STANDARDIZED FIELD SOBRIETY TESTING
ONE-DAY REFRESHER

8:30a.m. – 8:45a.m.	Welcome, Introductions, Purpose Statement
8:45a.m. – 10:15a.m.	Phase 1 – Vehicle in Motion Phase 2 – Personal Contact
10:15a.m. – 10:30a.m.	Break
10:30a.m. – 12:00p.m.	Concepts & Principles of SFSTs Phase 3 – Pre-Arrest Screening
12:00p.m. – 1:00p.m.	Lunch
1:00p.m. – 1:30p.m.	Demonstration & Dry Run
1:30p.m. – 2:30p.m.	Dry Lab Workshop
2:30p.m. – 2:45p.m.	Break
2:45p.m. – 3:30p.m.	Dry Lab Workshop
3:30p.m. – 4:30p.m.	Exam – Practical & Written

PREFACE

The procedures outlined in this manual describe how the Standardized Field Sobriety Tests (SFSTs) are to be administered under ideal conditions. We recognize that the SFSTs will not always be administered under ideal conditions in the field, because such conditions will not always exist. Even when administered under less than ideal conditions, they will generally serve as valid and useful indicators of impairment. Slight variations from the ideal, i.e., the inability to find a perfectly smooth surface at roadside, may have some affect on the evidentiary weight given to the results. However, this does not necessarily make the SFSTs invalid.

INTRODUCTION AND OVERVIEW

INTRODUCTION AND OVERVIEW

Upon successfully completing this session, the participant will be able to:

o State the goals and objectives of the course.
o Describe the course schedule and activities.
o Demonstrate their pre-training knowledge of course topics.

<u>CONTENT SEGMENTS LEARNING ACTIVITIES</u>

A. Welcoming Remarks and Objectives   o Instructor-Led Presentations

B. Administrative Details

DWI DETECTION AND STANDARDIZED FIELD SOBRIETY TESTING

TRAINING GOALS AND OBJECTIVES

1. <u>Ultimate Goal</u>

   To increase deterrence of DWI violations, and thereby reduce the number of crashes, deaths and injuries caused by impaired drivers.

2. <u>Enforcement-Related Goals</u>

   a. Understand enforcement's role in general DWI deterrence.
   b. Understand detection phases, clues and techniques.
   c. Understand requirements for organizing and presenting testimonial and documentary evidence in DWI cases.

3. <u>Job Performance Objectives</u>

   As a result of this training, participants will become significantly better able to:

   a. Recognize and interpret evidence of DWI violations.
   b. Administer and interpret Standardized Field Sobriety Tests.
   c. Describe DWI evidence clearly and convincingly in written reports and verbal testimony.

4. <u>Enabling Objectives</u>

   In pursuit of the job performance objectives, participants will come to:

   a. Understand the tasks and decisions of DWI detection.
   b. Know and recognize typical vehicle maneuvers and human indicators symptomatic of DWI that are associated with initial observation of vehicles in operation.
   c. Know and recognize typical reinforcing maneuvers and indicators that come to light during the stopping sequence.
   d. Know and recognize typical sensory and other clues of alcohol and/or other drug impairment that may be seen during face-to-face contact with DWI suspects.
   e. Know and recognize typical behavioral clues of alcohol and/or other drug impairment that may be seen during the suspect's exit from the vehicle.
   f. Understand the role and relevance of psychophysical testing in pre-arrest screening of DWI suspects.

g. Know and carry out appropriate administrative procedures for validated divided attention psychophysical tests.
h. Know and carry out appropriate administrative procedures for the Horizontal Gaze Nystagmus test.
i. Know and recognize typical clues of alcohol and/or other drug impairment that may be seen during administration of the Standardized Field Sobriety Tests.

ATTACHMENT

GLOSSARY OF TERMS

ALVEOLAR BREATH - Breath from the deepest part of the lung.

BLOOD ALCOHOL CONCENTRATION (BAC) - The percentage of alcohol in a person's blood.

BREATH ALCOHOL CONCENTRATION (BrAC) - The percentage of alcohol in a person's breath, taken from deep in the lungs.

CLUE - Something that leads to the solution of a problem.

CUE - A reminder or prompting as a signal to do something. A suggestion or a hint.

DIVIDED ATTENTION TEST - A test which requires the subject to concentrate on both mental and physical tasks at the same time.

DWI/DUI -The acronym "DWI" means driving while impaired and is synonymous with the acronym "DUI", driving under the influence or other acronyms used to denote impaired driving. These terms refer to any and all offenses involving the operation of vehicles by persons under the influence of alcohol and/or other drugs.

DWI DETECTION PROCESS - The entire process of identifying and gathering evidence to determine whether or not a suspect should be arrested for a DWI violation. The DWI detection process has three phases:

    Phase One - Vehicle In Motion
    Phase Two - Personal Contact
    Phase Three - Pre-arrest Screening

EVIDENCE - Any means by which some alleged fact that has been submitted to investigation may either be established or disproved. Evidence of a DWI violation may be of various types:

    a. Physical (or real) evidence: something tangible, visible, or audible.
    b. Well established facts (judicial notice).
    c. Demonstrative evidence: demonstrations performed in the courtroom.
    d. Written matter or documentation.
    e. Testimony.

FIELD SOBRIETY TEST - Any one of several roadside tests that can be used to determine whether a suspect is impaired.

HORIZONTAL GAZE NYSTAGMUS (HGN) - An involuntary jerking of the eyes

as they gaze toward the side.

ILLEGAL PER SE - Unlawful in and of itself. Used to describe a law which makes it illegal to drive while having a statutorily prohibited Blood Alcohol Concentration.

NYSTAGMUS - An involuntary jerking of the eyes.

ONE-LEG STAND (OLS) - A divided attention field sobriety test.

PERSONAL CONTACT - The second phase in the DWI detection process. In this phase the officer observes and interviews the driver face to face; determines whether to ask the driver to step from the vehicle; and observes the driver's exit and walk from the vehicle.

PRE-ARREST SCREENING - The third phase in the DWI detection process. In this phase the officer administers field sobriety tests to determine whether there is probable cause to arrest the driver for DWI, and administers or arranges for a preliminary breath test.

PRELIMINARY BREATH TEST (PBT) - A pre-arrest breath test administered during investigation of a possible DWI violator to obtain an indication of the person's blood alcohol concentration.

PSYCHOPHYSICAL - "Mind/Body." Used to describe field sobriety tests that measure a person's ability to perform both mental and physical tasks.

STANDARDIZED FIELD SOBRIETY TEST BATTERY - A battery of tests, Horizontal Gaze Nystagmus, Walk-and-Turn, and One-Leg Stand, administered and evaluated in a standardized manner to obtain validated indicators of impairment based on NHTSA research.

TIDAL BREATH - Breath from the upper part of the lungs and mouth.

VEHICLE IN MOTION - The first phase in the DWI detection process. In this phase the officer observes the vehicle in operation, determines whether to stop the vehicle, and observes the stopping sequence.

VERTICAL GAZE NYSTAGMUS - An involuntary jerking of the eyes (up and down) which occurs when the eyes gaze upward at maximum elevation.

WALK-AND-TURN (WAT) - A divided attention field sobriety test.

SESSION V

PHASE ONE: VEHICLE IN MOTION

SESSION V

PHASE ONE: VEHICLE IN MOTION

Upon successfully completing this session, the participant will be able to:

o   Identify typical cues of Detection Phase One.

o   Describe the observed cues clearly and convincingly.

CONTENT SEGMENTS   LEARNING ACTIVITIES

A.   Overview: Tasks and Decision   o   Instructor-Led Presentations

B.   Initial Observations: Visual Cues
      Impaired Operation   o   Video Presentation

C.   Initial Observations: Visual Cues
      Impaired Operation (Motorcycles)   o   Video Presentation

D.   Recognition and Description of
      Initial Cues   o   Instructor-Led Demonstrations

E.   Typical Reinforcing Cues of the
      Stopping Sequence   o   Participant's Presentations

F.   Recognition and Description of
      Initial and Reinforcing Cues

DWI DETECTION PHASE ONE: VEHICLE IN MOTION

Your first task in <u>Phase One: Vehicle in Motion</u> is to observe the vehicle in operation to note any initial cues of a possible DWI violation. At this point you must decide whether there is sufficient cause to stop the vehicle, either to conduct further investigation to determine if the suspect may be impaired, or for another traffic violation. You are not committed to arresting the suspect for DWI based on this initial observation, but rather should concentrate on gathering all relevant evidence that may suggest impairment. Your second task during phase one is to observe the manner in which the suspect responds to your signal to stop, and to note any additional evidence of a DWI violation.

The first task, observing the vehicle in motion, begins when you first notice the vehicle, driver or both. Your attention may be drawn to the vehicle by such things as:

    o   a moving traffic violation;

    o   an equipment violation;

    o   an expired registration or inspection sticker;

    o   unusual driving actions, such as weaving within a lane or moving at
            slower than normal speed; or

   o   "Evidence of drinking" or drugs in vehicle.

If this initial observation discloses vehicle maneuvers or human behaviors that may be associated with impairment, you may develop an initial suspicion of DWI.

Based upon this initial observation of the vehicle in motion, you must decide whether there is reasonable suspicion to stop the vehicle. At this point you have three choices:

    o   stop the vehicle;

    o   continue to observe the vehicle; or

    o   disregard the vehicle.

DWI DETECTION PHASE ONE:
VEHICLE IN MOTION

Phase One Tasks and Decisions

PHASE ONE:
Vehice In Motion

INITIAL OBSERVATION
OF VEHICLE IN
OPERATION

?

SHOULD I
STOP THE VEHICLE?

OBSRVATION OF THE
STOPPING SEQUENCE
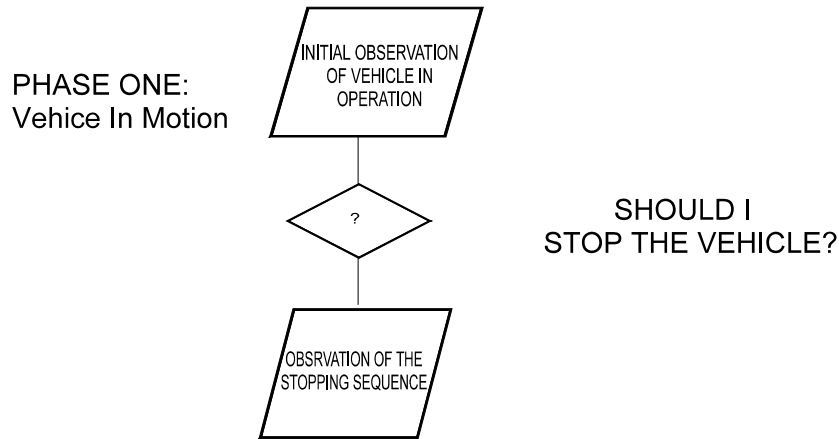
2. INITIAL OBSERVATIONS: VISUAL CUES TO DWI

Drivers who are impaired frequently exhibit certain effects or symptoms of
impairment. These include:

    o   slowed reactions;
    o   impaired judgment as evidenced by a willingness to take risks;
    o   impaired vision; and
    o   poor coordination

The next page presents common symptoms of alcohol influence. This unit focuses
on alcohol impairment because research currently provides more information about
the effects of alcohol on driving than it does about the effects of other drugs on
driving. Remember that whether the driver is impaired, the law enforcement
detection process is the same, and the offense is still DWI.

