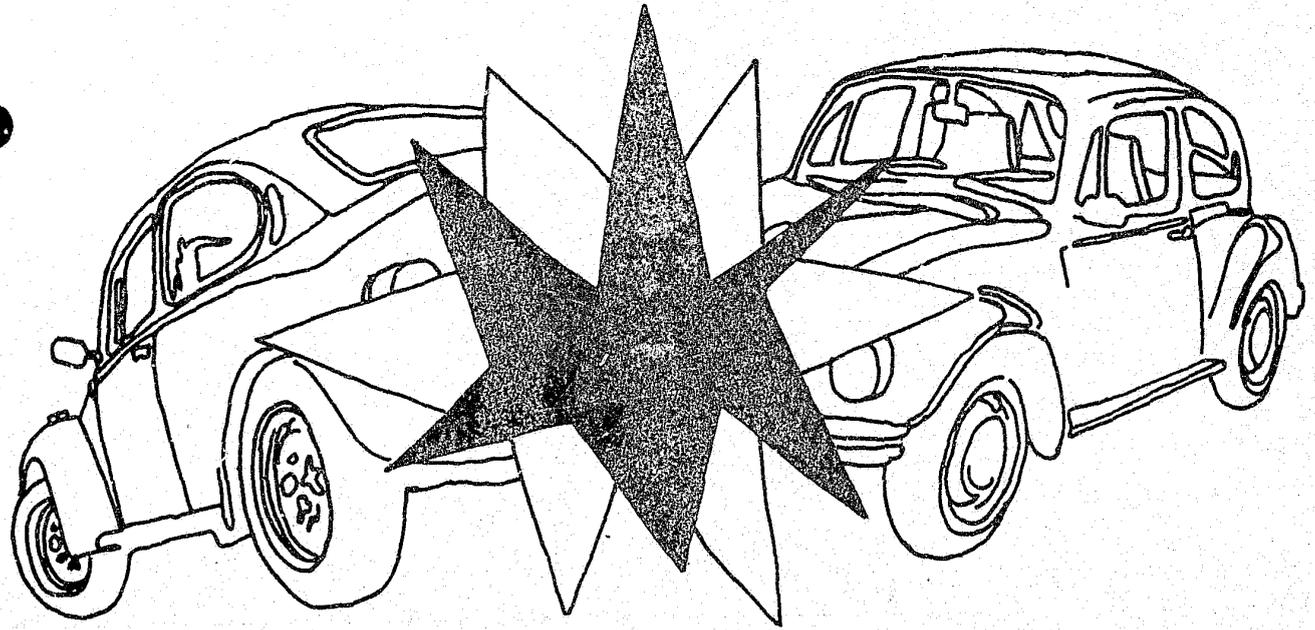


14

# FIELD TRAINING & COLLISION INVESTIGATION



52075



Distributed by the  
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Aberdeen Police Department  
Baltimore County Sheriff's Office  
Bowie State College  
Brunswick Police Department  
Cecil County Sheriff's Office  
Coppin State College  
Department of General Services  
Harford County Sheriff's Office  
Md. Center for Public Broadcasting  
Mass Transit Administration  
Military Department of Maryland  
North East Police Department  
University of Maryland-Baltimore County Campus

Salisbury, Maryland - 10/6/75-12/2/75

Cambridge Police Department  
Centreville Police Department  
Chestertown Police Department  
Crisfield Police Department  
Denton Police Department  
Easton Police Department  
Federalsburg Police Department  
Fruitland Police Department  
Hurlock Police Department  
Kent County Sheriff's Office  
Ocean City Police Department  
Pocomoke City Police Department  
Queen Anne's County Sheriff's Office  
Queenstown Police Department  
Rock Hall Police Department  
Salisbury Police Department  
Salisbury State College  
Talbot County Sheriff's Office  
University of Baltimore

Prince Georges County - 10/14/75-12/15/75

Armed Forces Police  
Bladensburg Police Department  
Brentwood Police Department  
Calvert County Sheriff's Office  
Charles County Sheriff's Office  
Cheverly Police Department  
GSA-Office of Buildings and Grounds  
Hyattsville Police Department  
Md. National Capital Park Police  
Mt. Rainier Police Department  
Riverdale Police Department  
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Takoma Park Police Department  
University Park Police Department  
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## XIV

### FIELD TRAINING AND COLLISION INVESTIGATION

#### ABSTRACT

This unit is designed to provide experience in applying appropriate information which has been obtained from the above units; it can be used as an evaluation tool in evaluating the capabilities of a collision investigator. The unit summarizes the tasks included in all previous units and provides comprehensive Performance Checklists for use in field training exercises.

