is enough room to stop, or if no escape route is available, emergency braking may be one way to avoid a collision or minimize the consequences. Goal: produce shortest possible stopping distance without locked wheels or loss of control. The best method for accomplishing this is:

1. Hard pressure to brake pedal without locking wheels:
    a. Quick, firm jabs
    b. Short, steady pressure; release; repeat.
2. If wheels lock, RELEASE BRAKE PEDAL. Reapply with less pressure.

--The best braking method is somewhat dependent on whether the vehicle is equipped with drum or disc brakes.

--If you have information about the kinds of brakes the students' on-job EVs are equipped with, go into a little detail about braking methods for those particular vehicles.

--Disc brakes can take more sustained hard braking since they cool off more effectively and are less likely to fade.

3. Rapid deceleration could cause a rear-end collision.

--In some cases, a rear-end collision is preferable to the alternative (e.g., hitting a pedestrian). Each case must be judged independently.

C. Evasive Acceleration simply means a quick burst of speed. Can be used to avoid collision with side-approaching or merging vehicles.

--Drivers often don't think of this evasive maneuver.

--When a vehicle is approaching from the side or merging, increasing speed often can avoid collision.

D. Unavoidable collisions. When collision is unavoidable, choose object. Considerations are:

1. Choose course least likely to cause death or injury, or the course that will cause the fewest injuries.
2. Head-on collisions are the most damaging in terms of both life and property.
    a. Steer so that EV sideswipes or hits the other subject an angle.

b. Avoid hitting large, immobile objects in favor of "impact-absorbing" objects.

--Ask the students if they can think of some examples of impact-absorbing objects and immobile (non-impact-absorbing objects). Have them help develop this list:

IMPACT-ABSORBING

--Parked cars
--Low bushes and shrubs
--Small signs (e.g., stop sign, speed limit)

NON-IMPACT-ABSORBING

--Concrete bridge abutments (just about anything made of concrete)
--Buildings
--Large trees
--Utility poles (also pose the hazard of power lines).

<u>What Would You Do? Practice</u>

A. Each of the drawings in this practice section illustrates a potential accident.

B. The things that could be done to avoid an accident include:

1. Emergency braking
2. Evasive Steering
3. Evasive acceleration
4. No action.

--Lead a short discussion about each of the illustrations. Call on a student to tell which action or combination of actions seems most appropriate for each drawing. Present the correct answer, if the class is unable to figure it out.

The EV is traveling on a four-lane road with no median. Gravel berms are on both sides of the road. The only other vehicle in the immediate vicinity is the car that appears to be out of control--it is crossing the center line and headed for the EV.

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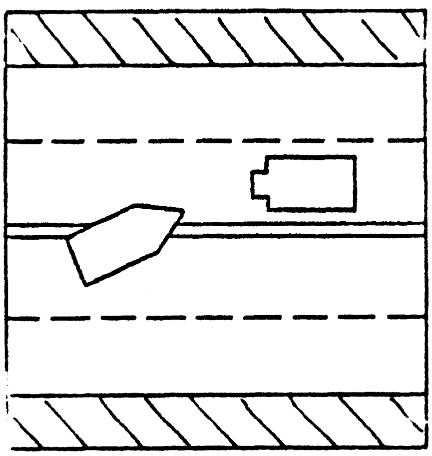
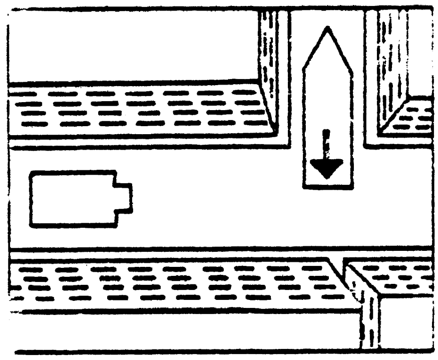


--Evasive steering.

--Steering to the right berm is probably best, since more traffic could be in the oncoming lanes. Also, the driver of the out-of-control vehicle may suddenly straighten out and pull back into his lane.

The EV is traveling at about 25 mph down a narrow, one-way alley. On either side of the alley are buildings set very close to the street. A large truck begins to back out of an intersecting alley to the left.



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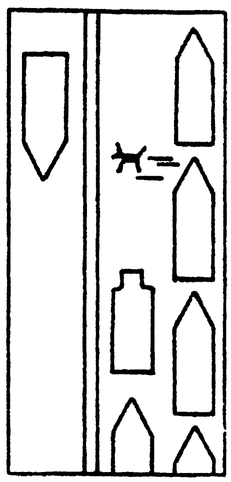
--Emergency braking and, perhaps, evasive steering.

--The operator could sound his horn to alert the truck driver, but a collision is probably unavoidable. Evasive steering alone is inappropriate, since it would be unwise to strike large buildings--they are non-impact-absorbing. The truck might stop, allowing the EV to steer around it.

The EV is traveling at about 30 mph on a busy, urban street. A car is behind the EV, following closely. Another car is approaching in the opposing lane of traffic. Parked cars are in the lane immediately to the EV's right. A small dog runs out in to the roadway.



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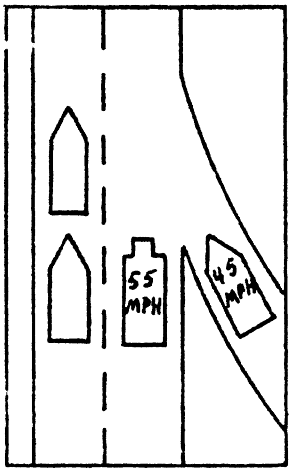
--No action.

--Either braking or steering will certainly cause an accident. There is some chance the animal will clear the EV if no action is taken.

The EV is traveling 55 mph in the right-most lane of a four-lane divided expressway. Two cars are in the left lane beside the EV. A car is about to enter the expressway from the entrance ramp; it is traveling approximately 45 mph.



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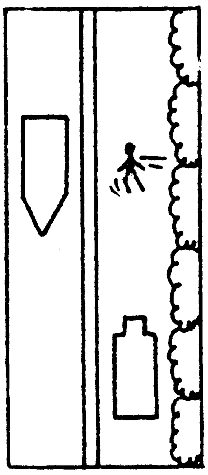
--Evasive acceleration.

--Braking would probable increase the chances of collision with the merging car and would open the possibility of being rear-ended.

--No action would probably result in a collision.

The EV is traveling on a two-lane rural road. There is a car in the opposing lane. On both sides of the road is a heavy growth of low bushes and shrubs. A small child runs out into the road.



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--Evasive steering and emergency braking.

--Braking alone will not allow the operator to avoid hitting the child. Since the low bushes and shrubs are impact-absorbing, it would be wise to steer toward the right side of the road and collide with them at an angle.

<u>Handling Skids</u>

Skidding means loss of steering and braking control.

A. The primary cause of all skids:

   1. A too-sudden change of speed or direction.

   2. Any change of speed or direction under conditions of poor traction.

B. To help regain control no matter what type of skid is occurring:

   1. Stay OFF the brake.

   2. Stay OFF the accelerator.

3. Countersteer: steer in the direction to which the rear end of the vehicle is skidding. Two points about countersteering:

   a. Steering wheel does not have to be turned violently to correct a skid.

      --This is a common "panic" reaction, and further trouble often arises because the car tends to skid back and forth (fishtailing).

   b. Once the wheel has been turned to countersteer, it may be necessary to immediately countersteer in the other direction.

--Explain the illustration of countersteering.

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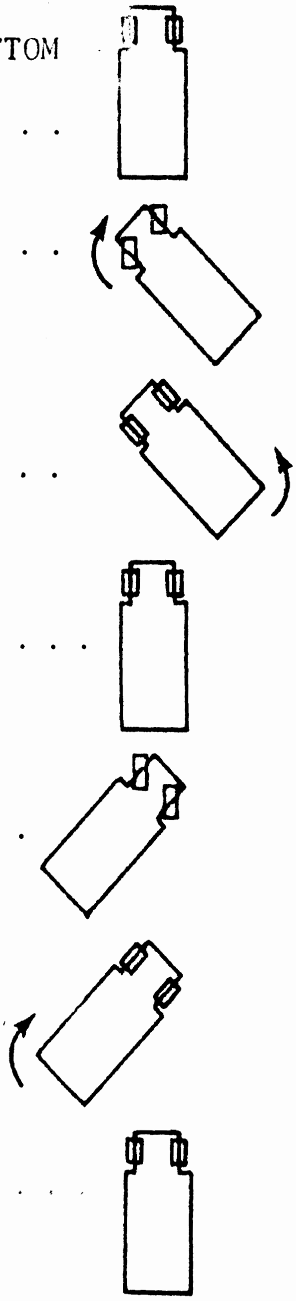

7. STEERING CONTROL IS REESTABLISHED . . . .

6. TO CONTROL FISHTAILING IN THE OPPOSITE DIRECTION, YOU'D COUNTERTURN RIGHT TO HELP YOU GET BACK ON COURSE . . . .

5. THE BACK END FISHTAILS TO THE RIGHT . . . .

4. THE VEHICLE IS BACK ON COURSE . . . .

3. YOU'D STEER LEFT, IN THE DIRECTION YOU WANT THE VEHICLE TO GO RELATIVE TO THE WAY IT'S FACING . . . .

2. THE BACK END OF THE VEHICLE SKIDS AROUND TO THE LEFT (THE VEHICLE IS STILL MOVING FORWARD AT AN ANGLE . . . .

1. THE VEHICLE IS GOING STRAIGHT . . . .

C. Specific Skids:

1. Braking skid. This kind of skid occurs when, due to sudden, hard brake pressure, one or more of the vehicle's wheels lock. If brakes are evenly adjusted, all wheels will lock at the same time.

   --A good reason to keep brakes properly adjusted--an all-wheels locked skid is easier to control.

   --Regardless of how many wheels lock, or how evenly, steering control will be lost. A WHEEL THAT IS NOT TURNING CANNOT BE STEERED.

   a. If all wheels lock evenly or if just the front wheels lock, the vehicle will move straight ahead, unless influenced by some other force (e.g., a dip in the road).

   b. If just the rear wheels lock, their reduced traction will cause them to move forward faster than the front wheels.

      --The vehicle may spin 180° (depending on speed, road surface, etc.). The vehicle may actually end up traveling in the opposite direction.

   c. Actions to take if a braking skid occurs:

      1) Release brakes immediately; it should then be possible to steer.

         --Releasing the brakes allow the wheels to turn.

      2) If braking is still necessary (to reduce speed or avoid an obstacle), apply with less pressure so that wheels don't lock again.

--Ask the students to think of some examples of a situation where a braking skid might occur. Some examples are:

--Hard braking on wet, snowy, icy, or debris-covered roads.

--Hard braking at high speed.

2. Power skid. This kind of skid occurs due to sudden, hard acceleration.

   --Since power is delivered only to the rear wheels, sudden acceleration can cause the rear wheels to lose traction. Even though the cause is different, a power skid is very similar to a braking skid.

   a. The back end of the EV may skid to one side, trying to overtake the front end.

--The tendency for the rear end to slide will be greatest if the front wheels are turned.

b. The actions to take if a power skid occurs:

1) Ease off the accelerator.

2) Countersteer in the direction towards which the rear end of the vehicle is skidding.

--Ask the students to think of an example of a situation where a power skid might occur. Some examples are:

--Accelerating on wet, icy, snowy or debris-covered roads.

--"Jack rabbit" starts.

3. Cornering Skid. This kind of skid occurs when speed is too great or traction is reduced (due to poor road/weather conditions) such that the vehicle cannot stay on the intended track around a curve.

--The cornering skid can occur even at normal driving speed if traction is reduced by tire or road surface condition.

a. The vehicle may continue to travel straight ahead--not in the intended path of travel around the turn.

--This is sometimes called "ploughing."

--This is a full cornering skid--all four wheels lose traction.

b. The rear end of the vehicle may try to overtake the front end, if just the rear wheels lose traction.

--This is sometimes called a "spinout."

c. Actions to take if a cornering skid occurs:

1) Ease off the accelerator.

2) If the vehicle is spinning out, countersteer as space permits.

--This will align front and rear wheels and control may be regained.

4. Hydroplane skid. Hydroplaning occurs when the tire is moving too fast for the water on the road to escape (to flow around it or through the tread). A small wedge of water builds up in front of the tire and lifts it off the surface of the road.

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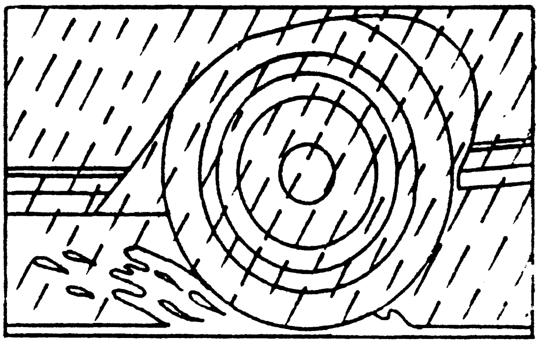

a. The results of a hydroplane skid are difficult to predict:

   1) As in all skids, there is loss of braking and/or steering control.

   2) Unless the operator attempts to brake or steer (other than straight ahead) he may not know he is hydroplaning.

b. Actions to take if a hydroplane skid occurs:

   1) East off brake or accelerator

   2) Allow the vehicle to decelerate

   --Since hydroplane skids are difficult to detect and control, the most effective thing an EV operator can do is to prevent them.

   --Inspect tires regularly to ensure they have plenty of tread (to allow water to escape) and that pressure is correct.

   --Be alert for hydroplane-type conditions--if there is enough water on the road surface to cast reflections from trees of other cars, be especially cautious; slow down.

Handling Other Specific Contingencies

The occurrences and conditions listed in this part of the unit should be handled according to the procedures outlined:

A. Blowout. Front tire blowouts are the most dangerous; the vehicle will pull to the side of the blown-out tire (see illustration below).