The common effects of alcohol on the driver's mental and physical faculties lead to
predictable driving violations and vehicle operating characteristics. The National
Highway Traffic Safety Administration (NHTSA) sponsored research to identify the
most common and reliable initial indicators of DWI. This research identified 24
cues, each with an associated high probability that the driver exhibiting the cue is
impaired. These cues and their associated probabilities are described in the
following Special Section, Initial Visual DWI Detection Cues.

They also are discussed in <u>Visual Detection of Driving While Intoxicated</u>, a film sponsored by NHTSA to assist law enforcement officers to recognize DWI detection cues. This film is included in the training video.

COMMON SIGNS OF ALCOHOL INFLUENCE

BLOOD ALCOHOL   CONCENTRATION

0.03%   0.05   0.08   0.10

Slowed
Reactions

Increased
Risk
Taking

Impaired
Vision

Poor
Coordination

INITIAL VISUAL DWI DETECTION CUES

Following are 24 cues which police officers may use to detect nighttime impaired drivers. The cues were developed from a list of more than 100 driving cues that have been found to predict BACs of 0.08 percent or greater. Hundreds of law enforcement officers were involved in three field studies involving more than 12,000 enforcement stops. These cues represent the most systematically developed method available for visually predicting whether a vehicle operated at night is being driven by a DWI driver or a sober driver.

A pocket-sized booklet, "The Visual Detection of DWI Motorists" [DOT HS 808 677] listing these cues is available free of charge from:
        National Highway Traffic Safety Administration - Impaired Driving Division
        400 Seventh Street, SW., Room 5118
        Washington, DC 20590

VISUAL CUE DESCRIPTIONS

1. PROBLEMS MAINTAINING PROPER LANE POSITION [p=.50-.75]

    A. **Weaving** - Weaving occurs when the vehicle alternately moves toward one side of the roadway and then the other, creating a zig-zag course. The pattern of lateral movement is relatively regular as one steering correction is closely followed by another.

    B. **Weaving Across Lane Lines** - Extreme cases of weaving when the vehicle wheels cross the lane lines before correction is made.

    C. **Straddling A Lane Line** - The vehicle is moving straight ahead with the center or lane marker between the left-hand and right-hand wheels.

    D. **Swerving** - A swerve is an abrupt turn away from a generally straight course. Swerving might occur directly after a period of drifting when the driver discovers the approach of traffic in an oncoming lane or discovers that the vehicle is going off the road; swerving might also occur as an abrupt turn is executed to return the vehicle to the traffic lane. In the illustration below, a swerve was executed to return to a lane after a period of drifting toward opposing traffic.

    E. **Turning With Wide Radius** - During a turn, the radius defined by the distance between the turning vehicle and the center of the turn in greater than normal. The vehicle may drive wide in a curve.

    F. **Drifting** - Drifting is a straight-line movement of the vehicle at a slight angle to the roadway. As the driver approaches a marker or boundary (lane marker, center line, edge of the roadway), the direction of drift might change. As shown in the illustration, the vehicle drifts across the lane marker into another lane, then the driver makes a correction and the vehicle drifts back across the lane marker. Drifting might be observed within a single lane, across lanes, across the center line, onto the shoulder, and from lane to lane.

    G. **Almost Striking Object or Vehicle** - The observed vehicle almost strikes a stationary object or another moving vehicle. Examples include: passing abnormally close to a sign, wall, building, or other object; passing abnormally close to another moving vehicle; and causing another vehicle to maneuver to avoid collision.

2. SPEED AND BRAKING PROBLEMS [p=.45-.70]

    A. **Stopping Problems (too far, too short, too jerky)** - Stopping too far
        from a curb or at an inappropriate angle. Stopping too short or beyond
        limit line at an intersection. Stopping with a jerking motion or abruptly.

    B. **Accelerating or Decelerating Rapidly** - This cue encompasses any
        acceleration or deceleration that is significantly more rapid than that
        required by the traffic conditions. Rapid acceleration might be
        accompanied by breaking traction; rapid deceleration might be
        accompanied by an abrupt stop. Also a vehicle might alternately accelerate
        and decelerate rapidly.

    C. **Varying Speed** - Alternating between speeding up and slowing down.

    D. **Slow Speed (10 m.p.h. + Under Limit)** - The observed vehicle is being
        driving at a speed that is more than 10 MPH below the speed limit.

3. VIGILANCE PROBLEMS [p=.55-.65]

    A. **Driving In Opposing Lanes or Wrong Way On One-Way Street** - The
        vehicle is observed heading into opposing or crossing traffic under one or
        more of the following circumstances: driving in the opposing lane; backing
        into traffic; failing to yield the right-of-way; driving the wrong way on a
        one-way street. The last circumstance is illustrated below.

    B. **Slow Response to Traffic Signals** - The observed vehicle exhibits a
        longer than normal response to a change in traffic signal. For example, the
        driver remains stopped at the intersection for an abnormally long period of
        time after the traffic signal has turned green.

    C. **Slow Or Failure To Respond To Officer's Signals** - Driver is unusually
        slow to respond to an officer's lights, siren or hand signals.

    D. **Stopping in Lane for No Apparent Reason** - The critical element in this
        cue is that there is no observable justification for the vehicle to stop in the
        traffic lane; the stop is not caused by traffic conditions, traffic signals, an
        emergency situation, or related circumstances. Impaired drivers might
        stop in the lane when their capability to interpret information and make
        decisions becomes impaired. As a consequence, stopping in lane for no
        apparent reason is likely to occur at intersections or other decision points.

E. **Driving Without Headlights At Night** - The observed vehicle is being driven with both headlights off during a period of the day when the use of headlights is required.

F. **Failure to Signal or Signal Inconsistent with Action** - A number of possibilities exist for the driver's signaling to be inconsistent with the associated driving actions. This cue occurs when inconsistencies such as the following are observed: failing to signal a turn or lane change; signaling opposite to the turn or lane change executed; signaling constantly with no accompanying driving action; and driving with four-way hazard flashers on.

4. JUDGMENT PROBLEMS [p=.35-.90]

A. **Following Too Closely** - The vehicle is observed following another vehicle while not maintaining the legal minimum separation.

B. **Improper Or Unsafe Lane Change** - Driver taking risks or endangering others. Driver is frequently or abruptly changing lanes without regard to other motorists.

C. **Illegal or Improper Turn (too fast, jerky, sharp, etc.)** - The driver executes any turn that is abnormally abrupt or illegal. Specific examples include: turning with excessive speed; turning sharply from the wrong lane; making a U illegally; turning from outside a designated turn lane.

D. **Driving on Other Than Designated Roadway** - The vehicle is observed being driven on other than the roadway designated for traffic movement. Examples include driving: at the edge of the roadway, on the shoulder, off the roadway entirely, and straight through turn-only lanes or areas.

E. **Stopping Inappropriately In Response To Officer** - The observed vehicle stops at an inappropriate location or under inappropriate conditions, other than in the traffic lane. Examples include stopping: in a prohibited zone; at a crosswalk; far short of an intersection; on a walkway; across lanes; for a green traffic signal; for a flashing yellow traffic signal; abruptly as if startled; or in an illegal, dangerous manner.

F. **Inappropriate Or Unusual Behavior (throwing objects, arguing, etc.)** - Throwing objects from the vehicle, drinking in the vehicle, urinating at roadside, arguing without cause, other disorderly actions.

G. **Appearing to be Impaired** - This cue is actually one or more of a set of indicators related to the personal behavior or appearance of the driver. Examples of specific indicators might include:

o   Eye fixation
o   Tightly gripping the steering wheel
o   Slouching in the seat
o   Gesturing erratically or obscenely
o   Face close to the windshield
o   Driver's head protruding from vehicle

POST STOP CUES $p \geq .85$

1. Difficulty with motor vehicle controls
2. Difficulty exiting the vehicle
3. Fumbling with driver's license or registration
4. Repeating questions or comments
5. Swaying, unsteady, or balance problems
6. Leaning on the vehicle or other object
7. Slurred speech
8. Slow to respond to officer/officer must repeat
9. Provides incorrect information, changes answers
10. Odor of alcoholic beverage from the driver

Ask for <u>Visual Detection of DWI Motorists</u>. (DOT HS 808 677).

VISUAL DETECTION OF DWI MOTORCYCLISTS

NHTSA has also developed research identifying driving impairment cues for motorcyclists (ANACAPA Sciences, DOT HS 807 839, 1993).

Excellent Cues (50% or greater probability)

- o Drifting during turn or curve
- o Trouble with dismount
- o Trouble with balance at a stop
- o Turning problems (e.g., unsteady, sudden corrections, late braking, improper lean angle)
- o Inattentive to surroundings
- o Inappropriate or unusual behavior (e.g., carrying or dropping object, urinating at roadside, disorderly conduct, etc.)
- o Weaving

Good Cues (30 to 50% probability)

- o Erratic movements while going straight
- o Operating without lights at night
- o Recklessness
- o Following too closely
- o Running stop light or sign
- o Evasion
- o Wrong way

3. DIVIDED ATTENTION

It is important to understand the effects of alcohol are exhibited in driving so that the significance of visual cues will be recognized. Driving is a complex task involving a number of subtasks, many of which occur simultaneously. These include:

- o steering;
- o controlling the accelerator;
- o signaling;
- o controlling the brake pedal
- o operating the clutch;
- o operating to gearshift;
- o observing other traffic;
- o observing signal lights, stop signs & other traffic control devices; and
- o making decisions (whether to stop, turn, speed up, slow down).

Safe driving demands the ability to divide attention among these various tasks. "Divided attention" simply means the ability to concentrate on two or more things at the same time. Under the influence of alcohol and/or other drugs, a driver's ability to divide attention is impaired. As a result, the impaired driver tends to concentrate on only the most important or critical parts of driving and to disregard the less important parts, often creating unexpected or dangerous situations for other drivers. Two examples were particularly evident in the video segment <u>Visual Detection of Driving While Intoxicated</u>. In one instance the driver <u>signaled for left turn</u>, <u>but actually turned right</u>. In the other, the driver <u>remained stopped at a green light</u>. In each case the driver was unable to divide attention.

- o   The first driver was concentrating on steering, looking for the street where he wished to turn and slowing for the turn. The driver realized that a signal was required and actually operated the signal lever. <u>But the driver didn't have enough attention left to move the lever in the right direction</u>. Therefore he signaled left, but turned right.

- o   The second driver was stopped at a traffic light, but <u>he did not have enough attention left to react to the specific color of the light</u>. Therefore he did not respond to the green light.

Some of the most significant evidence from all three phases of DWI detection can be related directly to the effects of alcohol and/or other drugs on divided attention ability. We will return to the concept of divided attention in <u>Session VI. Personal Contact</u> and <u>Session VII. Pre-arrest Screening</u>.

4.   RECOGNIZING AND DESCRIBING INITIAL CUES

Observing the vehicle in operation is the first task in DWI detection. Proper performance of that task requires two distinct but related abilities:

- o   the ability to recognize evidence of impairment; and
- o   the ability to describe that evidence clearly and convincingly.

It is not enough that you observe and recognize symptoms of impaired driving. You also must be able to describe what happened so that others will have a clear mental picture of what took place. Improving your ability to recognize and clearly describe observational evidence requires practice.

5. THE STOPPING SEQUENCE

Your second task during Phase One of the detection process is to observe the manner in which the driver responds to your signal to stop, and to note any additional evidence of a DWI violation.

Cues reinforcing the suspicion of DWI may be found in the stopping sequence. After the command to stop is given, the impaired driver may exhibit additional important evidence of DWI. These cues may include:

- o   an attempt to flee;
- o   no response;
- o   slow response;
- o   an abrupt swerve;
- o   sudden stop; and
- o   striking the curb or another object.