#### BEHAVIORAL OBJECTIVES

Develop skills in the following areas of accident investigation:

- Photographing the accident scene
- Making a field sketch and scale diagram of the accident scene
- Measuring the length and location of significant items in the accident environment
- Making test skids to determine skid resistance
- Estimating minimum speed from skidmarks
- Completing the departmental accident report and related forms
- Determining requirements for accident-related law enforcement action.

## XIV

### FIELD TRAINING AND COLLISION INVESTIGATION

#### Training Aids

The following is a list of training aids to be used in conjunction with this unit.

- Police accident records for three (3) traffic accidents to be simulated (simple, easy to simulate accidents should be selected; complex, multi-traffic unit accidents should be avoided).
  - At least one of the two accidents should contain clear-cut evidence for warranted law enforcement action and one accident should be one where no law enforcement action is required
  - Records should include the police accident report, field sketch and diagrams (where available), written statements from principals and witnesses, etc.
  - At least one accident to be simulated should be a pedestrian fatality accident and one accident should be a two car accident.
- One patrol car/official vehicle
- Civilian vehicles as necessary to recreate the simulated accidents
  - Each of the instructors should use his vehicle as the primary vehicle for each accident scene (i.e., only vehicle, or vehicle at fault)
  - Student vehicles, if necessary, to recreate the positions of secondary vehicles

- Controlled area/paved surface with no vehicular traffic and so located as not to attract civilian spectators or disturb the traffic environment
  - Sufficient traffic cones or painted lines to simulate roadway contours for the three simulated accidents
  - Two or more landmarks per accident scene; landmarks can be real or simulated (portable objects or pavement markings) and adequately spaced as to allow for triangulation
- Accident investigation equipment
  - 50' or 100' tape measures
  - 12' tape measures
  - Measuring wheels
  - Nails, pins
  - Marking crayons/chalk
  - Evidence gathering equipment
    - Sample envelopes/jars
    - Razor blades
  - Inexpensive Polaroid cameras or press-type cameras with Polaroid Land Film Holder (4" x 5" format) if used by the department and sufficient film
  - Templates (such as Northwestern Traffic Institute's "Traffic Template," if used)
  - Straightedges (12")
  - Drawing compasses
  - Clipboards

- Pedestrian fatality simulation accessories
  - Manikin(s) and associated clothing
  - Patches of cloth, hair to match that of manikin(s)
  - Ketchup to simulate blood stains
- Copies of the appropriate accident management and traffic law enforcement forms:
  - Accident report
  - Traffic citation/summons form
  - Alcoholic/drug influence report form
  - Arrest record
  - Witness statement form
  - 8 1/2" x 11" graph paper (10 divisions to the inch)
- Manila folders
- Flares/fusees (one per student)
- In cases where additional vehicles beyond those already stipulated are necessary for accident scene recreation, students should be asked to make their vehicles available for training purposes.

## Preparation

Prior to the actual recreation of the three simulated accident scenes, the following events should be accomplished:

- The police records should be secured for each of the three accidents (as specified on the Training Aids section above)
  - Accident records selected should, where possible, approximate the pavement and weather conditions expected at the field training site
  - Several copies should be made of the statements of the principals and/or witnesses for each accident, for the use of instructors and students during training
- The instructor and his assistants should become thoroughly familiar with the accident records, so as to allow for effective simulation of the accidents.