   1. Remove foot from accelerator, allowing vehicle to slow.

   2. Hold steering wheel firmly; anticipate steering difficulty.

   3. When steering is controlled, brake gradually; avoid locking wheels.

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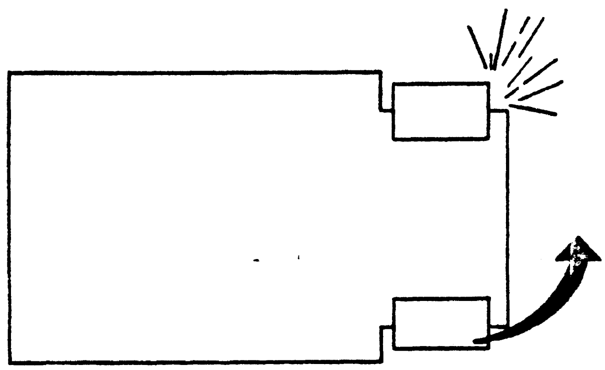


--The vehicle will pull to the side of the blown-out tire because the flat grips the road with more rubber (and more friction) and acts like a pivot.

B. <u>Brake failure</u>

1. Shift to lowest gear, if possible.
2. Apply parking brake in either of the following ways:
   a. In a pumping manner--steady pressure, release, etc.
   b. As hard as possible, without locking the wheels.

      --Procedure 2.b. will slow and stop the vehicle in the shortest distance. It is, however, very difficult to avoid locking the wheels.
3. Pump brake pedal rapidly.

   --This may build up some pressure in the brake lines and provide some braking force.
4. If these actions do not slow the vehicle, sound horn to alert traffic; activate four-way flashers and/or emergency signaling devices;
   <u>choose</u> an impact-absorbing object to collide with, if necessary.
   a. Avoid head-on collisions.
   b. Try to sideswipe parked cars, shrubs, even a dirt hillside--always at an angle.
5. If vehicle has been slowed sufficiently, select an offroad stopping place.
   a. If there is an upgrade within the assured clear distance ahead, stay on the road and allow the upgrade to further slow the vehicle, then select a path for leaving the roadway.

b. If no upgrade is within clear distance ahead, select the path for leaving the roadway that will minimize injuries and property damage.

C. <u>Transmission failure</u>

1. Select a safe off-road stopping place.
2. Brake gradually to a stop.

D. <u>Steering failure</u>

Steering failure is most likely to occur when a vehicle with power steering stalls. This will make steering difficult, but not impossible.

1. Power steering stall (steering failure):

   a. Anticipate steering difficulty; grasp wheel firmly.

   b. Find safe spot and pull off the road.

2. Total steering failure.

   a. Keep trying to steer.

   b. Stay OFF the brake.

   --Since directional control is impossible, if the brakes pull to one side it could be deadly. This is another reason to keep brakes properly adjusted.

   c. If the vehicles does not coast to a stop, shift to a lower gear and pump the parking brake (same procedure as brake failure).

E. <u>Accelerator sticks</u>

1. If the accelerator sticks and there are <u>no vehicles ahead</u> of the EV, the operator should attempt to release the pedal by sticking the tip of his shoe under it and lifting.

   --The operator should NEVER try to release it with his hands while in motion.

2. If this method is unsuccessful:

   a. Put vehicle in "neutral" gear. In vehicles without power steering and power brakes, turn engine off.

   --With engine off, it will be more difficult to steer if EV has power steering.

   --Many models of EVs have steering wheel/ignition interlocks (anti-theft). <u>Do not</u> turn off ignition if it will lock steering wheel.

   b. If the vehicle has power-assisted brakes, do not pump them. Instead, apply steady pressure.

c. Select a safe off-road stopping place and pull off.

d. Turn engine off if still running.

F. Visibility impaired (hood flies up, wiper or defroster failure)

1. If hood flies up, look for a gap at the bottom of the windshield.

2. If forward visibility is completely blocked, put head out side window to see forward.

3. Apply brakes moderately.

--You could be rear-ended.

4. Continue to brake gradually and select an off-road stopping place.

5. Pull off the roadway an- activate four-way flashers.

G. Wheel(s) off the road (off-road recovery). If at some time the EV's wheel(s) leave the road surface (intentionally or unintentionally), the operator will have to perform an off-road recovery. This can be dangerous unless performed properly. Correct procedure:

1. Hold steering wheel firmly; steering may be difficult.

--If there is a significant difference between the level of the roadway and the shoulder, or if the composition of the roadway and the shoulder are significantly different, the vehicle may pull to one side.

2. Check for traffic ahead and to the rear.

3. Reduce speed by easing off the accelerator.

4. If brakes must be applied to reduce speed, brake VERY gradually.

--If shoulder is gravel or muddy, skidding is a strong possibility.

5. Center vehicle over road edge.

6. Activate appropriate turn signal.

7. If the operator must avoid an obstacle, he should steer sharply toward the road, turning steering wheel about 90° while accelerating slightly.

--Point out to the students that the sharp-turn recovery (7) is dangerous.

--This procedure should only be used to avoid a collision. Two dangers: skidding and ending up in opposing lanes of traffic.

8. If the operator does not have to avoid an obstacle, he should scan the road edge to find the point at which there

is the least distance between road edge and berm, turn the wheel gradually, and steer on at that point.

9. As soon as the EV's front right wheel touches the road edge, countersteer to control lane position.

H. Danger signals from gauges and indicators on instrument panel

--Whenever a malfunction or danger signal appears, the EV operator should contact the dispatcher to send a back-up and/or service vehicle.

--Requesting a back-up unit is of the UTMOST IMPORTANCE is the EV is enroute to an emergency when the malfunction occurs.

1. Fuel gauge low.
   a. Continue to site if within range.
   b. Consider the amount of fuel necessary for the return trip.
2. Charging system fails (battery not charging)
   a. Turn off any equipment that will drain battery.
   b. If the engine is stopped, it is unlikely it will restart.
3. Brake warning light comes on:
   a. Stop immediately.

      --If there is complete brake failure use the procedure outlined in Brake Failure.
   b. Do not drive the vehicle until maintenance has been performed.

--Explain that the procedures listed below, if followed, will protect the EV and reduce the chances of a major vehicle malfunction.

4. Oil pressure drops:
   a. Stop immediately.
   b. Do not drive the vehicle until maintenance has been performed.
5. Engine temperature rises into danger zone (and remains).
   a. Stop immediately.
   b. Do not drive the vehicle until maintenance has been performed.

IF YOU MUST PULL OFF THE ROAD

Due to adverse weather conditions or a contingency situation, an EV operator may need to pull to the side, or off the road. In the worst case, the operator may be unable to get the vehicle entirely off the road (and out of the path of surrounding traffic). Whenever this situation arises, both the vehicle and the operator must be protected. The goal of "protecting the scene" is to provide visible early warning to surrounding traffic and thus avoid a collision (or avoid causing a collision). Principles:

A. Position of the vehicle is critical. The more likely a hazard it represents, the more critical the need for rapid, effective placement of warning devices.

   --If the trainees, when on the job, will be working at a department with an established policy on this subject, it should be presented. If that policy conflicts in any way with the material presented here, be sure to have the trainees <u>write the correct policy</u> in their study guides.

   1. MOST EFFECTIVE: Emergency warning devices such as triangular reflectors, flares, fuses, etc.

      --Triangular or other reflectors are best--no fire hazard.

   2. OKAY: Overhead beacon, four-way flashers, and cab lights.

      --Cab lights alone are not very effective. When used at night in conjunction with the beacon, however, they increase the overall amount of protection.

   3. POOR: Headlights, parking lights, or nothing.

      --Parking or headlights alone can actually increase the hazard. At night, tired motorists may tend to "follow" the lights right off the road into the rear end of the EV.

B. During Daylight:

   1. If the EV is well off the road, activating four-way flashers is usually sufficient to protect the scene.

   2. If the EV is not well off the road, additional precautions should be taken.

      --In addition to taking the extra precaution of placing warning devices the operator should protect himself by leaving the vehicle if collision is likely.

C. In Darkness:

1. If the EV is on or near the road, warning devices should be positioned whenever the EV will be stopped for more than a few moments.

2. If the length of time the EV will be stopped is long or indefinite, warning devices should be positioned (whether the EV is on or off the road).

--Again if likelihood of collision is great, operator should protect himself.

Placing Flares or Other Emergency Warning Devices

The obvious purpose of warning devices is to alert traffic to the stopped vehicle's presence, but another real goal is to cause as little interference as possible with the flow of traffic.

--Point out to the students that the distances outlined here are guidelines only. Actual distances must be based on the specific situation (e.g., terrain, visibility conditions).

A. One-way roads (or divided expressways):

1. Start four-way flashers before leaving the vehicle--cab lights on.
2. Place a warning device just beside the vehicle, on the traffic side.
3. Place a second device 100 to 200 feet to the rear of the vehicle, on the edge of the road. If the vehicle is actually on the roadway, the device should be placed in the middle of the lane.

4. Place a third device approximately 300 feet to the rear of the vehicle, on the road edge (or in the lane if the EV is on the road).

--When walking quickly, a normal stride is a little more than two feet.

B. Two-way traffic flow:

--Positioning is different due to the need to provide oncoming traffic with warning.

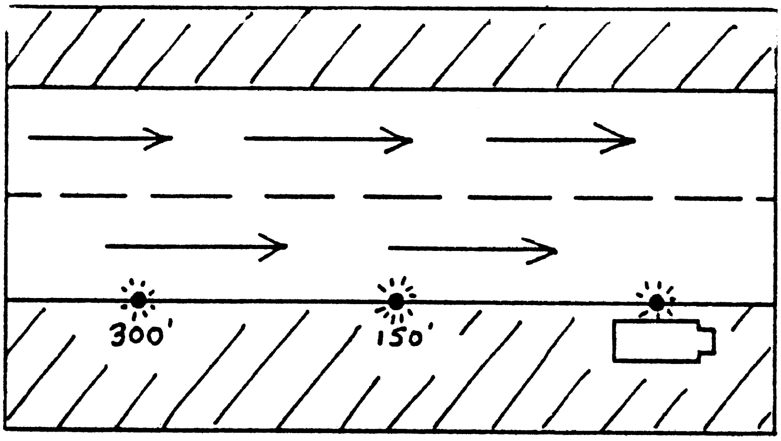
1. Start four-way flashers before leaving the vehicle--cab lights on.

2. Place a warning device just beside the vehicle on the road side.

3. Place a second device 100 to 200 feet to the rear of the vehicle on the road edge. (Again, if vehicle is on the road, device should be placed in the middle of the lane.)

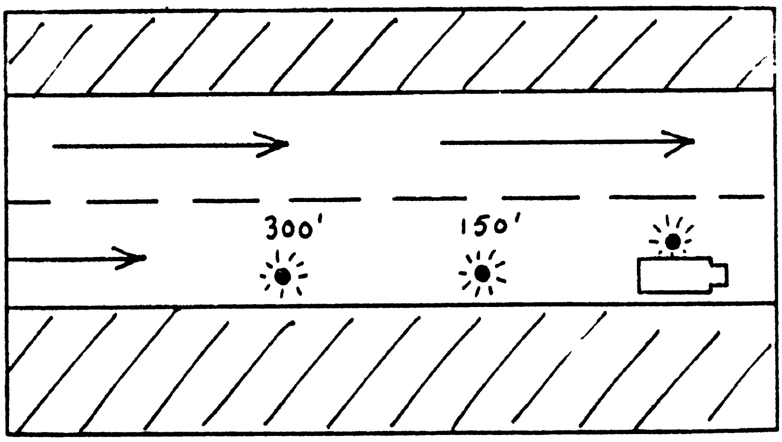
4. Place a third device 100 to 200 feet to the front of the vehicle on the road edge.

(Present transparency)



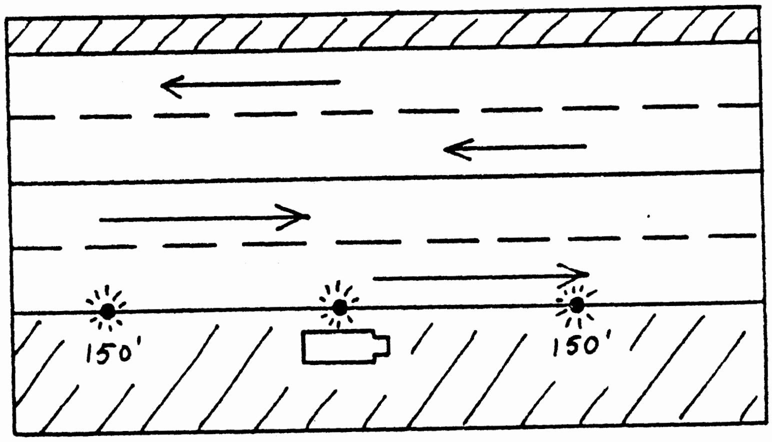
One-way flow of traffic.
Disabled vehicle off roadway.

(Present transparency)

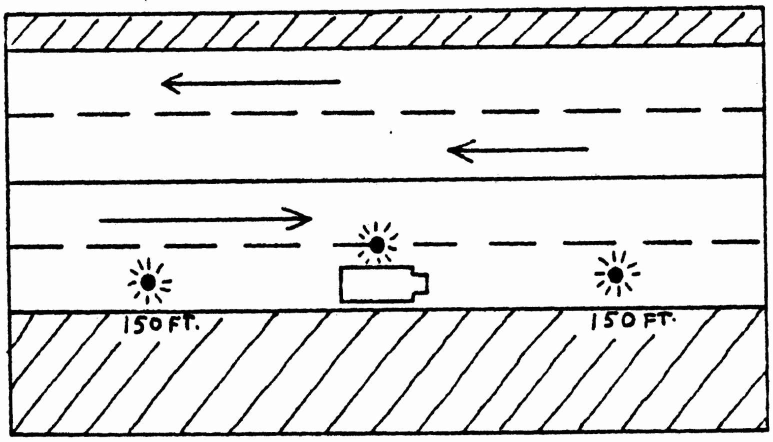


One-way flow of traffic.
Disabled vehicle on roadway.

(Present transparency)



Two-way flow of traffic.
Disabled vehicle off roadway.



Two-way flow of traffic.
Disabled vehicle <u>on</u> roadway.

C. Use of Flares or Fuses:

1. Read directions accompanying the warning devices.

2. The following can be used as general guidelines if no directions are present:

   a. Do not light device until you are ready to put it down.

   b. Pull the tab near the top of the device, to free the cap.

   c. Strike the matchlike head of the flare against the strike surface on the inside of the cap; point the flare or fusee <u>away</u> from your body as you do this.

--The inside of the cap is similar to the strike surface on a box of matches.

d. If flares with spiked ends are used and must be placed on the roadway:

1) Push them between slabs of concrete

2) Simply lay them on the road.