Some of these cues are exhibited because the stop command places additional demands on the driver's ability to divide attention. The signal to stop creates a new situation with which the driver must cope. Flashing emergency lights or a siren demand and divert the driver's attention, requiring that the driver now divide attention between driving and responding to the stop command. Stopping itself requires the driver simultaneously to turn the steering wheel, put on the brakes, use a turn signal, and so on. Thus the driver's task becomes more complex when the stop command is given. An impaired driver may not be able to handle this more complex task and additional evidence of impairment may appear.

It is your responsibility to recognize, record and convey the additional evidence of driving impairment that may come to light during the stopping sequence. This task, like Task One, observing the vehicle in operation, requires:

- o   the ability to recognize evidence of impairment; and
- o   the ability to describe that evidence clearly and convincingly.

Recognizing and describing the reinforcing cues of DWI that appear during the stopping sequence requires practice.

TEST YOUR KNOWLEDGE

INSTRUCTIONS: Complete the following sentences.

1. The Phase One tasks are _____

    _____

2. Two common symptoms of impairment are:

    a. _____

    b. _____

3. Alcohol impairs the ability to _____ among tasks.

4. Three cues reinforcing the suspicion of DWI which may be observed during the
    stopping sequence are:

    a. _____

    b. _____

    c. _____

SESSION VI

PHASE TWO: PERSONAL CONTACT

SESSION VI

PHASE TWO: PERSONAL CONTACT

Upon successfully completing this session, the participant will be able to:

o   Identify typical clues of Detection Phase Two.

o   Describe the observed clues clearly and convincingly.

<u>CONTENT SEGMENTS</u>   <u>LEARNING ACTIVITIES</u>

A.   Overview: Tasks and Decision   o   Instructor-Led Presentations

B.   Typical Investigation Clues of the
       Driver Interview   o   Video Presentation

C.   Recognition and Description of
       Investigation Clues   o   Instructor-Led Demonstrations

D.   Interview/Questions Techniques   o   Participant's Presentations

E.   Recognition and Description of Clues
       Associated With the Exit Sequence

PERSONAL CONTACT

OVERVIEW

DWI Detection Phase Two: Personal Contact, like Phases One and Three, comprises two major evidence gathering tasks and one major decision. Your first task is to approach, observe and interview the driver while they are still in the vehicle to note any face-to-face evidence of impairment. During this face-to-face contact you may administer some simple pre-exit sobriety tests to gain additional information to evaluate whether or not the driver is impaired. After this evaluation, you must decide whether to request the driver to exit the vehicle for further field sobriety testing. In some jurisdictions departmental policy may dictate that all drivers stopped on suspicion of DWI be instructed to exit. It is important to note that by instructing the driver to exit the vehicle, you still are not committed to an arrest; this is simply another step in the DWI detection process. Once you have requested the driver to exit the vehicle, your second task is to observe the manner in which the driver exits to note any additional evidence of impairment.

NOTE: You may initiate Phase Two without Phase One. This may occur, for example, at a roadblock, or when you have responded to the scene of a crash.

TASK ONE

The first task of Phase Two, observation and interview of the driver, begins as soon as the suspect vehicle and the patrol vehicle have come to complete stops. It continues through your approach to the suspect vehicle and involves all conversation between you and the driver prior to the driver's exit from the vehicle.

PHASE TWO:
Personal Contact

FACE-TO-FACE
OBSERVATION AND
INTERVIEW OF
DRIVER

?

SHOULD THE
DRIVER EXIT?

OBSERVATION OF THE
EXIT AND WALK
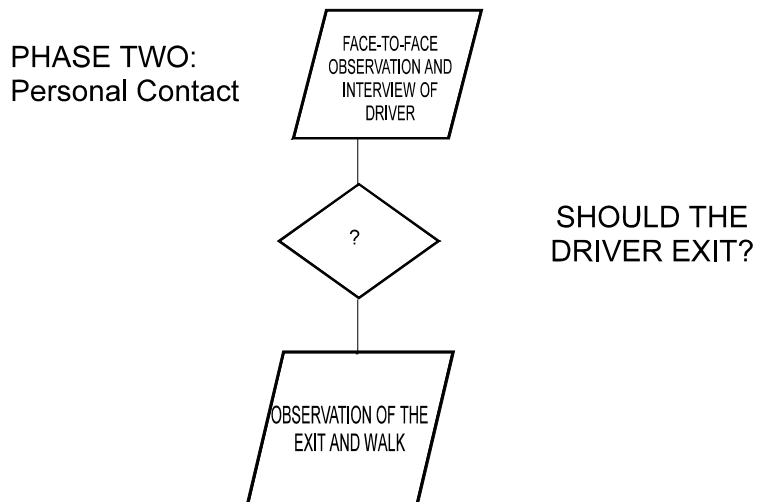
You may have developed a strong suspicion that the driver is impaired prior to the face-to-face observation and interview. You may have developed this suspicion by observing something unusual while the vehicle was in motion, or during the stopping sequence, or you may have developed no suspicion of DWI prior to the face-to-face contact. The vehicle operation and the stop may have been normal, you may have seen no actions suggesting DWI. For example, you may have stopped the vehicle for a equipment/registration violation, or where no unusual driving was evident. In some cases, Phase One will have been absent. For example, you may first encounter the driver and vehicle after a crash or when responding to a request for motorist assistance.

Regardless of the evidence that may have come to light during Detection Phase One, your initial face-to-face contact with the driver usually provides the first <u>definite</u> indications that the driver is impaired.

DECISION

Based upon your face-to-face interview and observation of the driver, and upon your previous observations of the vehicle in motion and the stopping sequence, you must decide whether there is sufficient reason to instruct the driver to step from the vehicle.

For some law enforcement officers, this decision is automatic since their agency policy dictates that the driver always be told to exit the vehicle, regardless of the cause for the stop. Other agencies, however, treat this as a discretionary decision, to be based on what the officer sees, hears and smells during observation and interview with the driver while the driver is seated in the vehicle.

If you decide to instruct the driver to exit, you must closely observe the driver's actions during the exit from the vehicle and note any evidence of impairment.

TYPICAL INVESTIGATION CLUES: THE DRIVER INTERVIEW

Face-to-face observation and interview of the driver allows you to use three senses to gather evidence of alcohol and/or other drug influence:

o   the sense of sight;
o   the sense of hearing; and
o   the sense of smell.

SIGHT

There are a number of things you might see during the interview that would be describable clues or evidence of alcohol and/or other drug influence. Among them are:

- o   bloodshot eyes;
- o   soiled clothing;
- o   fumbling fingers;
- o   alcohol containers;
- o   drugs or drug paraphernalia;
- o   bruises, bumps or scratches;
- o   unusual actions.
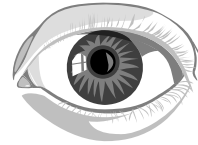
HEARING

Among the things you might <u>hear</u> during the interview that would be describable clues or evidence of alcohol and/or other drug influence are these:

- o   slurred speech;
- o   admission of drinking;
- o   inconsistent responses;
- o   abusive language;
- o   unusual statements.

SMELL

There are things you might <u>smell</u> during the interview that would be describable clues or evidence of alcohol and/or other drug influence. Typically these include:

- o   alcoholic beverages;
- o   marijuana;
- o   "cover up" odors like breath sprays;
- o   unusual odors.

REQUIRED ABILITIES

Proper face-to-face observation and interview of the driver demands two distinct but related abilities:

- o   the ability to recognize the sensory evidence of alcohol and/or other drug influence; and

- o   the ability to describe that evidence clearly and convincingly.

Developing these abilities requires practice.

PRE-EXIT INTERVIEW TECHNIQUES

A basic purpose of the face-to-face observation and interview of the driver is to identify and gather evidence of alcohol and/or other drug influence. This is the purpose of each task in each phase of DWI detection.

During the face-to-face observation and interview stage, it is not necessary to gather sufficient evidence to arrest the driver immediately for DWI.

There are a number of techniques you can use while the driver is still behind the wheel. Most of these techniques apply the concept of divided attention. They require the driver to concentrate on two or more things at the same time. They include both questioning techniques and psychophysical (mind/body) tasks.

These techniques are not as reliable as the standardized field sobriety tests but they can still be useful for obtaining evidence of impairment. **THESE TECHNIQUES DO NOT REPLACE THE SFST.**

Questioning Techniques

The questions you ask and the way in which you ask them can constitute simple divided attention tasks. Three techniques are particularly pertinent:

- o asking for two things simultaneously;
- o asking interrupting or distracting questions; and,
- o asking unusual questions.

An example of the first technique, <u>asking for two things simultaneously</u>, is requesting that the driver produce both the driver's license and the vehicle registration. Possible evidence of impairment may come to light as the driver responds to this dual request. Be alert for the driver who:

- o forgets to produce <u>both</u> documents;
- o produces documents other than the ones requested;
- o fails to see the license, registration or both while searching through wallet or purse;
- o fumbles or drops wallet, purse, license or registration;
- o is unable to retrieve documents using fingertips.

The second technique, <u>asking interrupting or distracting questions</u>, forces the driver to divide attention between searching for the license or registration and answering a new question. While the driver is responding to the request for license, registration or both, you ask an unrelated question like, "Without looking at your watch, what time is it right now?" Possible evidence of impairment may be disclosed by the interrupting or distracting question. Be alert for the driver who:

> o   ignores the question and concentrates only on the license or
>   registration search;
> o   forgets to resume the search after answering the question;
> o   supplies a grossly incorrect answer to the question.

The third technique, <u>asking unusual questions</u>, is employed after you have obtained the driver's license and registration. Using this technique, you seek verifying information through <u>unusual</u> questions. For example, while holding the driver's license, you might ask the driver, "What is your middle name?"

There are many such questions which the driver normally would be able to answer easily, but which might prove difficult if the driver is impaired, simply because they are unusual questions. Unusual questions require the driver to process information; this can be especially difficult when the driver does not <u>expect</u> to have to process information. For example, a driver may respond to the question about the <u>middle</u> name by giving a <u>first</u> name. In this case the driver ignored the <u>unusual</u> question and responded instead to a <u>usual</u> -- but unasked -- question.

ADDITIONAL TECHNIQUES

Know if there are any judicial restraints in reference to these tests.

ALPHABET

This technique requires the subject to recite a part of the alphabet. You instruct the subject to recite the alphabet beginning with a letter other than <u>A</u> and stopping at a letter other than <u>Z</u>. For example, you might say to a driver, "Recite the alphabet, beginning with the letter <u>E</u> as in Edward and stopping with the letter <u>P</u> as in Paul." This divides the driver's attention because the driver must concentrate to begin at an unusual starting point and recall where to stop.

COUNT DOWN

This technique requires the subject to count out loud 15 or more numbers in reverse sequence. For example, you might request a driver to, "Count out loud backwards, starting with the number 68 and ending with the number 53." This, too, divides attention because the driver must continuously concentrate to count backwards while trying to recall where to stop.

NOTE: This technique should never be given using starting and stopping points that end in <u>0</u> or <u>5</u> because these numbers are too easy to recall. For example, do not request that the driver count backwards from 65 to 50. Instead, ask the driver to count backwards from 64 to 49.

FINGER COUNT

In this technique, the subject is asked to touch the tip of the thumb in turn to the tip of each finger on the same hand while simultaneously counting up <u>one</u>, <u>two</u>, <u>three</u>, <u>four</u>; then to reverse direction on the fingers while simultaneously counting down <u>four</u>, <u>three</u>, <u>two</u>, <u>one</u>.