The physical conditions of each accident will be recreated in the following manner, before the students arrive for training:

- The patrol car/official vehicle will be used to lay down skidmarks required to simulate accident scenes. An instructor's vehicle should be placed in the final resting place of the primary vehicle (i.e., the only vehicle, or vehicle of the driver at fault, who will be role played by each instructor)
  - The speed prior to braking, for each skid, should be noted and recorded

- If the nature of the skidmarks to be replicated precludes safe and/or credible replication, such skidmarks will be simulated by measured pavement markings
- The final resting places for vehicles in addition to the primary vehicles will be marked in each accident scene so that student vehicles may be quickly located in these positions prior to the beginning of training; if there were skidmarks associated with any of these secondary vehicles, the skidmarks will be simulated by measured pavement markings
- The outline of any noteworthy damage sustained by the accident vehicles will be carefully marked (very lightly with a soft crayon) on the respective vehicles
- Any significant debris that was present in the real accident scene will be replicated, if feasible, or simulated by drawing an outline on the pavement with an appropriate label
- If one or more landmarks need to be simulated, this will be done by the use of portable objects or clearly labeled pavement markings
- Street/road designations will be displayed by the use of pavement markings or signs
- For pedestrian accidents, a clothed manikin will be used to simulate the pedestrian fatality/injury, and the need to simulate blood stains, hair and fiber remnants on the striking vehicle carefully considered
- All the forms, folders, and equipment will be carefully laid out for easy access to students.

## Demonstration

When all students have arrived at the training site and have been briefed on the objectives of this lesson, the following demonstrations will be conducted with the aid of the assistant instructors:

- The two man procedure for taking measurements
- The procedure for conducting a test skid
  - Using the patrol car/official vehicle, a test skid will be laid down away from the accident scenes
  - A moderate speed (20 or 25 mph) will be chosen for the test skid and the speed just prior to the application of brakes will be noted
  - Two pairs of students independently will measure the test skid length; following this, the skid speed will be announced to the students and they will be directed to determine the skid resistance
- The procedure for igniting a flare/fusee will be demonstrated and each student will be asked to ignite a flare/fusee and place it in safe position on the pavement.

## Practice

The class will be divided into approximately three equal groups and designated as Groups A, B, C or 1, 2, 3.

The students will be briefed on the training procedures in the following manner:

- All groups will conduct an accident investigation for each accident scene, carrying out the following activities with a minimum of disturbance to each accident scene:
  - Interview and take a statement from the principal driver at each scene (the instructor) and obtain and evaluate any and all written statements available
  - Take a photograph of the accident scene
  - Prepare a field sketch of each accident scene
  - Take measurements, such as:
    - Length and location of skidmarks
    - Location of vehicles, bodies, debris, etc.
  - Estimate the minimum speed for any skidmarks present, using the skid resistance determined from the test skid
  - Complete the accident report form
  - Collect, assemble, and evaluate all evidence prepared and/or collected and determine if enforcement action is warranted
  - Where warranted, take appropriate enforcement action, executing the proper forms

- When each group finishes its investigation, it will move on to the next available accident scene, until each group has completed an investigation of all three accident scenes. No more than 1 1/2 hours will be allowed for each accident investigation
- Each student will be individually responsible for completing the following activities during each investigation:
  - Take one photograph at each accident scene of a point of interest to support the investigation
  - Complete a field sketch of each accident scene
  - Make at least two measurements at each accident scene
  - Complete an accident report for each accident scene
  - Estimate the minimum speed for any skidmarks present
- The mock accident situations will be described so that students may conduct a thorough investigation
  - The circumstances of the mock accidents will be based on actual police accident records
  - The meaning of all pavement markings and their treatment will be described
  - The meaning of any markings on the vehicles (simulated accident damage) and their treatment will be described
  - All other important features of the mock accident scenes will be described (such as road layout and street names/routes, designations to be used in the report, direction of north)

- The instructor, who will be role playing the driver at each accident scene, will suspend his role playing, as necessary, to provide assistance and guidance to the students
- All the necessary forms and equipment will be provided. Folders should be used by each student to store the records for each accident investigated
- Each group will be assigned to an accident scene, and each group will be responsible for organizing its own activities at an accident scene
- Student performance will be supervised only as necessary to preclude gross errors from being made or to prevent any hazardous situations from arising.

## Summary

Following the completion of all exercises by all groups, the instructors will conduct a critique of student performance in the following areas:

- Procedures employed, e.g., measurement, photographic, evidence gathering, etc.
- Completeness, accuracy, and consistency of all forms completed
- Accuracy of minimum speed estimates for skidmarks.

## Performance Checklist

### General Directions

The Performance Checklist evaluates the officer's ability to investigate an accident.

### Administration

Needed materials are:

- Training Aids as specified above.