--A rock or other anchoring device can be placed to keep them from rolling.

3. Flares or fusees should NOT be used if there is evidence of the following:

a. Odor of gasoline.

b. Any fluid leakage.

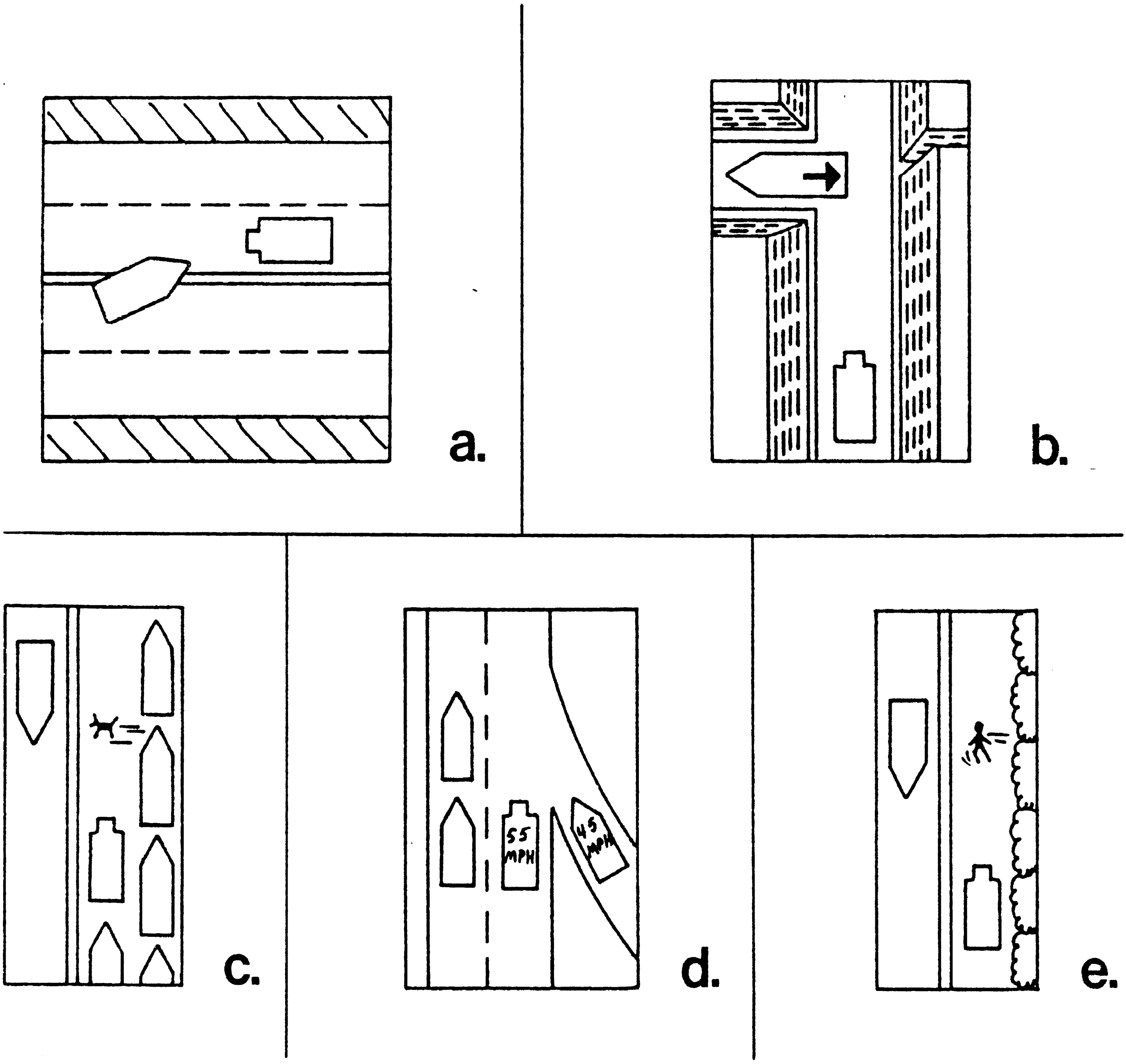
--Most motor vehicle fluids are combustible.

c. Any possibility of fire.

--Emphasize the danger of using flares or fusees if there is ANY possibility of fire.

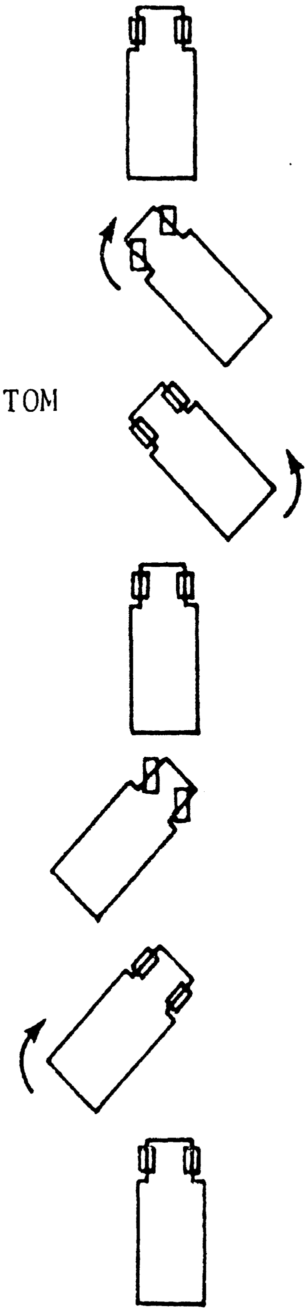
--In these cases, the only safe warning devices are reflectors. The large, red-orange triangles are especially effective. Of course, the vehicle's lights (e.g., beacon, four-ways) can be used as well.

4. Replace any warning devices that are used as soon as the EV returns to quarters.



WHAT WOULD YOU DO?
(PRACTICE)

READ FROM BOTTOM



7. Steering control is reestablished.

6. To control fishtailing in the opposite direction, you'd countersteer <u>right</u> to help you get back on course.

5. The back end fishtails to the right.

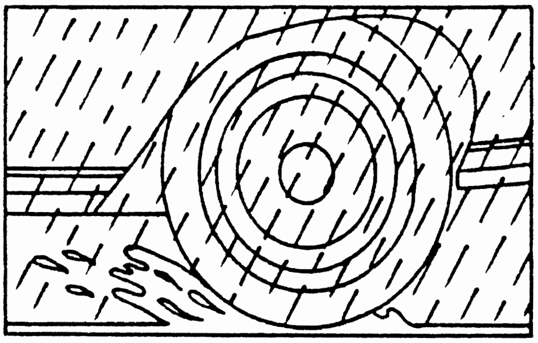
4. The vehicle is back on course.

3. You'd steer <u>left</u>, in the direction you want the vehicle to go relative to the way it's facing.

2. The back end of the vehicle skids around to the left (the vehicle is still moving forward at an angle).

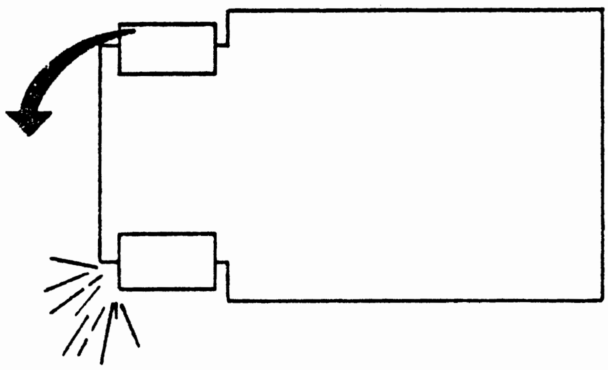
1. The vehicle is going straight.

COUNTERSTEERING



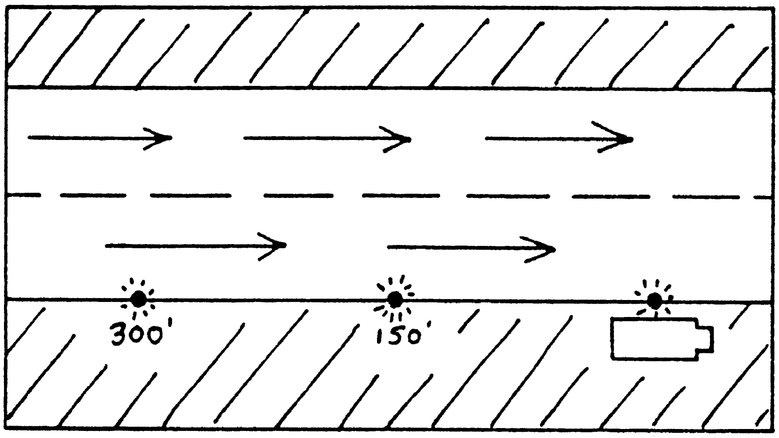
a.

HYDROPLANING



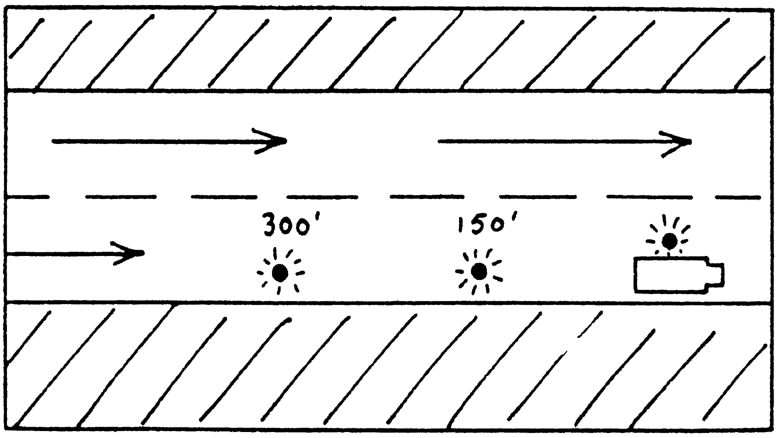
b.

BLOWOUT



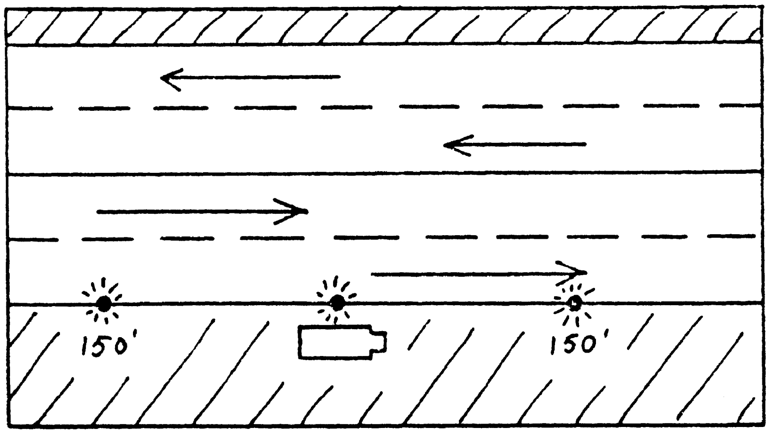
a.

DISABLED VEHICLE OFF ROADWAY
(ONE-WAY TRAFFIC FLOW)



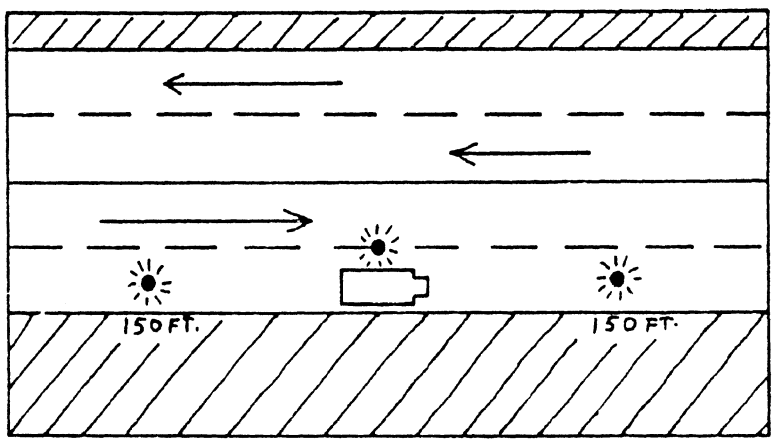
b.

DISABLED VEHICLE ON ROADWAY
(ONE-WAY TRAFFIC FLOW)



a.

DISABLED VEHICLE OFF ROADWAY
(TWO-WAY TRAFFIC FLOW)



b.

DISABLED VEHICLE ON ROADWAY
(TWO-WAY TRAFFIC FLOW)

Review Exercises

Below are several statements relating to the operation of an ambulance. Circle the letter in front of those statements that are correct.

a. Advance route planning can save time in an emergency.

b. You should use a checklist to inspect the vehicle's medical supplies and life-support equipment once a week.

c. Routine transports are not considered medical emergencies.

d. Ambulances generally require longer stopping distances than ordinary passenger cars.

e. You should not leave the scene until a patient is stabilized.

List two reasons why it is not advisable to drive in the emergency mode with a patient aboard.

- It can frighten the patient.
- It can put a stabilized patient into shock.
- It can disrupt on-going medical treatment.
- It can aggravate certain medical conditions sufficiently to cause death or permanent disability.

Name two conditions that indicate especially smooth, low-speed transport is desirable.

- Spinal injuries.
- Serious fractures.
- Heart attacks.

Name two conditions that indicate emergency mode transport is required.

- Uncontrolled hemorrhage.
- Uncontrolled cardiovascular or respiratory impairment.
- Complicated impending childbirth.

Write a brief description of the purpose of emergency signaling equipment.

The purpose of emergency signaling equipment is to inform traffic (and the public in general) of the presence of an emergency vehicle, and thus to aid in clearing a path the the EV.

Circle the letter in front of the statements that are correct:

a. You are required to use emergency signaling equipment whenever any of the exemptions to the state law are exercised.

b. An ambulance with a patient aboard should use emergency signaling equipment at all times.

c. At high speeds, it is possible to "out-run" the siren sound.

d. When siren is on, it is a good idea to leave driver's window partly open.

e. It is especially important to turn the siren on at railroad crossings.

f. It is especially important to turn the siren on at intersections.

When parallel parking on a slope, how should the vehicle's wheels be positioned?

So that the wheels will hit the curb and prevent rolling, or so that the vehicle cannot roll through traffic lanes.