In each instance, note whether and how well the subject is able to perform the divided attention task.

THE EXIT SEQUENCE

Your decision to instruct the driver to step from the vehicle usually is made after you have developed a suspicion that the driver is impaired.* Even though that suspicion may be very strong, usually the suspect is not yet under arrest when you give the instruction.

How the driver steps and walks from the vehicle and actions or behavior during the exit sequence may provide important evidence of impairment. Be alert to the driver who:

> o   shows angry or unusual reactions;
> o   cannot follow instructions;
> o   cannot open the door;
> o   leaves the vehicle in gear;
> o   "climbs" out of vehicle;
> o   leans against vehicle;
> o   keeps hands on vehicle for balance.

Proper face-to-face observation and interview of a driver requires the ability to recognize the sensory evidence of alcohol and/or other drug influence and the ability to describe that evidence clearly and convincingly. Developing these abilities takes practice.

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*<u>Except</u>, however, that you may instruct a suspect to exit the vehicle as a means of ensuring your own safety. Safety considerations take precedence over all other considerations.

TEST YOUR KNOWLEDGE

INSTRUCTIONS: Complete the following sentences.

1.   The two major evidence gathering tasks of Phase Two are _____

_____

_____

2.   The major decision of Phase Two is _____

_____

_____

3.   Among the describable clues an officer might <u>see</u> during the Phase Two
        interview are these three:

        a.

        b.

        c.

4.   Among the describable clues an officer might <u>hear</u> during the Phase II
        interview are these three:

        a.

        b.

        c.

5.   Among the describable clues an officer might smell during the Phase II
        interview are these two:

        a.

        b.

6. Three techniques an officer might use in asking questions constitute simple divided attention tasks. These techniques are:

   a.

   b.

   c.

7. The Count Down Technique requires the subject to _____

   _____

   _____

   _____

8. Leaning against the vehicle is a clue to DWI which may be observed during

   _____

   _____

SESSION VIII

CONCEPTS AND PRINCIPLES OF THE
STANDARDIZED FIELD SOBRIETY TESTS

SESSION VIII

CONCEPTS AND PRINCIPLES OF THE STANDARDIZED FIELD SOBRIETY TESTS

Upon successfully completing this session, the participant will be able to:

o   Discuss the development and validity of the research and the standardized elements, clues and interpretation of the three standardized field sobriety tests.

o   Discuss the different types of nystagmus and their effects on the Horizontal Gaze Nystagmus test.

o   Discuss and properly administer the three Standardized Field Sobriety Tests.

o   Discuss and recognize the clues of the three Standardized Field Sobriety Tests.

o   Describe in a clear and convincing fashion and properly record the results of the three Standardized Field Sobriety Tests on a standard note taking guide.

o   Discuss the limiting factors of the three Standardized Field Sobriety Tests.

CONTENTS SEGMENTS	LEARNING ACTIVITIES
A. Overview: Development and Validation	o Instructor-Led Presentation
B. SFST Field Validation Studies	o Instructor-Led Demonstration
C. Horizontal Gaze Nystagmus	o Participant Practice Session & Demonstration
D. Vertical Gaze Nystagmus	
E. Walk-and-Turn	
F. Combining the Clues of the Horizontal Gaze Nystagmus and Walk-and-Turn	
G. One-Leg Stand	
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I. Taking Field Notes on the Standardized Field Sobriety Tests	

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OVERVIEW OF SFST
RESEARCH AND DEVELOPMENT

1. For many years law enforcement officers have utilized field sobriety tests to
    determine the impairment of a person's driving due to alcohol influence. The
    performance of the person on those field sobriety tests was used by the officer to
    develop probable cause for arrest and as evidence in court. A wide variety of
    field sobriety tests existed and there was a need to develop a battery of
    standardized valid tests.

2. Beginning in late 1975, extensive scientific research studies were sponsored by
    NHTSA through a contract with the Southern California Research Institute
    (SCRI) to determine roadside field sobriety tests were the most accurate. SCRI
    published the following three reports:

    o   California: 1977 (Lab)
    o   California: 1981 (Lab and Field)
    o   Maryland, D.C., V.A., N.C., 1983 (Field)

3. SCRI traveled to law enforcement agencies throughout the United States to
    select the most commonly used field sobriety tests. Six tests were used in the
    initial stages of this study.

4. Laboratory research indicated that three of these tests, when administered in a
    standardized manner, were a highly accurate and reliable battery of tests for
    distinguishing BACs above 0.10:

    o   Horizontal Gaze Nystagmus (HGN)
    o   Walk-and-Turn (WAT)
    o   One-Leg Stand (OLS)

5. NHTSA analyzed the laboratory test data and found:

    o   HGN, by itself, was 77% accurate
    o   WAT, by itself, was 68% accurate
    o   OLS, by itself, was 65% accurate
    o   By combining HGN and WAT an 80% accuracy can be achieved.

6. The final phase of this study was conducted as a field validation.

    o   Standardized, practical and effective procedures were developed
    o   The tests were determined to discriminate in the field, as well as in the
        laboratory.

7. The three standardized test were found to be highly reliable in identifying subjects whose BACs were above 0.10. The results of the study unmistakably validated the SFSTs.

SFST VALIDATION STUDIES

1. Three SFST validation studies were undertaken between 1995 and 1998:

   o Colorado - 1995
   o Florida - 1997
   o San Diego - 1998

2. The Colorado SFST validation study was the first full field study that utilized law enforcement personnel experienced in the use of SFSTs.

   o The initial study utilized only a few experienced officers in DWI enforcement in both a laboratory setting and field setting.

   o Correct arrests decisions were made 93% of the time based on the 3-test battery (HGN, WAT, OLS). Substantially higher than the initial study results.

3. The Florida SFST field validation study was undertaken in order to answer the question of whether SFSTs are valid and reliable indices of the presence of alcohol when used under present day traffic and law enforcement conditions.

   o Correct decisions to arrest were made 95% of the time based on the 3-test battery (HGN, WAT, OLS).

   o This is the third SFST field validation study that has been undertaken. Each has shown that the SFST 3-test battery is the only scientifically validated and reliable method for discriminating between impaired and unimpaired drivers.

4. The San Diego SFST validation field study was undertaken because of the nationwide trend towards lower the BAC limits to 0.08. The question to be answered was "does SFST discriminate at BAC's below 0.10".

   o Correct arrest decisions were made 91% of the time based on the 3-test battery (HGN, WAT, OLS) at the 0.08 level and above.

o   The results of this study provide a clear evidence of the validity of the 3-test battery. To support arrest decisions at above or below 0.08, it strongly suggests that the SFSTs also accurately discriminate BACs at 0.04 and above.

OVERVIEW OF NYSTAGMUS

Nystagmus

Nystagmus is defined as an involuntary jerking of the eyes. Alcohol and certain other drugs cause Horizontal Gaze Nytagmus.

Categories of Nystagmus

There are three general categories of nystagmus:

1. Vestibular Nystagmus is caused by movement or action to the vestibular system.

    A. Types of vestibular nystagmus:

        o   Rotational Nystagmus occurs when the person is spun around or rotated rapidly, causing the fluid in the inner ear to be disturbed. If it were possible to observe the eyes of a rotating person, they would be seen to jerk noticeably.

        o   Post Rotational Nystagmus is closely related to rotational nystagmus: when the person stops spinning, the fluid in the inner ear remains disturbed for a period of time, and the eyes continue to jerk.

        o   Caloric Nystagmus occurs when fluid motion in the canals of the vestibular system is stimulated by temperature as by putting warm water in one ear and cold in the other.

        o   Positional Alcohol Nystagmus (PAN) occurs when a foreign fluid, such as alcohol, that alters the specific gravity of the blood is in unequal concentrations in the blood and the vestibular system.

2. Nystagmus can also result directly from neural activity:

    o   Optokinetic Nystagmus occurs when the eyes fixate on an object that suddenly moves out of sight, or when the eyes watch sharply contrasting moving images.

Examples of optokinetic nystagmus include watching strobe lights, rotating lights, or rapidly moving traffic in close proximity. The Horizontal Gaze Nystagmus test will not be influenced by optokinetic nystagmus when administered properly.

o   <u>Physiological</u> Nystagmus is a natural nystagmus that keeps the sensory cells of the eye from tiring. It is the most common type of nystagmus. It happens to all of us, all the time. This type of nystagmus produces extremely minor tremors or jerks of the eyes. These tremors are generally too small to be seen with the naked eye. Physiological nystagmus will have no impact on our Standardized Field Sobriety Tests, because its tremors are generally invisible.

o   <u>Gaze</u> Nystagmus occurs as the eyes move from the center position. Gaze nystagmus is separated into three types:

(1)   <u>Horizontal</u> Gaze Nystagmus occurs as the eyes move to the side. It is the observation of the eyes for <u>Horizontal</u> Gaze Nystagmus that provides the first and most accurate test in the Standardized Field Sobriety Test battery. Although this type of nystagmus is most accurate for determining alcohol impairment, its presence may also indicate use of certain other drugs.

(2)   Vertical Gaze Nystagmus is an involuntary jerking of the eyes (up and down) which occurs when the eyes gaze upward at maximum elevation. The presence of this type of nystagmus is associated with high doses of alcohol for that individual and certain other drugs. The drugs that cause Vertical Gaze Nystagmus are the same ones that cause Horizontal Gaze Nystagmus.

<u>Note</u>: There is no drug that will cause Vertical Gaze Nystagmus that does not cause Horizontal Gaze Nystagmus. If Vertical Gaze Nystagmus is present and Horizontal Gaze Nystagmus is not, it could be a medical condition.

(3)   <u>Resting</u> Nystagmus is referred to as a jerking of the eyes as they look straight ahead. Its presence usually indicates a pathology or high doses of a Dissociative Anesthetic drug such as PCP. If detected, take precautions. (**OFFICER SAFETY.**)

3.   Nystagmus may also be caused by certain <u>pathological disorders</u>. They include brain tumors and other brain damage or some diseases of the inner ear. These pathological disorders occur in very few people and in even fewer drivers.

Medical Impairment

The examinations that you can conduct to assess possible medical impairment include:

- o   Pupil size
- o   Resting Nystagmus
- o   Tracking ability

PROCEDURES

Procedures to Assess Possible Medical Impairment

Prior to administration of HGN, the eyes are checked for equal pupil size, resting nystagmus, and equal tracking (can they follow an object together). If the eyes do not track together, or if the pupils are noticeably unequal in size, the chance of medical disorders or injuries causing the nystagmus is present.

Procedures of Horizontal Gaze Nystagmus Testing: The Three Clues

The test you will use at roadside is "Horizontal Gaze Nystagmus" -- an involuntary jerking of the eyes occurring as the eyes gaze toward the side. Some jerking will be seen if the eyes are moved far enough to the side.

1. The Lack of Smooth Pursuit (Clue Number One) - The eyes can be observed to jerk or "bounce" as they follow a smoothly moving stimulus, such as a pencil or penlight. The eyes of an unimpaired person will follow smoothly, i.e., a marble rolling across a smooth pane of glass, or windshield wipers moving across a wet windshield.

2. Distinct and Sustained Nystagmus At Maximum Deviation (Clue Number Two) - Distinct and sustained nystagmus will be evident when the eye is held at maximum deviation for a minimum of four seconds. People exhibit slight jerking of the eye at maximum deviation, even when unimpaired, but this will not be evident or sustained for more than a few seconds. When impaired by alcohol, the jerking will be larger, more pronounced, sustained for more than four seconds, and easily observable.