### Procedure (Performance Checklist)

For each Performance Checklist included in the field training unit, it will be the responsibility of the test examiner to create and present a well planned, realistic, and varied role play test situation. Through the use of available facilities, special equipment, and personnel to role play essential parts, a realistic drama can be presented requiring the officer to demonstrate his accident investigation skills.

The Performance Checklists have been designed to provide an objective and complete evaluation of a student's performance across numerous instances of accident investigations. To provide for test security it is recommended that specific role play situations be changed frequently.

Scoring

Evaluate the student's responses on the Performance Checklist by placing a check mark under the column labeled (✓) PASS for each correct response. Use the Performance Checklist to guide evaluation of the student's performance.

PERFORMANCE CHECKLIST

(✓) PASS

Interview drivers, witnesses and passengers.

Identify the drivers.

Ask for drivers' licenses and vehicle registrations.

Verify information on operator's permit and registration.

Evaluate driver behavior for signs of impairment.

Interview each driver separately and obtain his/her account of what happened.

Interview passengers and witnesses as soon as possible.

Avoid processing witnesses with obvious biases.

Evaluate all accounts of accident events against the physical conditions present at the accident scene.

PERFORMANCE CHECKLIST

(√) PASS

Conduct interview.

Be objective and impartial.

Use positive approach in phrasing questions.

Be clear and specific in phrasing questions.

Ask pointed but not leading questions.

Prevent conflicts from arising between principals.

Keep drivers and witnesses separated.

Plan a basic approach to questioning.

Verify accounts of what happened.

Compare drivers' statements with passengers and witnesses.

Interview persons near location they originally witnessed accident events.

Interview the driver in depth.

Establish the first point and time of awareness.

Determine speed, speed changes, direction.

Determine evasive action taken, if any.

Describe key event.

Determine exactly where accident took place.

Determine final resting place.

Determine first and last thing remembered or seen after the accident.

Determine driver condition.

Determine trip plans.

Determine vehicle condition.

PERFORMANCE CHECKLIST

(√) PASS

Conduct interview. (Continued)

Interview witnesses in depth.

Locate witnesses as soon as possible after getting to the scene.

Note and record license plates of vehicles parked near the scene.

Contact witnesses before drivers.

Avoid using the word "witness".

Use indirect questions.

Be alert for biased witnesses.

Establish what was either seen or heard.

Determine location of witnesses.

Determine activities of witnesses at time of accident.

Determine direction witnesses were travelling at time of accident.

Determine direction witnesses were looking at time of accident.

Determine condition of witnesses' vision and hearing.

Allow witnesses time to remember.

Interview passengers in depth.

Question all passengers.

Obtain names and addresses of all passengers.

Determine relationships of passengers to drivers.

Uncover any potential bias.

PERFORMANCE CHECKLIST

(✓) PASS

Conduct interview. (Continued)

Question passengers separately from drivers.

Compare stories.

Determine where passengers were sitting.

Determine what passengers were doing at time of accident.

Determine where car was when passenger first became aware of trouble.

Inquire of passengers what the driver was doing before the accident.

Obtain written statements whenever possible.

Obtain written statements from drivers, passengers, and witnesses whenever possible.

Ask for what was seen, heard, or done.

Obtain signature, address, occupation, date.

Review statements and interview individuals.

Clarify and expand statements.

PERFORMANCE CHECKLIST

(✓) PASS

Make field measurements.

Decide which items need urgent measurement.

Measure temporary and short-lived items as time permits.

Mark outline of important items.

Determine how measurements will be recorded.

Use rough field sketch prior to taking measurements.

Take the measurement.

Account for safety of self.

Post someone to control traffic for safe measurement.

Follow basic procedures with assistant.

One individual anchor tape.

Other walk toward other end.

Draw tape taut close to ground.

Line up tape to zero point on point of origin.

Working alone, use weights, pins, or nails as anchors.

Use measuring wheel where appropriate.

Use on smooth, level surfaces.

Use for measuring curved surfaces.

Take measurements to locate a point.

Anchor measure to a geographically fixed and stable

reference point or landmark such as:

Roadway.

Guard rail.

Tree.

Fire hydrant.

PERFORMANCE CHECKLIST

(✓) PASS

Make field measurements. (Continued)

Take measurements to locate an item.