Sam (the operator) and Joe are in the control cab on a van ambulance. As Sam is backing out of a parking stall, a sudden jolt and a tinkling sound tell them they have hit something. Sam was monitoring the left outside mirror as well as the center rear-view mirror and joe was monitoring the right outside mirror. What more might have been done to avoid this accident?

Sam should have assigned Joe to direct the backing operation from the rear, outside of the vehicle.

Briefly describe the provisions of the state statute that deals with motorists' responsibilities for clearing a path for emergency vehicles.

- Localize to community law or standards.

Circle the letter in front of the statement which describes the best siren-use technique for negotiating through heavy or blocked traffic:

a. Low-pitch (growl) constant siren.

b. No siren.

c. High-pitch constant siren.

d. Intermittent siren.

Circle the number that represents the percentage of emergency vehicle accidents that occur at intersections.

35 percent 50 percent 65 percent

Circle the letter in front of the method appropriate for checking traffic before crossing an intersection.

a. Look right, then left, then right again.

b. Look left, then right, then left again.

c. Look left, then right.

d. Look right, then left.

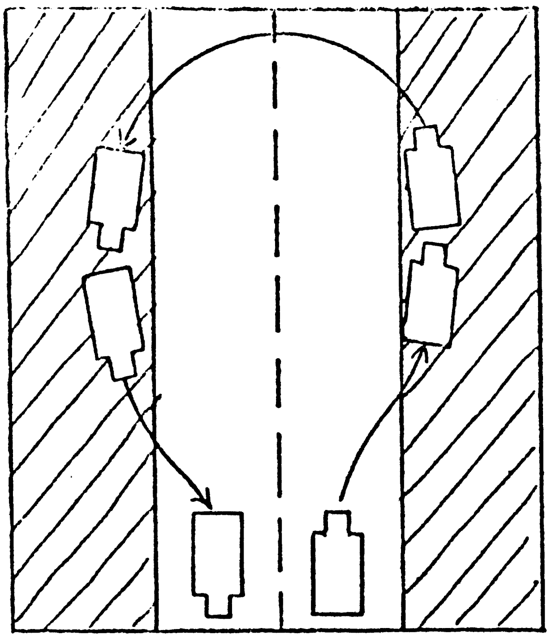
State which type of turn, a right of left, requires a larger gap in cross traffic. Explain your answer.

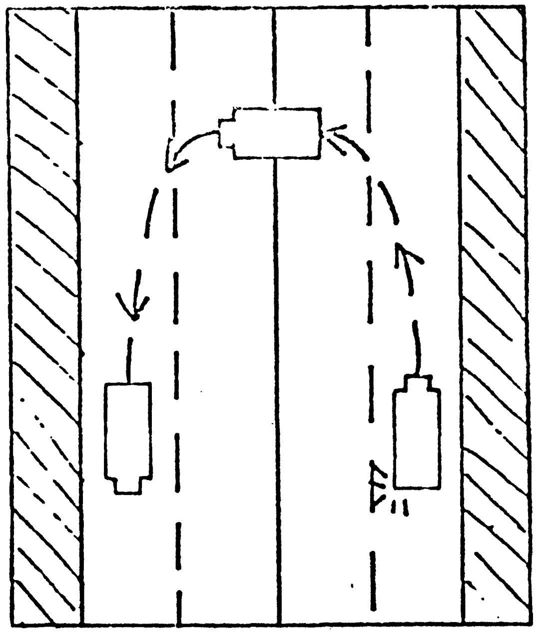
Left. Because traffic lanes must be crossed.

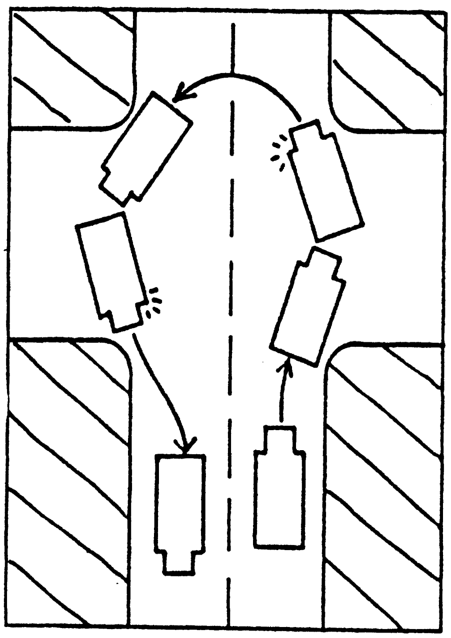
What is the safest type of turnabout?

U-turn.

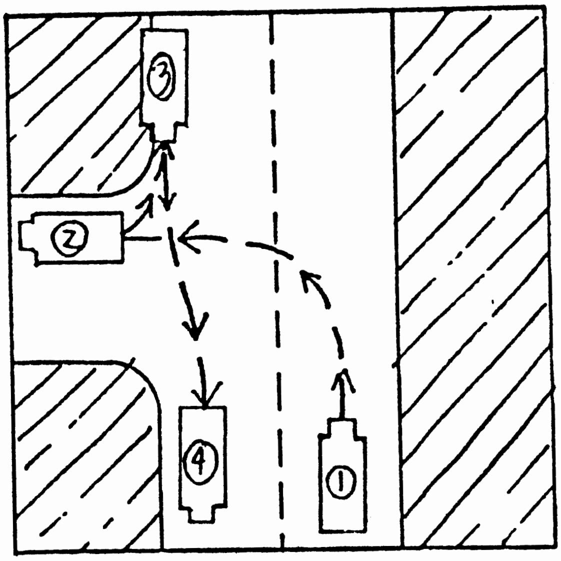
On the illustrations below, draw the correct path for a vehicle making U-turns.

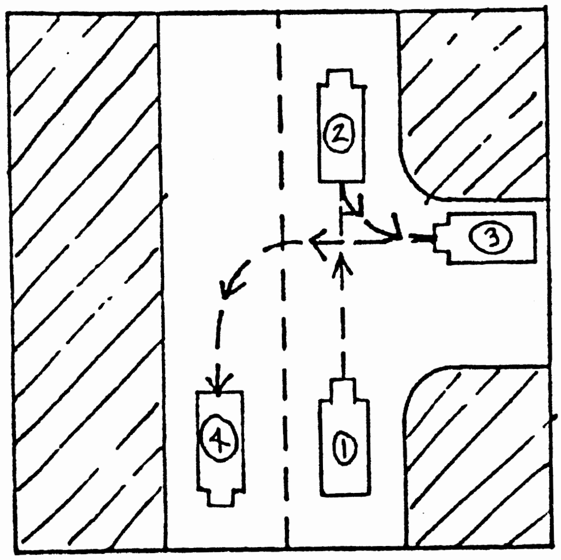






On the illustrations below, draw the correct path for a vehicle making a left and a right side-road turnabout.





Write a brief description of the two methods of estimating following distance.

Estimate car lengths: One car length for every 10 mph.

Two-second rule: Maintain a separation of at least two seconds between the EV and the vehicle being followed.

Of the items that appear below, some are cues to increase following distance. Circle the letter in front of those items.

a. When following a vehicle that is being driven erratically.

b. When operating in the emergency mode.

c. When weather conditions are poor.

d. When following a late-model sports cars.

e. When traveling on damaged road surfaces.

f. When traveling during rush hour.

g. When following another EV.

Select the siren-use technique most appropriate for entering and exiting expressways. Circle the letter in front of that item.

a. Intermittent siren.

b. Low-pitch (growl) siren.

c. No siren.

d. High-pitch siren.

Below are several statements relating to following distance. Circle the letter in front of those that are correct.

a. Following at the full stopping distance is unnecessary.

b. Not all vehicles have the same stopping distance for a given speed.

c. Vehicle condition can have an effect on stopping distance.

d. In general, large, heavy vehicles require less distance to stop.

e. Following distance should be decreased when traveling in the emergency mode.

Name two types of road configuration (not lane markings or signs) that indicate it is unsafe to pass.

- Hillcrests.
- Curves.
- Intersections.

In a 45 mph zone, the EV is traveling 45 mph. Circle the letter in front of any of the following statements that indicate it is unsafe for the EV to pass.

a. Four-lane divided highway, heavy traffic in all lanes.

b. Vehicle to be passed is traveling at the posted limit.

c. Two-lane road, broken center line, hillcrest approximately 1/4 mile ahead.

d. Straight two-lane road, broken center line, small driveway intersecting to the left approximately one block ahead.

Write a brief definition of the meaning of a "Yield" sign.

Yield sign requires that the right-of-way be given to any traffic that is close enough to be a hazard.

For each of the sentences relating to driving curved roads at high speed, insert the word(s) that best completes that sentence.

a. On a decreasing radius curve the maximum possible entry speed is too fast or high for the later (tighter) portion of the curve.

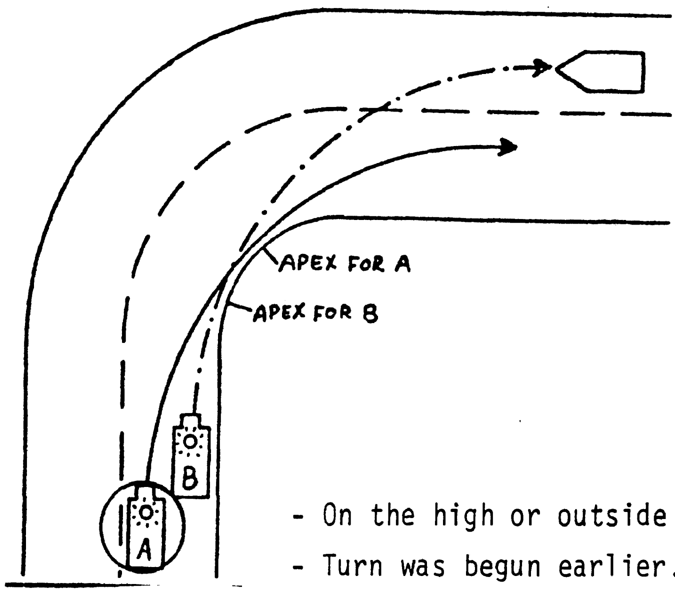
b. The tighter the curve, the slower the EV most go.

c. Brake or decelerate to the proper entry speed before entering a curve.

d. Entry speed for any curve can be increased somewhat by entering the curve on the high side.

e. On a decreasing radius curve, if the speed is too high for the tighter portion of the curve, vehicle control will be lost or impossible.

On the drawing below, the two vehicles are just beginning their turn. Circle the vehicle that has chosen the correct entry position for the curve. Give reasons why the position of the vehicle you chose is correct.



- On the high or outside of the curve.
- Turn was begun earlier.
- Vehicle B will end up in opposing lanes of traffic.

Indicate which of the following statements are true and which are false.

a. More than half of all fatal accidents occur at night. (true)

b. Generally, older people's eyes function just as well as younger people's eyes when it comes to night driving. (false)

c. It is a good idea to have instrument panel lights as bright as possible at night. (false)

d. The roadway is usually most slippery when it has just begun to rain. (true)

e. It is a good idea to go through large areas of water as quickly as possible, so that the vehicle is exposed to its effects for the shortest possible time. (false.)

f. The farther below freezing the temperature drops, the more hazardous the ice of snow on the road will be. (false)

g. When driving in fog avoid the use of high beams. (true)

Some of the items listed below are less likely than the others to cause personal injury and property damage if struck in a collision because they are impact-absorbing. Circle the letters beside the items that are impact-absorbing.

a. Road sign (speed limit, stop sign)

b. Telephone pole

c. Low bushes and shrubs

d. Parked cars

e. Concrete bridge abutment

f. Chain-link fence

g. Full-size oak tree

What are the three primary steps that can be taken to help control a skid?

- Stay off brake
- Stay off accelerator
- Countersteer

Indicate which of the following statements relating to off-road recovery are true, which are false.

a. If your wheels go off the road edge while traveling a high speed, pump-braking is a good way to reduce speed. (false)

b. If possible, it is a good idea to reduce speed to about 15 mph before attempting to steer back onto the roadway. (true)

c. If you do not have time to decelerate (because of an obstacle ahead) you can steer the vehicle sharply toward the road edge (about 90°) to effect an off-road recovery. (true)

d. You should attempt to steer onto the road at the place where there is the least difference between road edge and berm. (true)

e. As soon as all four wheels are back on the roadway, you should countersteer to control your lane position. (false)

Describe, for any five (5) of the following malfunctions, the appropriate procedure for handling the malfunction.

a. Brake failure: Shift to lowest gear; apply parking brake; avoid locking wheels; pump brake pedal rapidly.

b. Accelerator sticks: Attempt to release using tip of foot; if unsuccessful, put vehicle in neutral and turn engine off.

c. Engine temperature rises into danger zone: Stop vehicle immediately; do not drive until maintenance has been performed.

d. Transmission failure: Select off-road stopping place; brake gradually to a stop.

e. Blowout: Do not brake or accelerate; maintain steering control (may be difficult); when steering is controlled, brake gradually.

f. Hood flies up: Try to see through gap, or put head out side window, pull to side of road without sudden braking.

When the EV is at the side of the road, EV operators could use any one or a combination of the following to warn/alert motorists. On the list below, mark the <u>most effective</u> way with the letter "M" and mark the <u>least effective</u> way with the letter "L".