3. Onset of Nystagmus Prior To 45 Degrees (Clue Number Three) - The point at which the eye is first seen jerking. If the jerking begins prior to 45 degrees it is evident that the person has a BAC above 0.08, as shown by recent research.

    The higher the degree of impairment, the sooner the nystagmus will be observable.

Estimating a 45-Degree Angle

It is important to know how to estimate a 45-degree angle. How far you position the stimulus from the suspect's nose is a critical factor in estimating a 45-degree angle. (i.e., If the stimulus is held 12" in front of the suspect's nose, it should be moved 12" to the side to reach 45 degrees. Likewise, if the stimulus is held 15" in front of the suspect's nose, it should be moved 15" to the side to reach 45 degrees.)

For practice, a 45-degree template can be prepared by making a 15"-square cardboard and connecting its opposite corners with a diagonal line.

To use this device, hold it up so that the person's nose is above the diagonal line. Be certain that one edge of the template is centered on the nose and perpendicular to (or, at right angles to) the face. Have the person you are examining follow a penlight or some other object until suspect is looking down the 45-degree diagonal. Note the position of the eye. With practice, you should be able to recognize this angle without using the template.
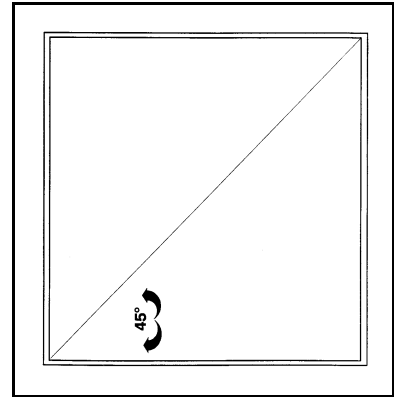
Specific Procedures

If the suspect is wearing eyeglasses, have them removed.

Give the suspect the following instructions from a safe position. (**FOR OFFICER SAFETY KEEP YOUR WEAPON AWAY FROM THE SUSPECT**):

o   "I am going to check your eyes."
o   "Keep your head still and follow this stimulus with your eyes only."
o   "Keep following the stimulus with your eyes until I tell you to stop."

Position the stimulus approximately 12-15 inches from the suspect's nose and slightly above eye level. Check to see that both pupils are equal in size. If they are not, this may indicate a head injury. You may observe Resting Nystagmus at this time, then check the suspect's eyes for the ability to track together. Move the stimulus smoothly across the suspect's entire field of vision. Check to see if the eyes track the stimulus together or one lags behind the other. If the eyes don't track together it could indicate a possible medical disorder, injury, or blindness.

Check the suspect's left eye by moving the stimulus to your right. Move the stimulus smoothly, at a speed that requires approximately two seconds to bring the suspect's eye as far to the side as it can go. While moving the stimulus, look at the suspect's eye and determine whether it is able to pursue smoothly. Now, move the stimulus all the way to the left, back across suspect's face checking if the right eye pursues smoothly. Movement of the stimulus should take approximately two seconds out and two seconds back for each eye. Repeat the procedure.
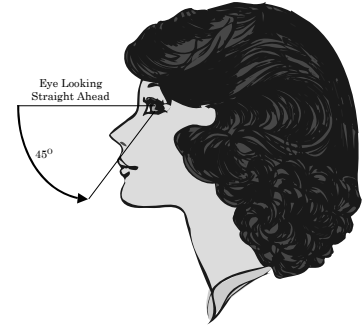
After you have checked both eyes for lack of smooth pursuit, check the eyes for distinct and sustained nystagmus at maximum deviation beginning with the suspect's left eye. Simply move the object to the suspect's left side until the eye has gone as far to the side as possible. Usually, no white will be showing in the corner of the eye at maximum deviation. Hold the eye at that position for a minimum of four seconds, and observe the eye for distinct and sustained nystagmus. Move the stimulus all the way across the suspect's face to check the right eye holding that position for a minimum of four seconds. Repeat the procedure.

Note: Fatigue Nystagmus. This type of nystagmus may begin if a subject's eyes are held at maximum deviation for more than 30 seconds.

Next, check for onset of nystagmus prior to 45 degrees. Start moving the stimulus towards the right (suspect's left eye) at a speed that would take approximately four seconds for the stimulus to reach the edge of the suspect's shoulder. Watch the eye carefully for any sign of jerking. When you see it, stop and verify that the jerking continues. Now, move the stimulus to the left (suspect's right eye) at a speed that would take approximately four seconds for the stimulus to reach the edge of the suspect's shoulder. Watch the eye carefully for any sign of jerking. When you see it, stop and verify that the jerking continues. Repeat the procedure. NOTE: It is important to use the full four seconds when checking for onset of nystagmus. If you move the stimulus too fast, you may go past the point of onset or miss it altogether.

If the suspect's eyes start jerking before they reach 45 degrees, check to see that some white of the eye is still showing on the side closest to the ear. If no white of the eye is showing, you either have taken the eye too far to the side (that is more than 45 degrees) or the person has unusual eyes that will not deviate very far to the side.

> ### ADMINISTRATIVE PROCEDURES
> 1. CHECK FOR EYEGLASSES
> 2. VERBAL INSTRUCTIONS
> 3. POSITION STIMULUS (12-15 INCHES)
> 4. EQUAL PUPIL SIZE AND RESTING NYSTAGMUS
> 5. TRACKING
> 6. LACK OF SMOOTH PURSUIT
> 7. DIST. & SUSTAINED NYSTAGMUS @ MAX. DEV.
> 8. ONSET OF NYSTAGMUS PRIOR TO 45°
> 9. TOTAL THE CLUES
> 10. CHECK FOR VERTICAL GAZE NYSTAGMUS

NOTE: Nystagmus may be due to causes other than alcohol. These other causes include seizure medications and some other drugs. A large disparity between the performance of the right and left eye may indicate a medical condition.

Test Interpretation

You should look for three clues of nystagmus in each eye.

1. The eye cannot follow a moving object smoothly.
2. Nystagmus is distinct and sustained when the eye is held at maximum deviation for a minimum of four seconds.
3. The angle of onset of nystagmus is prior to 45 degrees.

Based on the original research, if you observe four or more clues it is likely that the suspect's BAC is above 0.10. Using this criterion you will be able to classify about 77% of your suspects accurately. This was determined during laboratory and field testing and helps you weigh the various field sobriety tests in this battery as you make your arrest decision.

Vertical Gaze Nystagmus

The Vertical Gaze Nystagmus test is simple to administer. During the Vertical Gaze Nystagmus test, look for jerking as the eyes move up and are held for approximately four seconds at maximum elevation.

1. Position the stimulus horizontally, about 12-15 inches in front of the suspect's nose.

2. Instruct the suspect to hold the head still, and follow the object with the eyes only.

3. Raise the object until the suspect's eyes are elevated as far as possible.

4. Hold for approximately four seconds.

5. Watch closely for evidence of jerking.

Horizontal and Vertical Gaze Nystagmus can be observed directly and does not require special equipment. You will need a contrasting stimulus for the suspect to follow with their eyes. This can be the tip of your index finger, penlight, or pen. The stimulus used should be held slightly above eye level, so that the eyes are wide open when they look directly at it. It should be held approximately 12-15 inches in front of the nose. Remain aware of your position in relation to the suspect at all times.

OFFICER SAFETY IS THE NUMBER ONE PRIORITY ON ANY TRAFFIC STOP.

<u>Procedures for Walk-and-Turn Testing</u>

1. <u>Instructions Stage: Initial Positioning and Verbal Instructions</u>

    For standardization in the performance of this test, have the suspect assume the heel-to-toe stance by giving the following verbal instructions, accompanied by demonstrations:

    o   "Place your left foot on the line" (real or imaginary). Demonstrate.

    o   "Place your right foot on the line ahead of the left foot, with heel of right foot against toe of left foot." Demonstrate.

    o   "Place your arms down at your sides." Demonstrate.

    o   "Maintain this position until I have completed the instructions. <u>Do not start</u> <u>to walk until told to do so</u>."

    o   "Do you understand the instructions so far?" (Make sure suspect indicates understanding.)

2. <u>Demonstrations and Instructions for the Walking Stage</u>

    Explain the test requirements, using the following verbal instructions, accompanied by demonstrations:

    o   "When I tell you to start, take nine heel-to-toe steps, turn, and take nine heel-to-toe steps back." (Demonstrate 3 heel-to-toe steps.)

    o   "When you turn, keep the front foot on the line, and turn by taking a series of small steps with the other foot, like this." (Demonstrate).

    o   "While you are walking, keep your arms at your sides, watch your feet at all times, and count your steps out loud."

    o   "Once you start walking, don't stop until you have completed the test."

    o   "Do you understand the instructions?" (Make sure suspect understands.)

    o   "Begin, and count your first step from the heel-to-toe position as 'One.'"
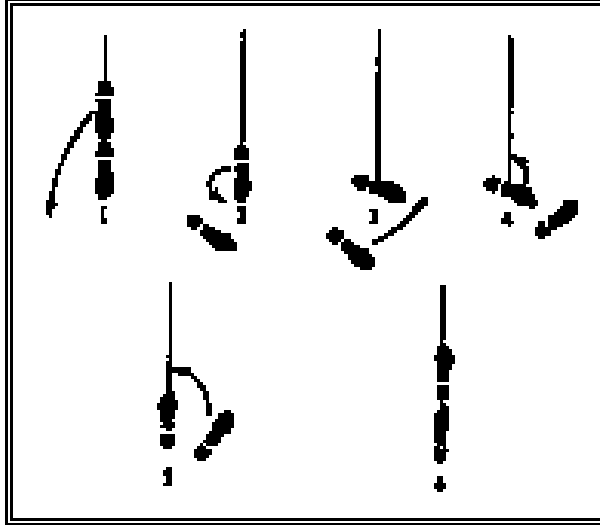
3. Test Interpretation

You may observe a number of different behaviors when a suspect performs this test. Original research demonstrated that the behaviors listed below are likely to be observed in someone with a BAC above 0.10. Look for the following clues each time this test is given:

A. Cannot keep balance while listening to the instructions. Two tasks are required at the beginning of this test. The suspect must balance heel-to-toe on the line, and at the same time, listen carefully to the instructions. Typically, the person who is impaired can do only one of these things. The suspect may listen to the instructions, but not keep balance. Record this clue if the suspect does not maintain the heel-to-toe position throughout the instructions. (Feet must actually break apart.) Do not record this clue if the suspect sways or uses the arms to balance but maintains the heel-to-toe position.

B. Starts before the instructions are finished. The impaired person may also keep balance, but not listen to the instructions. Since you specifically instructed the suspect not to start walking "until I tell you to begin," record this clue if the suspect does not wait.

C. Stops while walking. The suspect pauses for several seconds. Do not record this clue if the suspect is merely walking slowly.

D. Does not touch heel-to-toe. The suspect leaves a space of more than one-half inch between the heel and toe on any step.

E. Steps off the line. The suspect steps so that one foot is entirely off the line.

F. <u>Uses arms to balance</u>. The suspect raises one or both arms more than 6 inches from the sides in order to maintain balance.

G. <u>Improper turn</u>. The suspect removes the front foot from the line while turning. Also record this clue if the suspect has not followed directions as demonstrated, i.e., spins or pivots around.

H. <u>Incorrect number of steps</u>. Record this clue if the suspect takes more or fewer than nine steps in either direction.

Note: If suspect can't do the test, record observed clues and document the reason for not completing the test, e.g. suspect's safety.

If the suspect has difficulty with the test (for example, steps off the line), continue from that point, not from the beginning. This test may lose its sensitivity if it is repeated several times.