Use approximate center point for small objects.

Locate vehicles by measuring to two or more points at each end of the vehicle.

Use two diagonal corners or two corners on one side.

Use well defined corners.

Locate long marks on or off roadway.

Measure to two points at each end of mark.

Use roadway edge as line of origin.

Establish reference or zero point at roadway edge.

Measure 10 - 20' intervals along roadway edge.

Measure 3 - 5' for track curvature.

Take perpendicular measurements from each of the roadway edge origin points to mark in question (coordinate method).

For loose debris/irregular areas:

Measure to the center point of concentration.

For large and/or irregular areas:

Take several measurements.

Use triangulation method when appropriate.

Use to locate a point with good accuracy.

Use where there are not sharp, well-defined pavement edges.

Measure from two fixed anchor points of landmarks to the unknown point.

PERFORMANCE CHECKLIST

(✓) PASS

Make field measurements. (Continued)

Measure distance between two anchor points when convenient:

Measure when urgent aspects of investigation are over.

Form triangles as broad as possible for greatest accuracy.

Avoid narrow triangles.

Measure skidmarks.

Determine location of beginning and end of each skidmark made by each wheel, and all gaps in between.

Discriminate between probable and positive skidmarks.

Mark the beginning and end of each skidmark.

Use crayon or other object to mark.

Identify each skidmark with the wheel making it.

Use symbols FR, FL, RR, RL for 4 wheel vehicles.

Distinguish skidmarks from tire imprints.

Measure the length of the positive skidmark to the nearest half foot.

Record for each wheel.

Show length and location of each skidmark in the sketch/diagram.

Measure length of skidmark on each kind of pavement.

Count two separate skids when there is a gap in the skid.

Determine the total skidding distance as the sum of the two skids.

Measure perfectly overlapping skids.

Subtract the vehicle's wheelbase from the total measured length to get the skidding distance.

PERFORMANCE CHECKLIST

(√) PASS

Make field measurements. (Continued)

Determine that all four wheels have skid by burn marks  
on tires.

Measure curved skids.

Place the tape on its edge.

Shape the tape to contour of skidmarks.

Use measuring wheel when possible.

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PERFORMANCE CHECKLIST

(√) PASS

Prepare a field sketch.

Make a field sketch at outset of investigation.

Make a field sketch before location measurements are made.

Show only factual observable items.

Show the following accident related items:

Show final position of objects.

Show collapse of vehicles.

Show skidmarks and other roadmarks.

Show traffic control devices.

Show type(s) of debris present.

Show landmarks and other origins of measurements.

Show camera positions for photographs.

Show roadway edges, shoulders.

Arrange accident scene to show north at top of page.

Use graph paper with ten divisions to the inch.

Cross out (do not erase) mistakes.

Note reason for corrections.

Include the following in a completed field sketch:

Include municipality or name of highway.

Include day and hour of accident.

Include accident scene localization.

Include landmark/anchor point.

Include direction of north.

Include name of person preparing report.

Include legend explaining symbols used.

PERFORMANCE CHECKLIST

(√) PASS

Prepare a scale diagram.

Use to formalize information in field sketch.

Acquire basic tools:

Acquire graph paper (10 lines to inch).

Acquire compass.

Acquire template.

Obtain precise shape of roadway contours from engineering office.

Include the following:

Include lines to show relative positions of objects.

Include symbols to represent common objects.

Include brief, descriptive wording.

Include numbers for identification and dimensions.

Use drawing compass to transfer field sketch to scale diagram.

Let each division on graph paper represent one foot.

Include the following identifying information in a completed scale diagram:

Include municipality.

Include day and hour of accident.

Include road area identification.

Include indication of any grade present.

Include landmark/anchor point.

Include direction of north.

Include name of person who prepared report.

Include date scale diagram prepared.

Include reference to field sketch on which diagram based.

PERFORMANCE CHECKLIST

(✓) PASS

Prepare a scale diagram. (Continued)

Include clear labels of final positions of objects.

Include legend to explain symbols used.

Include scale of the diagram.

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PERFORMANCE CHECKLIST

(√) PASS

Conduct test skid to determine drag factor.

Use the accident vehicle to make test skids.

Obtain permission from owner.