____ Headlights

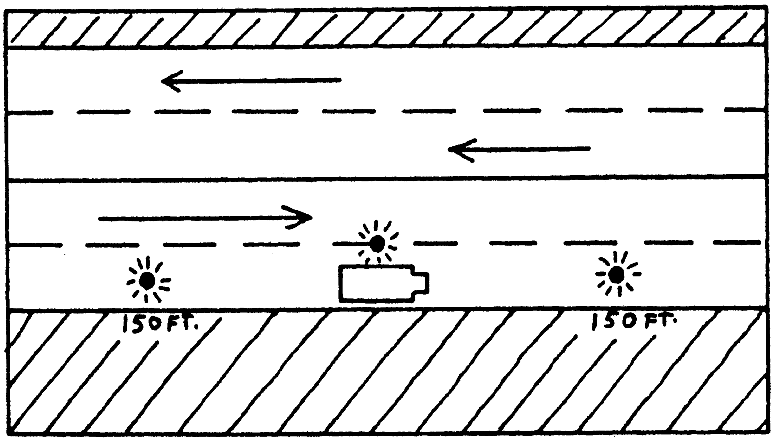
____ Four-way flashers

M Triangles

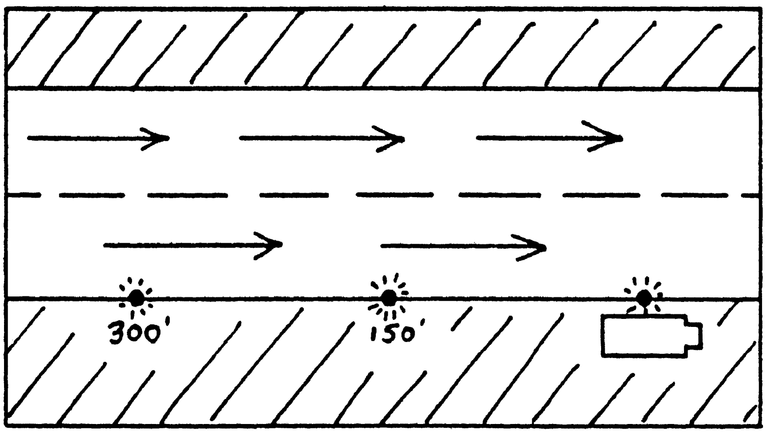
____ Overhead beacon

L Parking lights

On the two drawings below, indicate with X's the correct placement of warning devices (e.g., reflectors, flares).



On-road, two-way traffic flow.



Off-road, divided highway.

AMBULANCE DRIVER TRAINING

UNIT SUMMARY

Unit VI , Accident Involvement

Description:

Information concerning the responsibilities of the ambulance driver when involved in an accident while driving the emergency vehicle.

List of Lessons:

Accident Responsibilities

Accident Reports

Attachments:

AMBULANCE DRIVER TRAINING

Lesson Outline

Unit VI , Accident Involvement

Lesson 1 , Accident Responsibilities Est. Time 1/4 Hour

****

Description/Purpose:

A review of the responsibilities of the driver when involved in a collision.

Topical Outline:

Legal Responsibilities
The Paradox
Consequences

Objectives:

Students will:

--demonstrate knowledge of state statutes regarding their legal responsibilities as ambulance drivers.

--demonstrate knowledge of the steps to take should they be involved in an accident.

--demonstrate knowledge of the consequences of accident involvement.

References:

Student Handout Material:

Michigan Vehicle Code

Teaching Aids:

Michigan Vehicle Code

Instructor's Notes for Lesson Content

Legal Responsibilities

Michigan Vehicle Code

--If you were involved in an accident, or have reason to believe you were involved or the cause of an accident (physical contact between vehicles need not have actually taken place) you must

1. Stop
2. Exchange information
3. Render aid

This is true even if you are on an emergency run. There are no exceptions.

The Paradox

The ambulance is a mission oriented vehicle dispatched to fulfill an immediate need. Yet if it's accident involved it cannot accomplish its mission - without an intolerable delay.

Consequences:

Accident involvement not only results in delay but also has the following consequences:

1. Repairs must be made - with the unit being out of service during the time of repair.
2. Back-up must be utilized - both for the immediate call and for other calls until repairs can be effected or a replacement vehicle obtained. This can compromise the ability of the organization to provide adequate coverage.
3. Adverse publicity.
4. Cost - of repairs
   - increased insurance premiums
   - replacement rental
   - medical costs for injuries not covered by insurance
5. Possibility of a lawsuit for negligence.

AMBULANCE DRIVER TRAINING

Lesson Outline

Unit VI, Accident Involvement

Lesson 2, Accident Reports Est. Time 1/4 Hour

****

Description/Purpose:

Suggestions and requirements to assist the ambulance driver in recording data concerning the accident when involved in a collision.

Topical Outline:

- Reporting Requirements
  - Police
  - Company
  - Insurance
  - Personal

Objectives:

To give students the opportunity to demonstrate their knowledge of proper accident reporting procedures at the police, company, insurance and personal levels.

References:

Student Handout Material:

Teaching Aids:

Instructor's Notes for Lesson Content

Police Report

If police are called to scene, they will complete a report.

If not, you must report accident to police.

Company Report

Must report to company. If they have a form, use it.

If not, prepare a letter report detailing who, what, when, where.

Be specific. Describe just how accident happened.

Insurance Report

Use insurance form. If no form, prepare a letter as in company report above.

Personal Report

Write down all details of accident for your own record and protection. If needed later, such a record is helpful in recalling details of accident. Keep notes of subsequent events. Do not rely on memory.

AMBULANCE DRIVER TRAINING

UNIT SUMMARY

Unit VII , In-Vehicle Driving Exercises

Description:

Topics presented in this unit are to be conducted in a closed protective area using an actual ambulance preferably of the type the student will be driving.

List of Lessons:

Vehicle inspection

Patient ride

Low speed maneuvers

Precision driving

Attachments:

AMBULANCE DRIVER TRAINING

Lesson Outline

Unit VII , In-Vehicle Driving Exercises

Lesson 1 , Vehicle Inspection Est. Time 1/2 Hour

****

Description/Purpose:

The student, using a check-sheet or a guide, will carry out a thorough vehicle inspection. Also available is the opportunity to manipulate all vehicle controls, switches, etc.

Topical Outline:

Inspection

Preparing to drive

Objectives:

To have the student perform a full vehicle inspection.

To have each student adjust the vehicle to him. Re: seat, mirrors, etc.

To provide each student with the opportunity to examine the vehicle in detail and to try out or operate all controls, etc.

References:

Student Handout Material:

Copies of inspection forms.

Teaching Aids:

An ambulance.

Instructor's Notes for Lesson Content

Guidelines for Demonstrating Inspection, Maintenance, and Pre-Start Procedures

A. Inspection

1. Use the Inspection Checklist and go over every item.

2. For every item, point out the key indicators whether or not they represent a problem on that particular vehicle.

3. Keep the students directly involved in the demonstration. Some way to do this are:

   a. For any given item, ask the students what the key indicators are.

   b. Ask the students to make judgments about the key indicators (e.g., tread depth).

   c. Have each student complete the check lists.

This is an opportunity to see, feel, hear, touch everything on and about the vehicle.

NOTE: If you can arrange to have defect on the vehicle for demonstration purposes, it is useful. Examples are a burned-out light, low windshield washer fluid, etc.

B. Preparing to Drive. Using the criteria outlined in this unit, demonstrate the proper adjustment of the following:

1. Seat Position (students have not done it properly unless seat is locked into position).
2. Head restraint (center of skull)
3. Lap belt (snug across lower pelvis - NOT stomach)
4. Shoulder harness (fist between harness and chest?)
5. All mirrors (per pictures in text and specific vehicle requirements).
6. Make all other adjustments, as needed.

C. At the end of this lesson each student should be thoroughly familiar with the vehicle.

AMBULANCE DRIVER TRAINING

Lesson Outline

Unit VII , In-Vehicle Driving Exercises

Lesson 2 , "Patient" Ride Est. Time 1/4 Hour

****

Description/Purpose:

Each student will be given the experience of being transported on the cot in the vehicle on a simulated emergency run.

Topical Outline:

A ride for each student as a "patient."

Objectives:

To give each student the opportunity to experience a ride in an ambulance as a "patient."

References:

Student Handout Material:

Teaching Aids:

Ambulance, cot, backboard

Instructor's Notes for Lesson Content

A "typical" ambulance crew should be selected from the group. The crew should consist of the instructor or teaching assistant, and three students. The students take turns being the "patient" and crew.

The "patient" lies on the cot on top of a backboard. The "crew" fastens the patient onto the cot and lifts the patient into the ambulance and secures the cot in place.

One crew rides with the driver, the other in the compartment.

The driver takes a short trip including several turns, stops, starts, a panic stop, etc. Speeds are kept low (25 mph or less). The purpose of the ride is to demonstrate how improper driving (which is proper driving under certain conditions) can affect the patient.

The procedure is repeated for all students.

AMBULANCE DRIVER TRAINING

Lesson Outline

Unit VII , In-Vehicle Driving Exercises

Lesson 3 , Low-Speed Maneuvers Est. Time 2 Hour

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Description/Purpose:

Demonstration and practice in vehicle backing, parking, turns, steering, braking, turn-arounds, etc., so as to develop skill and perception at low speed in performing common vehicle maneuvers.

Topical Outline:

Selected precision maneuvers are listed as suggestions.

Objectives:

To give the student practice in low-speed maneuvers.

To give the student practice in depth perception.

References:

Student Handout Material:

Teaching Aids:

Ambulance
Cones for course

Instructor's Notes for Lesson Content

Examples of practice exercises are given below.

These can be set up individually or combined into a "course."

Each student should be given a chance to practice each exercise. Timed events can be used.

NOTE: Each exercise should be demonstrated by the instructor. Also ask if any student suffers from motion sickness and request that they (and you) be prepared.

SMALL-AREA EXERCISES

Dutton's Weave*

A. Description: This exercise will provide practice in precise forward and backward control of the EV in cramped quarters, at low speed. It will illustrate proper backing techniques and the use of mirrors to judge rear and side clearances.

B. Procedure:

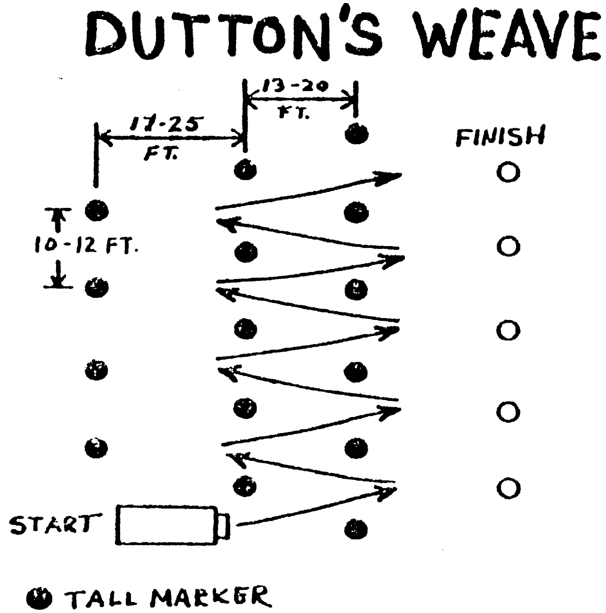
1. This is a 60-second, timed event. (optional)
2. The EV is driven alternately forward and backward in the pattern indicated on the drawing.
3. EV should stop approximately 1' from the outer row of cones before changing direction.

C. Possible Performance Problems:

1. Over or understeering.
2. Steering in the wrong direction (in "Reverse").
3. Difficulty using mirrors to judge position.
4. Vehicle not centered in relation to outer rows of cones.
5. Driving too slowly (not completing in 60 seconds).

D. Criteria for Excellent Rating (3 Error-Free Runs): optional

1. Completed in 60 seconds or less.
2. All cones standing.



Stall Parking (also entering a driveway).

A. Description: This exercise provides the van or modular EV operator with practice in backing the EV into a stall such as an Emergency Room loading ramp. It illustrates the proper procedure for stall parking and, through the use of cones, the most important cues to look for. The width of the stall may have to be increased for a driveway exercise.

B. Procedure:

1. The EV is driven beyond the "stall" (which is perpendicular to the main "road").

2. A "partner" is stationed against the far wall of the stall to provide guidance.

3. The EV is backed into the center of the stall.

C. Possible Performance Problems:

1. Over or understeering in reverse.

2. Relying on mirror when partner can provide better information.

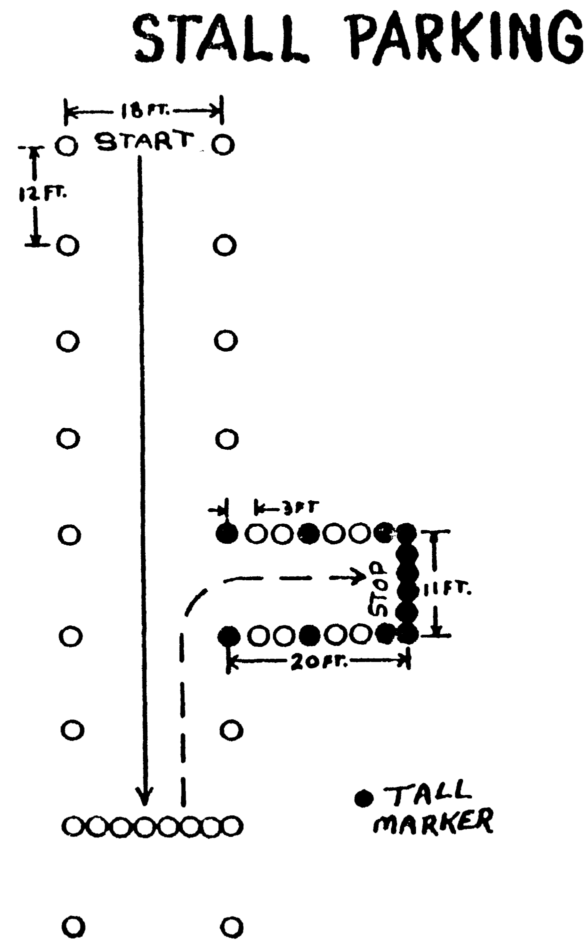
D. Criteria for Excellent Rating:

1. EV positioned in center of stall.

2. Rear of EV stopped within 1' of rear stall markers.

3. All cones standing.

E. For driveway practice, the ambulance should be entered from both directions as well as entering forward and backing into.

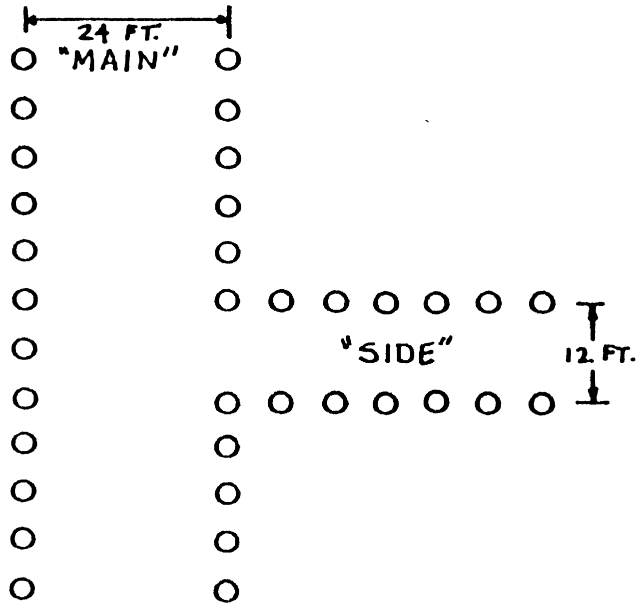


Turnabouts

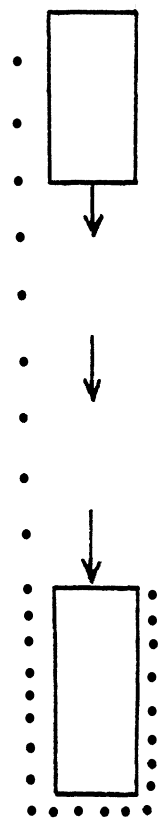
A. Description: This exercise provides trainees with practice in performing turnabouts using left and right-hand side roads. Cones are used to outline the "roads," but any intersection on the driving range could be used.