Observe the suspect from a safe distance and limit your movement which may distract the suspect during the test. **Always consider officer safety.**

Based on original research, if the suspect exhibits two or more clues on this test or fails to complete it, classify the suspect's BAC as above 0.10. Using this criterion, you will be able to accurately classify 68% of your suspects.

4. <u>Test Conditions</u>

Walk-and-Turn test requires a designated straight line, and should be conducted on a reasonably dry, hard, level, nonslippery surface. There should be sufficient room for suspects to complete nine heel-to-toe steps. Note: Recent field validation studies have indicated that varying environmental conditions have not affected a suspect's ability to perform this test.

The original research indicated that individuals over 65 years of age, back, leg or inner ear problems had difficulty performing this test. Individuals wearing heels more than 2 inches high should be given the opportunity to remove their shoes.

5. <u>Combined Interpretation of Horizontal Gaze Nystagmus and Walk-and-Turn Tests</u>

Based on the original research, combining four or more clues of HGN and two or more clues of the Walk-and-Turn, suspects can be classified as above 0.10 BAC 80% of the time.

Procedures for One-Leg Stand Testing

1. Instructions Stage: Initial Positioning and Verbal Instructions

   Initiate the test by giving the following verbal instructions, accompanied by demonstrations.

   o "Please stand with your feet together and your arms down at the sides, like this." (Demonstrate)

   o "Do not start to perform the test until I tell you to do so."

   o "Do you understand the instructions so far?" (Make sure suspect indicates understanding.)

2. Demonstrations and Instructions for the Balance and Counting Stage

   Explain the test requirements, using the following verbal instructions, accompanied by demonstrations:

   o "When I tell you to start, raise one leg, either leg, with the foot approximately six inches off the ground, keeping your raised foot parallel to the ground." (Demonstrate one leg stance.)

   o "You must keep both legs straight, arms at your side."

   o "While holding that position, count out loud in the following manner: "one thousand and one, one thousand and two, one thousand and three, until told to stop." (Demonstrate a count, as follows: "one thousand and one, one thousand and two, one thousand and three, etc." Officer should not look at his foot when conducting the demonstration - OFFICER SAFETY.)

   o "Keep your arms at your sides at all times and keep watching the raised foot."

   o "Do you understand?" (Make sure suspect indicates understanding.)

   o "Go ahead and perform the test." (Officer should always time the 30 seconds. Test should be discontinued after 30 seconds.)

   Observe the suspect from a safe distance. If the suspect puts the foot down, give instructions to pick the foot up again and continue counting from the point at which the foot touched the ground. If the suspect counts very slowly, terminate the test after 30 seconds.

3. Test Interpretation

You may observe a number of different behaviors when a suspect performs this test. The original research found the behaviors listed below are the most likely to be observed in someone with a BAC above 0.10. Look for the following clues each time the One-Leg Stand test is administered.

A. <u>The suspect sways while balancing</u>. This refers to side-to-side or back-and-forth motion while the suspect maintains the one-leg stand position.

B. <u>Uses arms for balance</u>. Suspect moves arms 6 or more inches from the side of the body in order to keep balance.

C. <u>Hopping</u>. Suspect is able to keep one foot off the ground, but resorts to hopping in order to maintain balance.

D. <u>Puts foot down</u>. The suspect is not able to maintain the one-leg stand position, putting the foot down one or more times during the 30-second count.

Note: If suspect can't do the test, record observed clues and document the reason for not completing the test, e.g. suspect's safety.

Remember that time is critical in this test. The original research has shown a person with a BAC above 0.10 can maintain balance for up to 25 seconds, but seldom as long as 30.

Based on original research, if an individual shows two or more clues or fails to complete the One-Leg Stand, there is a good chance the BAC is above 0.10. Using that criterion, you will accurately classify 65% of the people you test as to whether their BAC's are above 0.10.

Observe the suspect from a safe distance and remain as motionless as possible during the test so as not to interfere. If the suspect puts the foot down, give instructions to pick the foot up again and continue counting from the point at which the foot touched the ground. If the suspect counts very slowly, terminate the test after 30 seconds.

4. Test Conditions

One-Leg Stand requires a reasonably dry, hard, level, and non-slippery surface. Suspect's safety should be considered at all times.

The original research indicated that certain individuals over 65 years of age, back, leg or inner ear problems, or people who are overweight by 50 or more pounds had difficulty performing this test. Individuals wearing heels more than 2 inches high should be given the opportunity to remove their shoes.

5. Taking Field Notes on Suspects' Performance of Field Sobriety Tests

For purposes of the arrest report and courtroom testimony, it is not enough to record the total number of clues on the three tests. The number of clues is important to the police officer in the field because it helps determine whether there is probable cause to arrest. But to secure a conviction, more descriptive evidence is needed.

The officer must be able to describe how the suspect performed on the tests, and exactly what the suspect did.

The standard note taking guide provided in this Manual is designed to help you develop a clear description of the suspect's performance on the tests.

6. Taking Field Notes on The Eye Procedures

First, have subject remove glasses.

Equal Pupils	☐ Yes ☐ No
Equal Tracking	☐ Yes ☐ No
Vertical Nystagmus	☐ Yes ☐ No
Other (i.e., Resting Nystagmus) _____	

The section for Medical Assessment appears at the bottom of the guide's front page.

o   Check "Yes" or "No" box for equal pupil size.
o   Check "Yes" or "No" box for equal tracking.

In the section labeled "other", record any facts, circumstances, conditions, or observations that may be relevant to this procedures (i.e., Resting Nystagmus).

HORIZONTAL GAZE NYSTAGMUS

	LEFT	RIGHT
✪ LACK OF SMOOTH PURSUIT		
✪ DISTINCT AND SUSTAINED NYSTAGMUS AT MAXIMUM DEVIATION		
✪ ONSET OF NYSTAGMUS PRIOR TO 45 DEGREES		

The section on the Horizontal Gaze Nystagmus test appears on the bottom of the guide's front side.

Complete the entire test for both eyes, writing "yes" or "no" for each nystagmus clue.

o   Write "yes" if the clue is present;
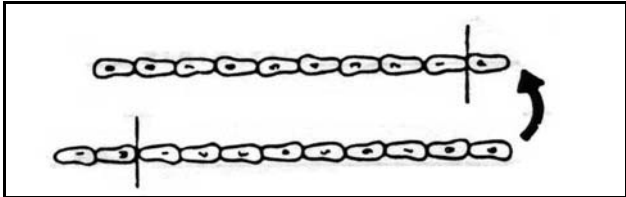o   Write "no" if the clue is not present.

In the section labeled "other," record any facts, circumstances, conditions or observations that may be relevant to this test.

o   Examples of additional evidence of impairment emerging during nystagmus test:

   -   suspect unable to keep head still;
   -   suspect swaying noticeably;
   -   suspect utters incriminating statements.

o   Examples of conditions that may interfere with suspect's performance of the Horizontal Gaze Nystagmus test:

   -   wind, dust, etc. irritating suspect's eyes;
   -   visual or other distractions impeding the test (always face suspect away from rotating lights, strobe lights and traffic passing in close proximity).

7.   Taking Field Notes on Walk-and-Turn Testing

The section on the Walk-and-Turn test appears at the top of the guide's back side.

WALK AND TURN

CANNOT KEEP BALANCE [   ]

STARTS TOO SOON   [   ]

	FIRST NINE STEPS	SECOND NINE STEPS
STOPS WALKING		
MISSES HEEL -TO- TOE		
STEPS OFF LINE		
RAISES ARMS		
ACTUAL STEPS TAKEN		

IMPROPER TURN (Describe)
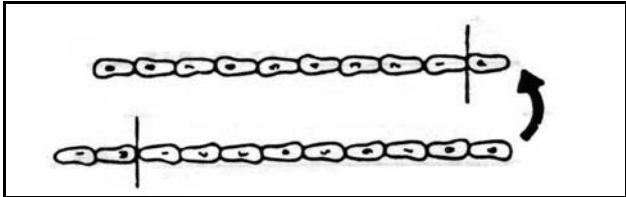
CANNOT DO TEST (EXPLAIN)

OTHER:

The first two clues, "cannot keep balance" and "starts too soon" apply only during the instructions stage of the test. Record the <u>number of times</u> each of those clues appear.

For example, if the suspect's feet "break apart" from the heel-to-toe stance twice during the instructions stage, write "2" in the box alongside the "cannot keep balance" clue. Similarly, if the suspect never "starts too soon," write "0" in that box. Note: Actual steps taken is for scoring purposes only. Wrong number of steps is the validated clue.

Don't leave boxes blank. If a particular clue never shows up, write "0" in the corresponding box.

Record the next five clues <u>separately</u> for the walk <u>down</u> the line, and then up the line.

A. If a suspect <u>stops walking</u>, record it by drawing a vertical line across the toe of the step at which the stop occurred. Do this for the first as well as the second nine steps. Place the letter "S" at bottom of the vertical line to indicate stops walking.

<u>WALK AND TURN</u>

CANNOT KEEP BALANCE [   ]
STARTS TOO SOON [   ]

	FIRST NINE STEPS	SECOND NINE STEPS
STOPS WALKING		
MISSES HEEL -TO- TOE		
STEPS OFF LINE		
RAISES ARMS		
ACTUAL STEPS TAKEN		

IMPROPER TURN (Describe)

CANNOT DO TEST (EXPLAIN)

OTHER:

B. If suspect <u>fails to touch heel-to-toe</u>, record how many times this happens. Draw a vertical line across the toe of the step at which the miss occurred. Place the letter "M" at the top of the vertical line to indicate missed heel to toe.

C. If suspect <u>steps off the line</u> while walking, record it by drawing a line from the appropriate foot print at an angle in the direction in which the foot stepped. Do it for each nine steps.

D. If suspect <u>uses arms to balance</u>, give some indication of how often or how long this happens.

   o <u>Example</u>: suspect raised arms from sides three times; place a check for each occurrence in appropriate box.

   o <u>Example</u>: suspect held arms away from sides during 3 through 7; place a check for each occurrence in appropriate box.

   o <u>Example</u>: suspect "flapped" arms continuously; make a note.

E. Record the <u>actual number of steps</u> taken by suspect in each direction.

   For the next point, "improper turn," record a <u>description</u> of the turn.

   If you note that the suspect <u>"cannot perform test,"</u> indicate explicitly why you did so.

   o <u>Example</u>: "off line three times;"
   o <u>Example</u>: "staggered six steps to right, nearly fell;"
   o <u>Example</u>: "fear of injury."

   At end of the test, examine each factor and determine how many clues have been recorded. <u>Remember, each clue may appear several times, but still only constitutes one clue</u>.

   In the section labeled "other," record any facts, circumstances, conditions or observations that may be relevant to this test.

   o Examples of additional evidence of impairment during Walk-and-Turn test:

      - suspect verbally miscounts steps;
      - suspect utters incriminating statements.

o   Examples of conditions that may interfere with suspect's performance of the Walk-and-Turn test:

- wind/weather conditions;
- suspect's age, weight;
- suspect's footwear.