Use similar vehicle if accident vehicle not usable.

Exercise caution in conducting test skids.

Do not attempt in hazardous weather.

In marginal weather try low speed skid.

Do not obscure accident skid.

Make separate skids on different types of pavement.

Select area near accident scene.

Select safe area.

Select speed limit or 35 mph.

Position vehicle to make test skid.

Start the run.

Adjust vehicle about 3 mph faster than desired test skid speed.

Release accelerator.

Wait for speed to drop to desired speed.

Jam the brakes suddenly and hard.

Hold the brakes down until vehicle stops.

Note actual speed braking is begun.

Run a second test skid to compare.

Measure and record length of test skidmarks.

Note and record:

Any grade or slope.

Pavement type and condition.

Loose material.

PERFORMANCE CHECKLIST

(✓) PASS

Conduct test skid to determine drag factor. (Continued)

Determine drag factor using Speed Nomograph.

Estimate speed from skid marks.

Recognize that speed estimate obtained will probably be lower than actual speed.

Obtain length of the accident skid, based on careful field measurements.

Determine length of straight skids.

Use length of the longest skidmarks left by any one wheel.

Subtract the length of any gaps present.

Determine the length of curved skids.

Add the skidmark lengths for all wheels.

Divide by the number of wheels if weight is equally distributed.

Determine the length of overlapping skids.

Determine the total length of the skid.

Subtract the length of the wheelbase.

Determine the drag factor for skidding tires.

Identify conditions affecting drag factor.

Identify material on pavement surface.

Identify length of skid.

Identify tire tread.

Identify ambient temperature.

Identify vehicular weight.

Identify tire orientation.

Identify wind.

PERFORMANCE CHECKLIST

(√) PASS

Conduct test skid to determine drag factor. (Continued)

Calculate drag factor using following formula:

$$\text{Use } F = 0.0033 \times \frac{s^2}{d} .$$

Identify F = drag factor.

Identify s = speed of test skid (mph).

Identify d = length of skid (feet).

Calculate drag factor from Speed Nomograph.

Locate test skid distance on "d" scale.

Locate test skid speed on "s" scale.

Position a straight edge between these points on the

"F ± f" scale to get the drag factor.

Use the most conservative estimate.

Use lower of two test skid estimates.

Use table of possible ranges of pavement drag factors.

Use this table in absence of calculated drag factor.

Use this table to obtain rough approximation of minimum speed.

Determine the skid resistance for skidding tires.

Recognize that the total skid resistance is equal to the drag factor plus the positive or negative effect of any grade present.

Express total skid resistance as "F ± f."

Identify "± f" as the % grade.

Identify "+" as uphill.

Identify "-" as downhill.

PERFORMANCE CHECKLIST

(✓) PASS

Conduct test skid to determine drag factor. (Continued)

Identify "f" as the number of feet the road rises or falls for each 100 feet of road surface.

Determine the minimum speed for accident skidmark.

Use the formula  $S = 5.5 \sqrt{d(F \pm f)}$ .

Identify S = minimum speed (mph).

Identify d = accident skid length (feet)

Identify (F ± f) = total skid resistance.

Use the Speed Nomograph.

Locate the accident skid distance on the "d" scale.

Locate the skid resistance on the "F ± f" scale.

Position a straight edge between these two points.

Determine where the straight line intersects "s" scale (minimum speed).

PERFORMANCE CHECKLIST

(✓) PASS

Take law enforcement action.

Recognize that enforcement action at the scene is the primary objective of accident investigation.

Identify "on-view" enforcement as directly observed infractions.

Identify "investigative" enforcement as discovered infractions.

Identify violations frequently associated with traffic accidents, such as:

Speed too fast for conditions.

Failure to yield right-of-way.

Failure to keep safe distance.

Drove left of center.

Made improper turn.

Improper overtaking.

Improper lights.

Defective brakes or steering.

Ignored traffic control device.

Drove while under influence of alcohol or drugs.

Consider assistance for making an arrest for driving while under the influence.

Explain action as result of violating a specific traffic law.

Explain citation and obligations regarding fines and/or court appearances.

Conduct terminal accident management actions.

Verify all forms completed and distributed.

Ensure physical evidence collected.

Ensure physical evidence marked and stored.