B. Procedure/Criteria: The procedure for turnabouts is illustrated on Transparencies 14 and 15 and explained on pages I-F-44 through I-F-47.

TURNABOUTS

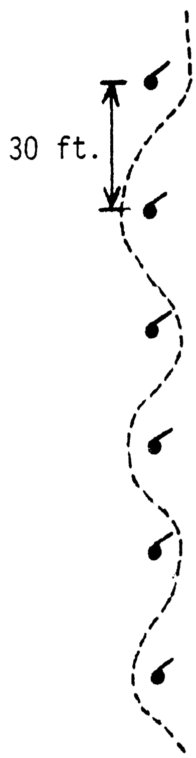


Depth Perception



A 12' lane with a barrier at the end is set up to simulate a loading dock or ambulance entrance area. The student drives straight ahead to the end cone line and stops just before touching the cones. No assistance is provided. The student then gets out of the vehicle and observes how close he came. Several tries should be made with the student checking each time. A good score is to stop within 12" of the cone. This procedure should also be tried by backing into the area.

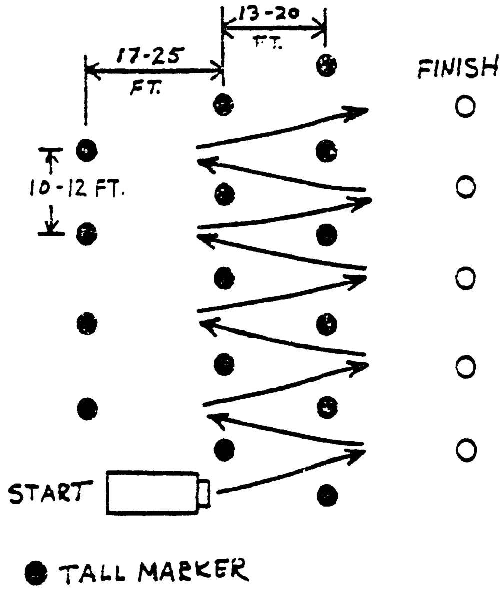
Serpentine



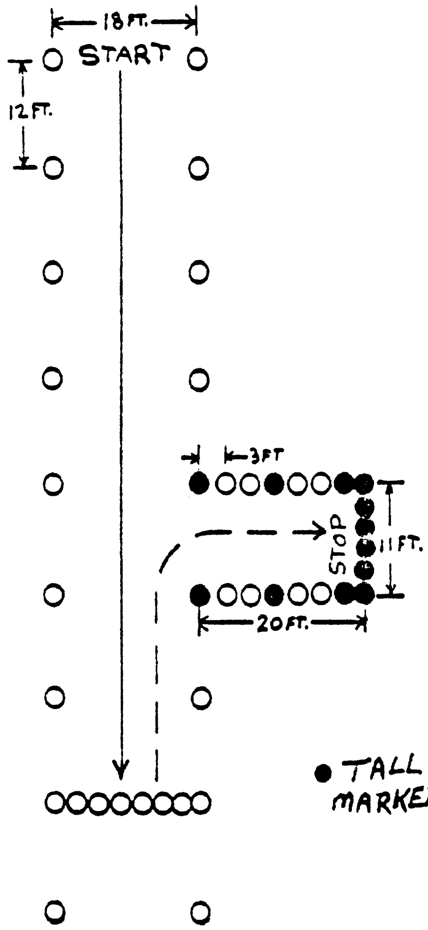
About six flags are set up in a straight line. Spacing between flats is 30' (adjusted to vehicle length). The objective is to weave through the markers, staying as close as possible to them without knocking them over. Steering and depth perception are practiced here. The procedure should be tried by backing through also.

SMALL AREA EXERCISES

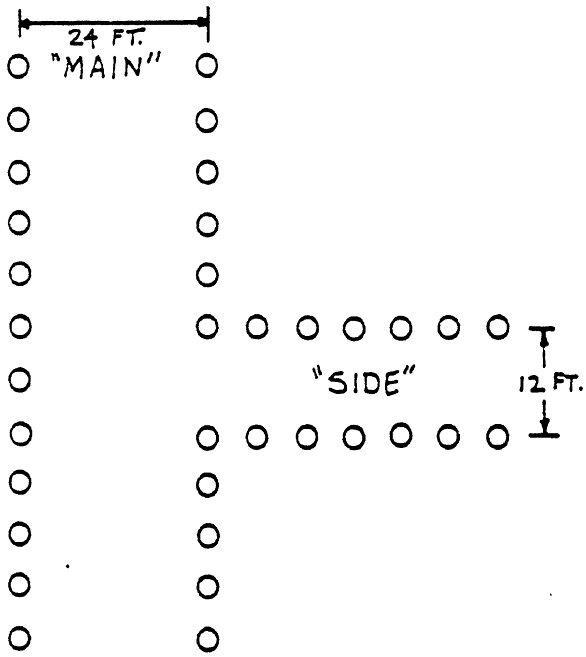
DUTTON'S WEAVE



STALL PARKING



TURNABOUTS



AMBULANCE DRIVER TRAINING

Lesson Outline

Unit VII, In-Vehicle Driving Exercises

Lesson 4, Precision Driving Est. Time 1-1/4 Hour

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Description/Purpose:

Demonstration and practice in vehicle control and handling at urban speeds. Topics include panic stops, evasive steering, lane changing, etc.

Topical Outline:

Selected precision driving maneuvers are listed as suggestions.

Objectives:

To give the student practice in precision driving.

References:

Student Handout Material:

Teaching Aids:

Instructor's Notes for Lesson Content

NOTE: These maneuvers are to be conducted at speeds of not greater than 25 mph. Skid and evasive maneuvers are not recommended <u>unless</u> a vehicle equipped with a roll bar and other safety equipment is available.

These exercises are a continuation of the skill exercises described in Lesson 3.

SPEED LIMIT 25 MPH

Evasive Maneuver

A. Description: This exercise provides practice in the proper techniques for executing an evasive maneuver. It will demonstrate that, using proper handling techniques, an operator can avoid an obstacle in a short distance (even at high speed). It will also illustrate that panic-braking often requires more distance than an evasive maneuver.

B. Procedure:

1. Establish proper entry speed and maintain throughout (15 mph for first run).
2. Use 3 and 9 o'clock hand position on sedan steering wheel.
3. At cue cones, Instructor indicates "Left," "Right,"
   Vehicle operator:
   a. Selects correct lane
   b. Steers to and through proper lane.

C. Possible Performance Problems:

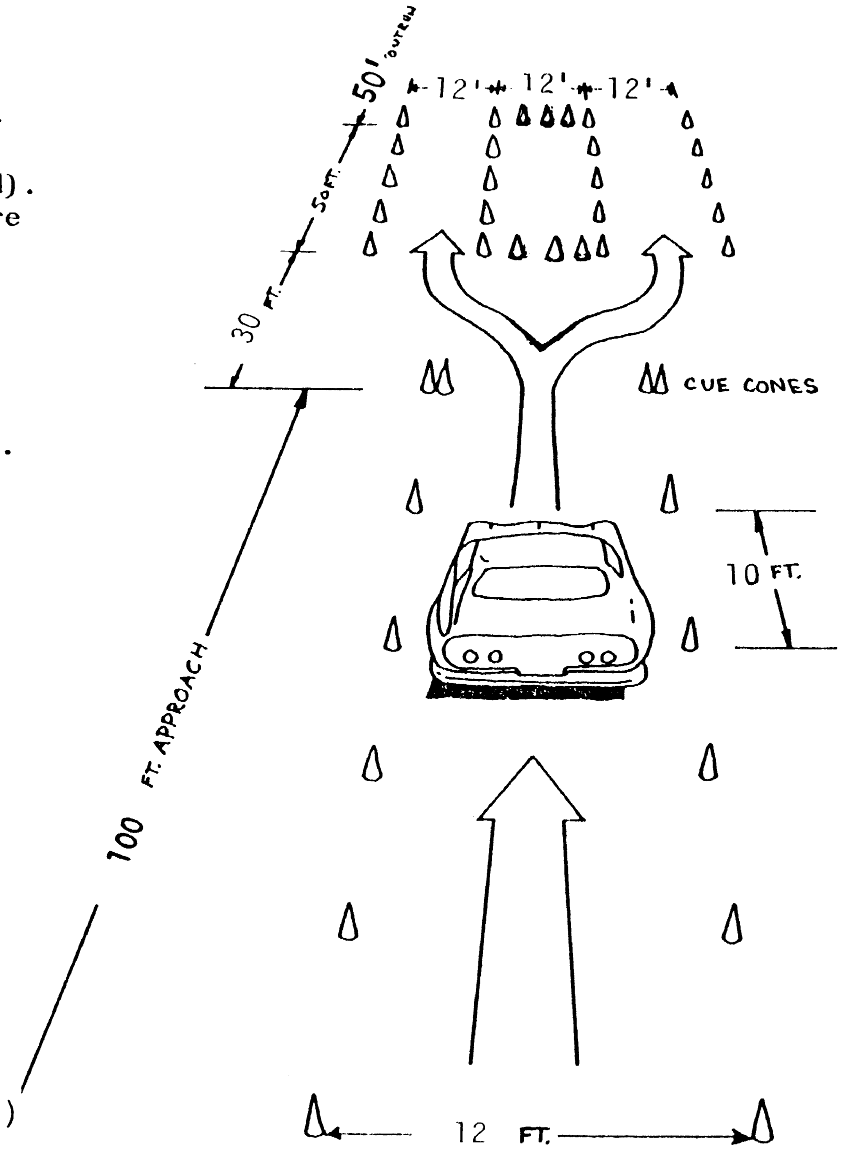
1. Slow reaction to command.
2. Anticipating Instructor's command.
3. Under or oversteering.

D. Criteria for Excellent Rating (3 Error-Free Runs)

1. Speed: 25 mph throughout.
2. Correct lane selection.
3. All cones standing.

Note: A variation of this is to narrow one lane (right or left) to 9 feet at the opposite end.

EVASIVE MANEUVER



Serpentine Course

A. Description: This exercise provides practice in directional control. It will demonstrate that throttle control and timing affect the ability to steer.

B. Procedure:

1. Establish proper entry speed and maintain throughout (20 mph for first run).
2. Steer so that vehicle passes closest to black (pivotal) cones on the inside of curves.
3. Establish rhythm in throttle use and steering input, such that weight transfer is smooth and equivalent throughout exercise.

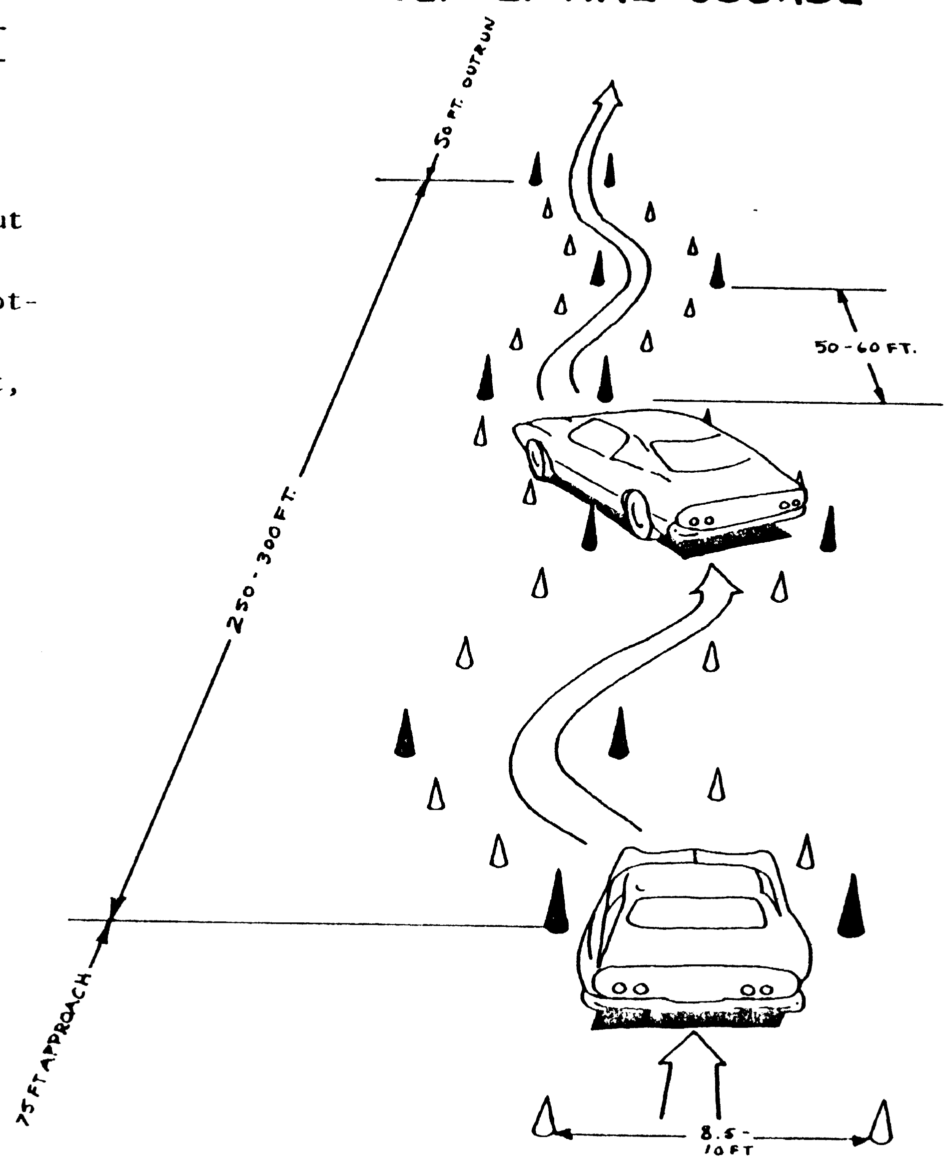
C. Possible Performance Problems:

1. Improper entry angle.
2. Under or oversteering.

D. Criteria for Excellent Rating (3 Error-Free Runs):

1. Speed: 25 mph throughout.
2. Smooth, rhythmic control.
3. All cones standing.

SERPENTINE COURSE



Baird's Judgment

A. Description: This exercise provides practice in judging clearances. It will illustrate that even small differences in gap size can be visually detected.