8.   Taking Field Notes on the Combined Interpretation of Nystagmus and Walk-and-Turn

By combining four or more clues of HGN with two or more clues of the WAT test, suspects can be correctly classified as above 0.10 BAC 80% of the time.
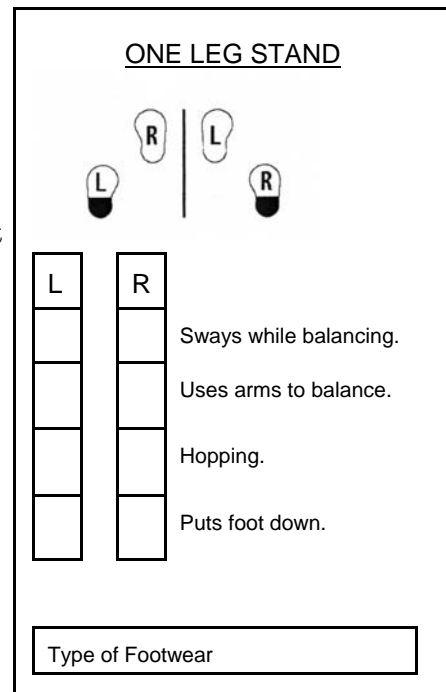
9.   Taking Field Notes on One-Leg Stand Testing

The section on the One-Leg Stand test appears midway down the page.

By recording when things happen as well as what happens, you will be able to prepare a more descriptive arrest report.

You will place check marks in or near the small boxes to indicate how many times you observed each of the clues. You will do this separately for the test on the left leg (L) or on the right leg (R).
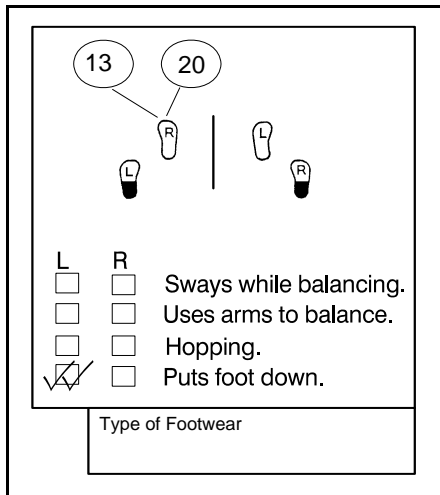
In addition, if the suspect puts the foot down during the test, you will record when it happened (write the count on new note guide). For example, when standing on the left leg the suspect lowered the right foot at a count of "one thousand and thirteen", and again at "one thousand and twenty". Your diagram should look like the sketch to the left. You must also pay attention to the suspect's general appearance and behavior while the test is being performed.

At end of the test, examine each factor and determine how many distinct clues have appeared.

ONE LEG STAND

L	R	
		Sways while balancing.
		Uses arms to balance.
		Hopping.
		Puts foot down.

Type of Footwear

13   20

L	R	
☐	☐	Sways while balancing.
☐	☐	Uses arms to balance.
☐	☐	Hopping.
☑	☐	Puts foot down.

Type of Footwear

IT IS NECESSARY TO EMPHASIZE THIS VALIDATION APPLIES ONLY WHEN:

o   **THE TESTS ARE ADMINISTERED IN THE PRESCRIBED, STANDARDIZED MANNER**

o   **THE STANDARDIZED CLUES ARE USED TO ASSESS THE SUSPECT'S PERFORMANCE**

o   **THE STANDARDIZED CRITERIA ARE EMPLOYED TO INTERPRET THAT PERFORMANCE.**

IF ANY ONE OF THE STANDARDIZED FIELD SOBRIETY TEST ELEMENTS IS CHANGED, THE VALIDITY IS COMPROMISED.

At end of the test, examine each factor and determine how many clues have been recorded. <u>Remember</u>, each clue may appear several times, but still only constitutes one clue.

TEST YOUR KNOWLEDGE

INSTRUCTIONS: Complete the following sentences.

1. Walk-and-Turn is an example of _____ field sobriety test.

2. The Walk-and-Turn requires a real or imaginary line and _____
    _____

3. During the _____ stage of the Walk-and-Turn, the suspect is required to
    count out loud.

4. Per the original research, the Walk-and-Turn can determine whether a
    suspect's BAC is above or below 0.10, _____ percent of the time.

5. In the Walk-and-Turn test, a suspect who steps off the line during the first 9
    steps and once again during the second 9 steps and who raises arms for balance
    twice during the second nine steps has produced _____ distinct clue(s).

6. The Walk-and-Turn may not be valid when administered to persons who are
    over _____ years of age.

7. During the _____ stage of the One-Leg Stand the suspect must maintain
    balance for 30 seconds.

8. The One-Leg Stand requires that the suspect keep the foot elevated for ____ seconds.

9. Per original research, the One-Leg Stand can determine whether a suspect's
    BAC is above or below 0.10, _____ percent of the time.

10. In the One-Leg Stand test, a suspect who sways has exhibited _____ clue(s).

11. In the One-Leg Stand test, a suspect who raises arms, hops, and puts foot down
    has exhibited _____ clue(s).

12. The maximum number of clues for Horizontal Gaze Nystagmus that can appear
    in <u>one</u> eye is _____.

13. Per original research, the HGN test can determine whether a suspect's BAC is
    above 0.10, _____ percent of the time.

14. The <u>third clue</u> of HGN is an onset of nystagmus prior to _____ degrees.

SESSION VII

PHASE THREE: PRE-ARREST SCREENING

SESSION VII

PHASE THREE: PRE-ARREST SCREENING

Upon successfully completing this session, the participants will be able to:

o   Describe the role of psychophysical and preliminary breath tests.

o   Define and describe the concepts of divided attention and nystagmus.

o   Discuss the advantages and limitations of preliminary breath testing.

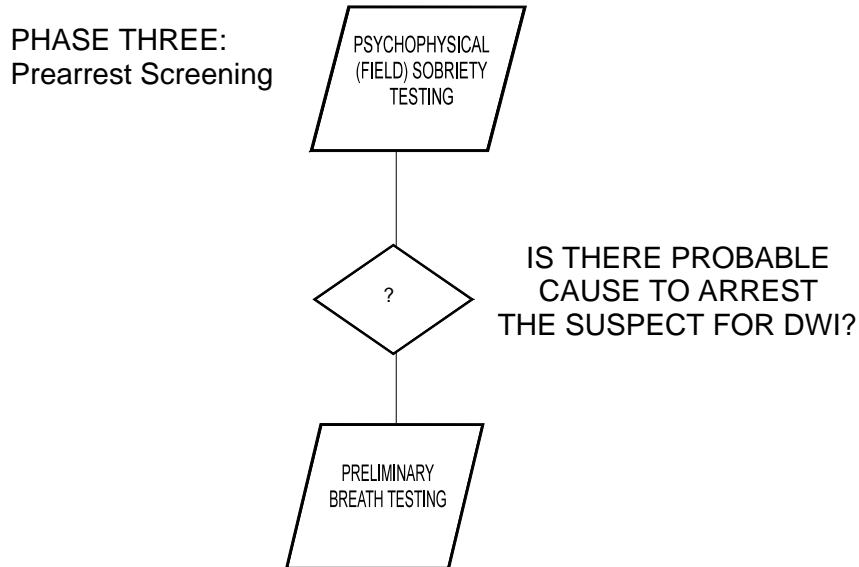o   Discuss the arrest decision process.

CONTENT SEGMENTS	LEARNING ACTIVITIES
A. Overview: Tasks and Decision	o Instructor-Led Presentations
B. Gaze Nystagmus - Definition	o Instructor-Led Demonstrations
C. Horizontal Gaze Nystagmus - Definition, Concepts, Demonstrations	o Video Presentation
D. Vertical Gaze Nystagmus - Definition, Concepts, Demonstrations	
E. Divided Attention Tests: Concepts, Examples, Demonstrations	
F. Advantages and Limitations of Preliminary Breath Testing	
G. The Arrest Decision	

PRE-ARREST SCREENING

PHASE THREE TASKS AND DECISION

Like Phases One and Two, DWI Detection Phase Three, Pre-arrest Screening has
two major evidence gathering tasks and one major decision.

PHASE THREE:
Prearrest Screening

PSYCHOPHYSICAL
(FIELD) SOBRIETY
TESTING

?

IS THERE PROBABLE
CAUSE TO ARREST
THE SUSPECT FOR DWI?

PRELIMINARY
BREATH TESTING

Your first task in Phase Three is to administer three scientifically validated
psychophysical (field) sobriety tests. Based on these tests and on all other evidence
from Phase One and Two, you must decide whether there is sufficient probable
cause to arrest the driver for DWI. Your second task may then be to administer (or
arrange for) a preliminary breath test (PBT) to confirm the chemical basis of the
driver's impairment, if your agency uses PBTs. The entire detection process
culminates in the arrest/no arrest decision.

PSYCHOPHYSICAL TESTS

Psychophysical tests are methods of assessing a suspect's mental and physical
impairment. These tests focus on the abilities needed for safe driving: balance,
coordination, information processing and so on.

Psychophysical testing actually begins as soon as you come into face-to-face contact
with the suspect and begin the interview. Psychophysical testing continues as the
suspect steps from the vehicle and you observe the manner of the exit and walk
from the vehicle. The most significant psychophysical tests are the three
scientifically validated structured tests that you administer at roadside.

PRELIMINARY BREATH-TEST

The preliminary breath test (PBT) can help to corroborate all other evidence and to confirm your judgment as to whether the suspect is impaired. Usually PBT results cannot be introduced as evidence against the driver in court. However, state laws vary in this regard.

THE ARREST DECISION

The DWI detection process concludes with the arrest decision. This decision is based on <u>all</u> of the evidence you have obtained during all three detection phases: on observation of the vehicle in motion and during the stopping sequence; on face to face observation and interview of the driver.

NYSTAGMUS

"Nystagmus" means an involuntary jerking of the eyes.

HORIZONTAL GAZE NYSTAGMUS

Horizontal Gaze Nystagmus (HGN) refers to an involuntary jerking occurring as the eyes gaze toward the side. In addition to being involuntary the person experiencing the nystagmus is unaware that the jerking is happening.

Involuntary jerking of the eyes becomes readily noticeable when a person is impaired. As a person's blood alcohol concentration increases, the eyes will begin to jerk sooner as they move to the side.

Horizontal Gaze Nystagmus is the most reliable field sobriety test. Especially when used in combination with the divided attention tests, it will help police officers correctly identify suspects who are impaired.

In administering the HGN test, the officer has the suspect follow the motion of a small stimulus with the eyes only. The stimulus may be the tip of a pen or penlight, an eraser on a pencil or your finger tip, whichever contrasts with the background.

When the HGN test is administered always begin with subject's left eye. Each eye is examined for three specific clues.

o   as the eye moves from side to side, does it move smoothly or does it jerk noticeably? (As people become impaired by alcohol, their eyes exhibit a lack of smooth pursuit as they move from side to side.)

o   when the eye moves as far to the side as possible and is kept at that position for several seconds, does it jerk distinctly? (Distinct and sustained nystagmus at maximum deviation is another clue of impairment.)

o   as the eye moves toward the side, does it start to jerk prior to a 45-degree angle? (Onset of nystagmus prior to 45-degrees is another clue of impairment.)

As a person's blood alcohol concentration increases it is more likely these clues will appear.

The maximum number of clues that may appear in one eye is three. The maximum total number for any suspect is six. The original research shows that if four or more clues are evident, it is likely that the suspect's blood alcohol concentration is above 0.10. With four-or-more clues present, this test is 77% accurate.

VERTICAL GAZE NYSTAGMUS

Vertical Gaze Nystagmus is an involuntary jerking of the eyes (up and down) which occurs when the eyes gaze upward at maximum elevation. Although this type of nystagmus was not addressed in the original research, field experience has indicated that the presence of Vertical Gaze Nystagmus has proven to be a reliable indicator of high doses of alcohol for that individual or certain other drugs.