PERFORMANCE CHECKLIST

(✓) PASS

Take law enforcement action. (Continued)

Return licenses, registrations, etc.

Verify all personal property of deceased or injured is marked  
and safeguarded for transport.

Return all equipment to patrol car.

Check safe condition of roadway.

Mark badly damaged roadway areas.

Report all trafficway damage.

Remove and dispose of warning signals.

Report to dispatcher before leaving scene.

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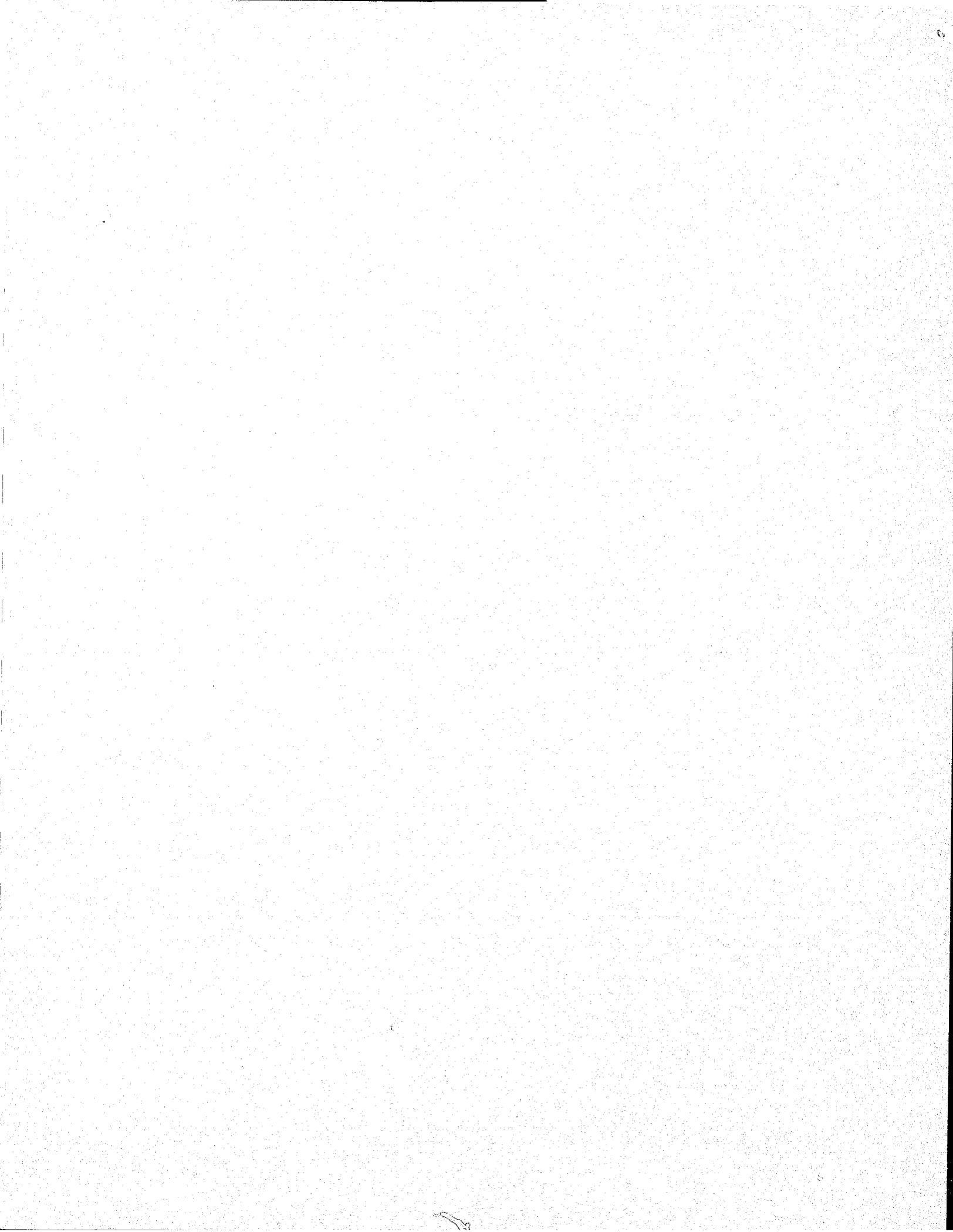
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