B. Procedure:

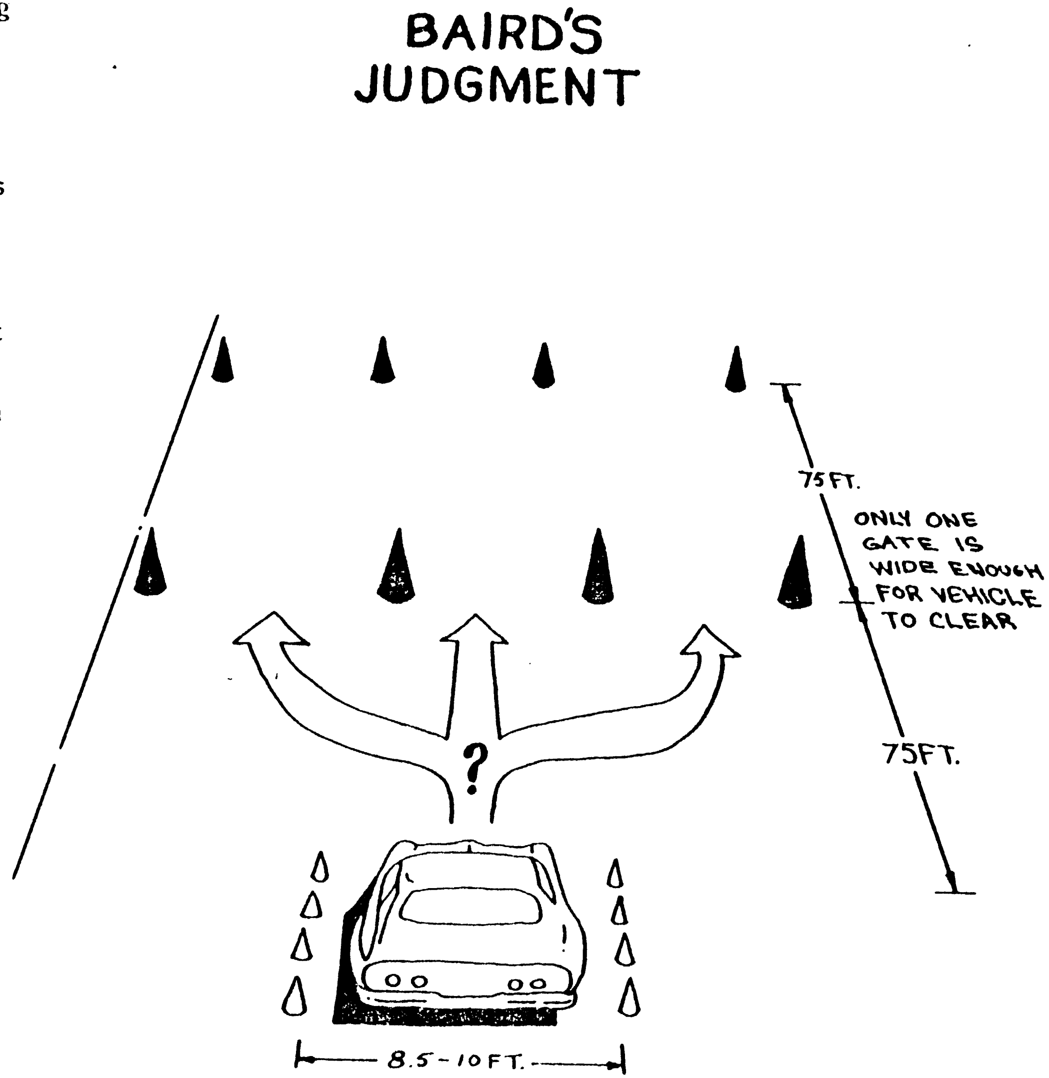
1. Before each run-through, one of the two center cones in each row is moved about 6" to the right or left. Moving the cone will leave only one of the three gates sufficiently "open" for the EV to clear.
2. Establish proper entry speed and maintain throughout (25 mph for first run).
3. Steer so that vehicle passes through largest gate in each row of cones.

C. Possible Performance Problems:

1. Reacting too slowly.
2. Correct selection of gate, but consistently hitting either the right or left cone.

D. Criteria for Excellent Rating (3 Error-Free Runs)

1. Speed: 45 mph throughout.
2. All cones standing.



Lane Change Maneuver

A. Description: This exercise provides practice in making 90° turns, and in establishing a proper approach for precise alignment through lanes.

B. Procedure:

1. Establish proper entry speed and maintain throughout (20 mph for first run).
2. Follow track indicated on illustration.
3. Use 3 and 9 o'clock hand position on steering wheel.
4. Use overhand method for turning wheel.

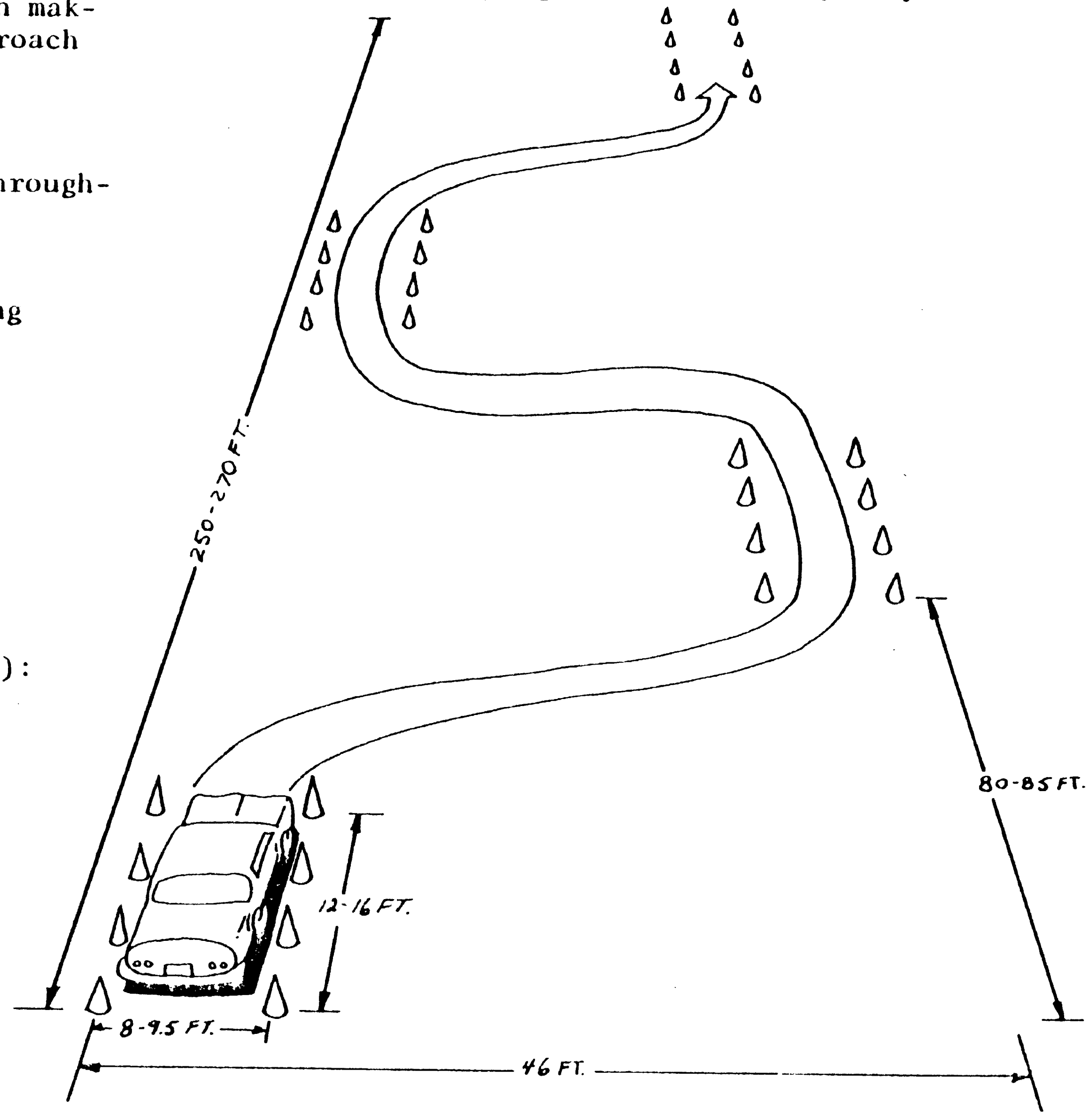
C. Possible Performance Problems:

1. Speed fluctuation.
2. Beginning turns too early or too late.
3. Under or oversteering.

D. Criteria for Excellent Rating (3 Error-Free Runs):

1. Speed: 25 mph throughout.
2. All cones standing.

LANE CHANGE MANEUVER



Controlled Braking

A. Description: This exercise provides practice in performing a maximum braking stop while maintaining directional control. It will also provide practice in determining the braking point just before wheel lockup and will illustrate that steering with locked wheels is impossible.

B. Procedure:

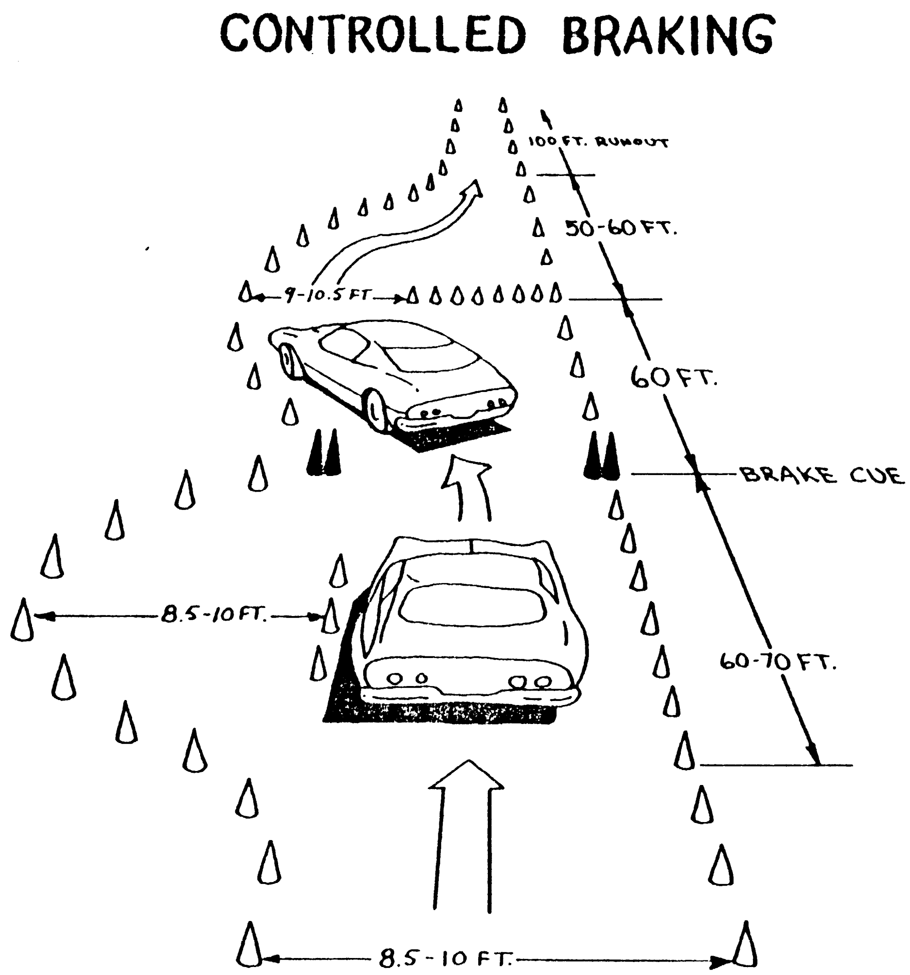
1. Establish proper entry speed (30 mph for first run).
2. Approximately 80' before brake cue cones, Instructor indicates "Left" or "Straight." Vehicle operator:
    a. Steers in direction indicated by Instructor.
    b. Applies brakes as front of EV reaches cue cones.
    c. Steers left around barricade without loss of directional control.
    d. Returns to lane and stops in first 20' of runout.

C. Possible Performance Problems:

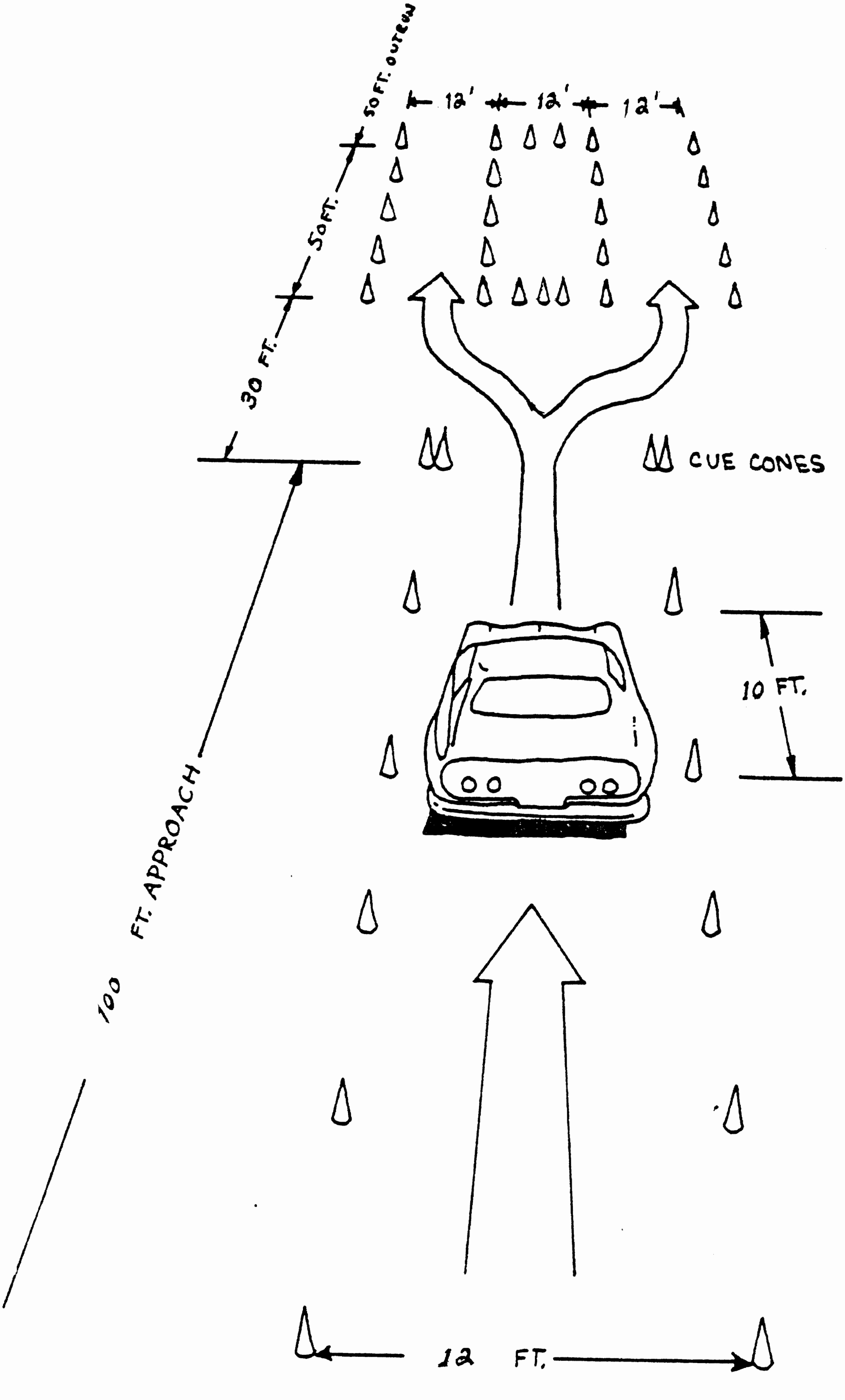
1. Anticipating Instructor's command.
2. Braking before cue.
3. Locking wheels (loss of directional control).
4. Over or understeering.

D. Criteria for Excellent Rating (3 Error-Free Runs):

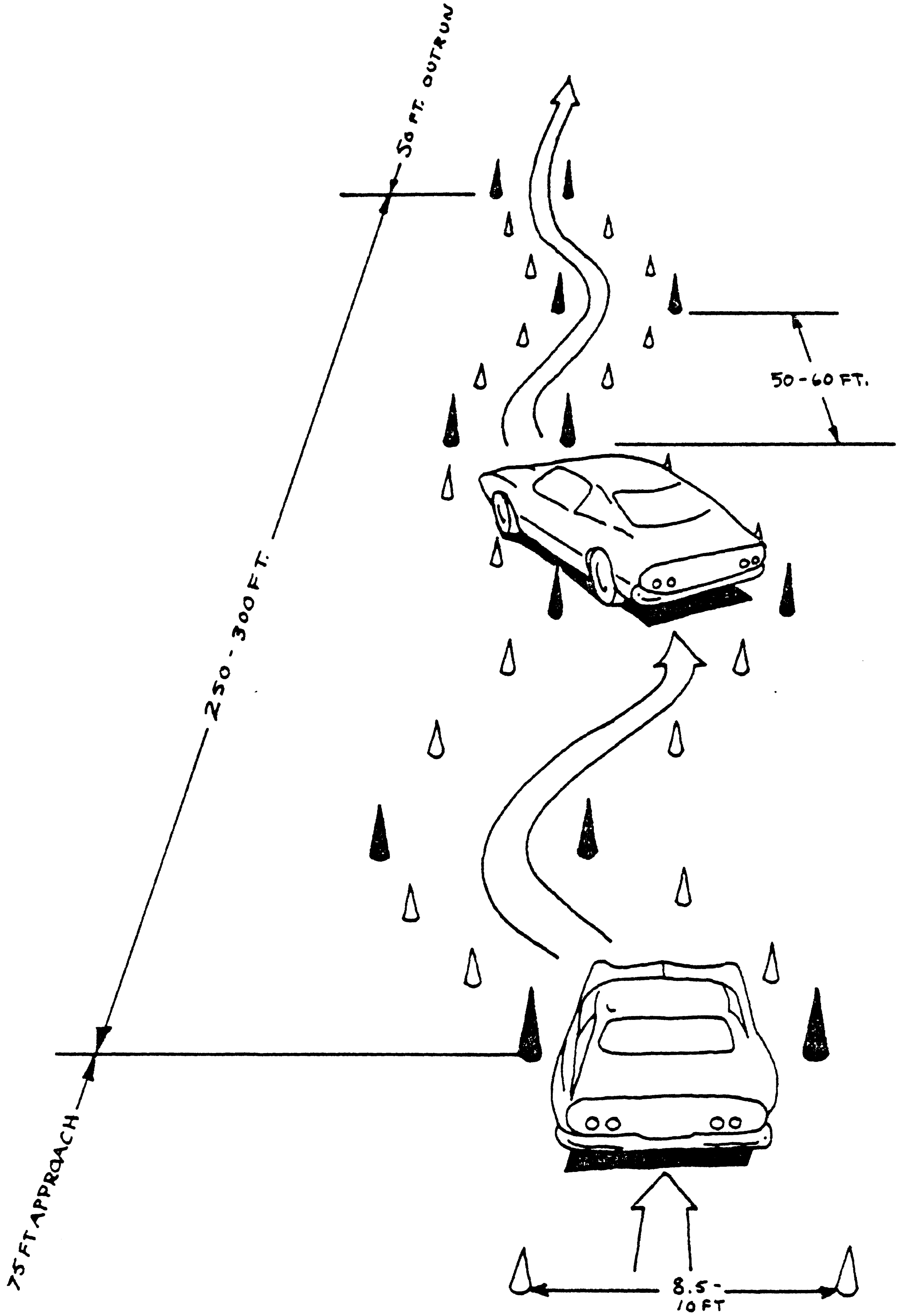
1. Speed: **25** mph.
2. Stop within 20' of runout.
3. All cones remain standing.



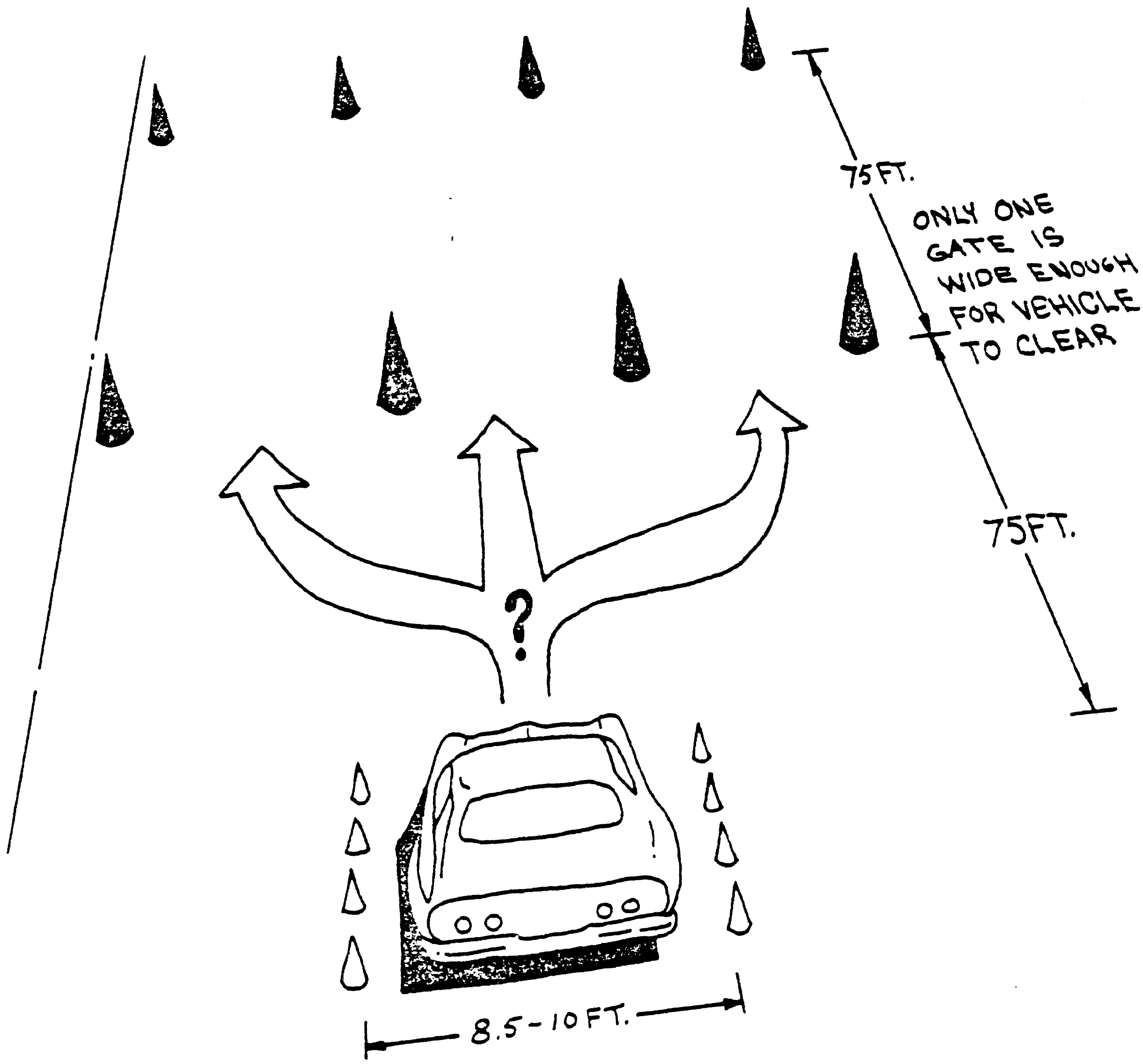
EVASIVE MANEUVER



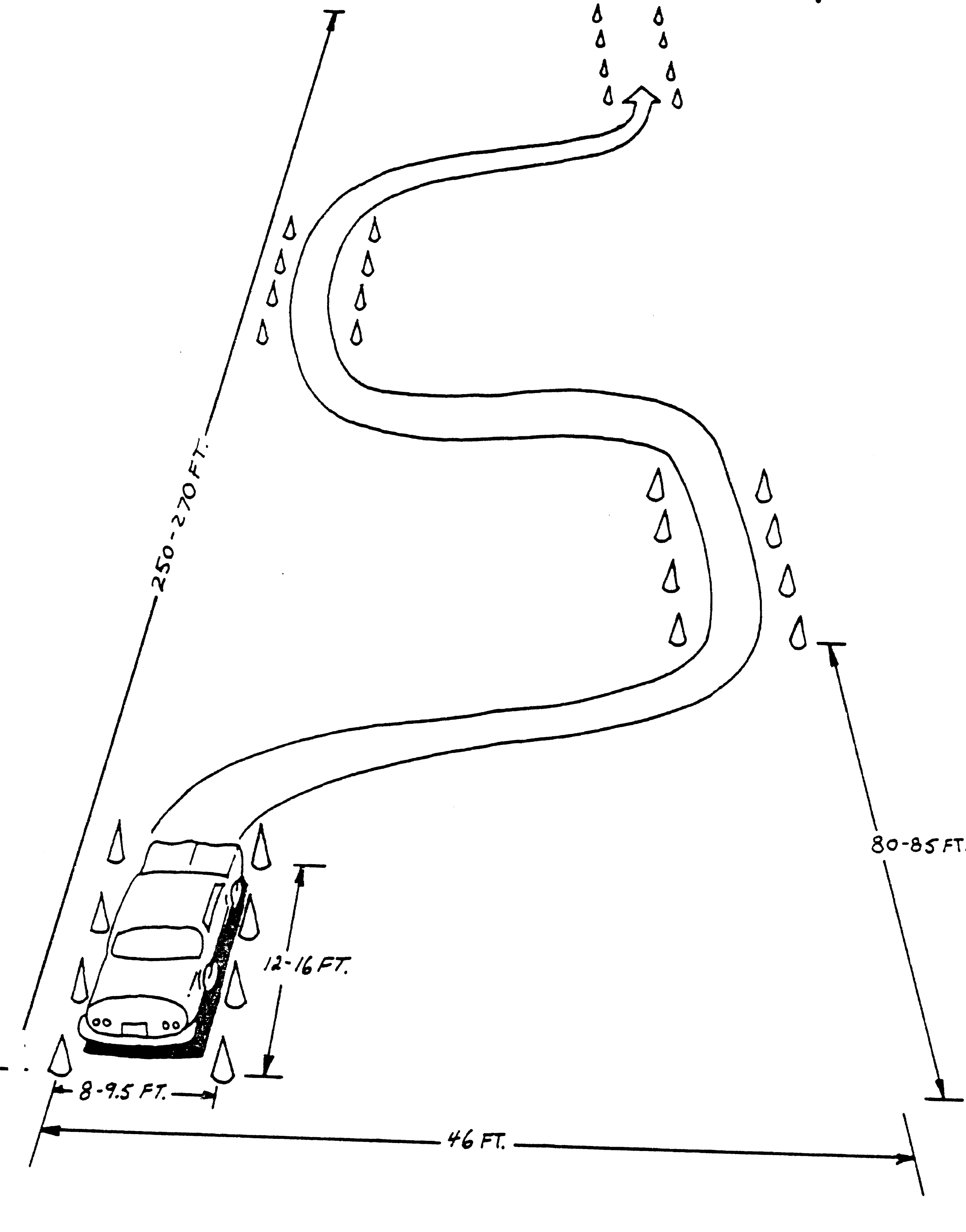
SERPENTINE COURSE



BAIRD'S JUDGMENT



LANE CHANGE MANEUVER



CONTROLLED BRAKING