DIVIDED ATTENTION TESTS

INTRODUCTION

Many of the most reliable and useful psychophysical tests employ the concept of divided attention: they require the subject to concentrate on two things at once. Driving is a complex divided attention task. In order to operate a vehicle safely, drivers must simultaneously control steering, acceleration and braking; react appropriately to a constantly changing environment; and perform many other tasks. Alcohol and many other drugs reduce a person's ability to divide attention. Impaired drivers often ignore the less critical tasks of driving in order to focus their impaired attention on the more critical tasks. For example, a driver may ignore a traffic signal and focus instead on speed control.

Even when they are impaired, many people can handle a single, focused attention task fairly well. For example, a driver may be able to keep the vehicle well within the proper traffic lane, as long as the road remains fairly straight. However, most people when impaired cannot satisfactorily divide their attention to handle multiple tasks at once.

The concept of divided attention has been applied to psychophysical testing. Field sobriety tests that simulate the divided attention characteristics of driving have been developed and are being used by police departments nationwide. The best of these tests exercise the same mental and physical capabilities that a person needs to drive safely:

  o   information processing;
  o   short-term memory;
  o   judgment and decision making;
  o   balance;
  o   steady, sure reactions;
  o   clear vision;
  o   small muscle control;
  o   coordination of limbs.

Any test that requires a person to demonstrate two or more of these capabilities simultaneously is potentially a good psychophysical test.

Simplicity is the key to divided attention field sobriety testing. It is not enough to select a test that just divides the subject's attention. The test also must be one that is reasonably simple for the average person to perform when sober. Tests that are difficult for a sober subject to perform have little or no evidentiary value.

Two divided attention field sobriety tests that have proven accurate and effective in DWI detection are the Walk-and-Turn and the One-Leg Stand. These tests are described briefly below.

Walk-and-Turn

Walk-and-Turn is a test that has been validated through extensive research sponsored by the National Highway Traffic Safety Administration (NHTSA). It is a divided attention test consisting of two stages:

- o   Instructions Stage; and,
- o   Walking Stage.

In the <u>Instructions Stage</u>, the subject must stand with their feet in heel-to-toe position, keep their arms at their sides, and listen to the instructions. The Instructions Stage divides the subject's attention between a balancing task (standing while maintaining the heel-to-toe position) and an information processing task (listening to and remembering instructions).

In the <u>Walking Stage</u> the subject takes nine heel-to-toe steps, turn in a prescribed manner, and take nine heel-to-toe steps back, while counting the steps out loud, while watching their feet. During the turn, the subject keeps their <u>front</u> foot on the line, turn in a prescribed manner, and use the other foot to take several small steps to complete the turn. The Walking Stage divides the subject's attention among a balancing task (walking heel-to-toe and turning); a small muscle control task (counting out loud); and a short-term memory task (recalling the number of steps and the turning instructions).

The Walk-and-Turn test is administered and interpreted in a standardized manner, i.e., the same way every time. Officers administering the Walk-and-Turn test observe the suspect's performance for <u>eight clues</u>:

- o   can't balance during instructions;
- o   starts too soon;
- o   stops while walking;
- o   doesn't touch heel-to-toe;
- o   steps off line;
- o   uses arms to balance;
- o   loses balance on turn or turns incorrectly; and,
- o   takes the wrong number of steps.

Inability to complete the Walk-and-Turn test occurs when the suspect:

- o steps off the line three or more times;
- o is in danger of falling;
- o cannot do the test.

Original research shows that if a suspect exhibits <u>two or more</u> of the clues, or cannot complete the test, the suspect's BAC is likely to be above 0.10. This criterion has been shown to be accurate 68 percent of the time.

ONE-LEG STAND

The One-Leg Stand test also has been validated through NHTSA's research program. It is a divided attention test consisting of two stages:

- o Instructions Stage; and,
- o Balance and Counting Stage.

In the <u>Instruction Stage</u>, the subject must stand with feet together, keep arms at sides, and listen to instructions. This divides the subject's attention between a balancing task (maintaining a stance) and an information processing task (listening to and remembering instructions.)

In the <u>Balance and Counting Stage</u>, the subject must raise one leg, either leg, with the foot approximately six inches off the ground, keeping raised foot parallel to the ground. While looking at the elevated foot, count out loud in the following manner: "one thousand and one", "one thousand and two", "one thousand and three" until told to stop. This divides the subject's attention between balancing (standing on one foot) and small muscle control (counting out loud).

<u>The timing for a thirty-second period by the officer is an important part of the One-Leg Stand test</u>. The original research has shown that many impaired subjects are able to stand on one leg for up to 25 seconds, but that few can do so for 30 seconds.

One-Leg Stand is also administered and interpreted in a standardized manner. Officers carefully observe the suspect's performance and look for four specific clues:

- o sways while balancing;
- o uses arms to balance;
- o hops;
- o puts foot down.

Inability to complete the One-Leg Stand test occurs when the suspect:

- o puts the foot down three or more times, during the 30-second period;
- o cannot do the test.

The original research shows that, when the suspect produces <u>two or more</u> clues or is unable to complete the test, it is likely that the BAC is above 0.10. This criterion has been shown to be accurate 65 percent of the time.

PRELIMINARY BREATH TESTING

The basic purpose of preliminary breath testing (PBT) is to demonstrate the association of alcohol with the observable evidence of the suspect's impairment. The suspect's impairment is established through sensory evidence: what the officer sees, hears and smells. The PBT provides the evidence that alcohol is the <u>chemical basis</u> of that impairment by yielding an on-the-spot indication of the suspect's blood alcohol concentration (BAC). The PBT provides direct indication of the BAC level. It does <u>not</u> indicate the level of the suspect's impairment. Impairment varies widely among individuals with the same BAC level.

Preliminary breath testing, like psychophysical testing, is a stage in the pre-arrest screening of a DWI suspect. Usually the suspect is not yet under arrest when requested to submit to the preliminary breath test. The DWI incident remains at the investigative stage; the accusatory stage has not yet begun. The PBT result is only one of many factors the officer considers in determining whether the suspect should be arrested for DWI. It should never be the sole basis for a DWI arrest. The PBT result <u>is</u> an important factor because it provides <u>direct</u> indication of alcohol impairment. All other evidence, from initial observation of the vehicle in operation through formal psychophysical testing, indicates alcohol impairment.

ADVANTAGES OF PBT

A PBT offers several important advantages for DWI detection. It may:

- o corroborate other evidence by demonstrating that the suspicion of alcohol impairment is consistent with the officer's observations of the suspect's mental and physical impairment.

- o confirm the officer's own judgment and help gain confidence in evaluating alcohol impairment accurately, based on observations and psychophysical tests. (Many officers experienced in DWI enforcement find that they rely less and less on the PBT as their confidence in their own powers of detection increases.)

o   disclose the possibility of medical complications or impairment due to drugs other than alcohol. (The PBT can confirm <u>or deny</u> that alcohol is the cause of the observed impairment. For example, observed psychophysical impairment coupled with a PBT result showing a very low BAC indicates an immediate need to investigate the possibility that the suspect has ingested a drug other than alcohol or suffers from a medical problem.)

o   help to establish probable cause for a DWI arrest. (The role of the PBT in establishing probable cause may be affected by the evidentiary value of PBT results in your state. Consult your specific PBT law, your supervisor, or the local prosecutor for clarification, if necessary.)

LIMITATIONS OF PBT

Preliminary breath testing may have both evidentiary limitations and accuracy limitations. Evidentiary limitations vary with specific laws. In some states PBT results are admissible as evidence; in other states they are not admissible. Where the results are admissible, there may be differences in the weight or value they are given. Consult your state PBT law, your supervisor or your local prosecutor, as necessary, for clarification.

PBT instruments have accuracy limitations. Although all PBT instruments currently used by law enforcement are reasonably accurate, they are subject to the possibility of error, especially if they are not used properly. There are factors that can affect the accuracy of preliminary breath testing devices. Some of these factors tend to produce "high" test results; others tend to produce "low" results.

There are two common factors that tend to produce <u>high</u> results on a PBT.

o   <u>Residual mouth alcohol</u>. After a person takes a drink, some of the alcohol will remain in the mouth tissues. If the person exhales soon after drinking, the breath sample will pick up some of this left-over mouth alcohol. In this case, the breath sample will contain an additional amount of alcohol and the test result will be <u>higher</u> than the true BAC.

It takes approximately 15 minutes for the residual alcohol to evaporate from the mouth.

The only sure way to eliminate this factor is to make sure the suspect does not take any alcohol for at least 15 to 20 minutes before conducting a breath test. Remember, too, that most mouthwashes, breath sprays, cough syrups, etc., contain alcohol and will produce residual mouth alcohol. Therefore, it is always best not to permit the suspect to put <u>anything</u> in their mouth for at least 15 to 20 minutes prior to testing.

o   <u>Breath Contaminants</u>. Some types of preliminary breath tests might react to certain substances other than alcohol. For example, substances such as ether, chloroform, acetone, acetaldehyde and cigarette smoke conceivably could produce a positive reaction on certain devices. If so, the test would be contaminated and its result would be higher than the true BAC. Normal characteristics of breath samples, such as halitosis, food odors, etc., do not affect accuracy.

There are two common factors that tend to produce <u>low</u> PBT results.

o   <u>Cooling of the breath sample</u>. If the captured breath sample is allowed to cool before it is analyzed, some of the alcohol vapor in the breath may turn to liquid and precipitate out of the sample. If that happens, the subsequent analysis of the breath sample will produce a low BAC result.

o   <u>The composition of the breath sample</u>. Breath composition means the mixture of the tidal breath and alveolar breath. Tidal breath is breath from the upper part of the lungs and the mouth. Alveolar breath is deep lung breath. Breath testing should be conducted on a sample of alveolar breath, obtained by having the subject blow into the PBT instrument until all air is expelled from the lungs.

Radio frequency interference (RFI) can produce either high or low test results, or can prevent a breath test device from producing any result. Care should be exercised when utilizing a PBT around radio equipment

THE ARREST DECISION

Your arrest/no arrest decision is the culmination of the DWI detection process. Your decision is based on <u>all</u> the evidence you have accumulated during each detection phase.

PHASE ONE:
o   initial observation of vehicle in motion;
o   observation of the stop.

PHASE TWO:
o   face-to-face observation and interview;
o   observation of the exit.

PHASE THREE:
o   SFSTs;
o   preliminary breath tests.

Your decision involves a careful review of each of the observations you have made.

Conduct a "mental summary" of the evidence collected during vehicle in motion, personal contact and pre-arrest screening. If all of the evidence, taken together, establishes probable cause to believe that DWI has been committed, you should arrest the suspect for DWI. Under no circumstances should you charge the suspect with a lesser offense <u>instead</u> of DWI if there is probable cause to believe that DWI has been committed. Any reduction of DWI to a lesser charge is the responsibility of the prosecutor or judge.

TEST YOUR KNOWLEDGE

INSTRUCTIONS: Complete the following sentences.

1. The two major evidence gathering tasks of Phase Three are _____

    _____

    _____

    _____

2. The major decision in Phase Three is _____

    _____

    _____

    _____

3. The entire DWI detection process culminates in _____

    _____

    _____

    _____

4. Divided attention tests require the subject to _____

    _____

    _____

    _____

5. Among the mental and physical capabilities a person needs to drive safely are these four:

    a.

    b.

    c.

    d.

6. The two stages of the Walk-and-Turn are:

    a.

    b.

7. The two stages of the One-Leg Stand are:

    a.

    b.

8. The purpose of PBT is _____

    _____

    _____

    _____

9. Two factors that produce <u>high</u> results on a PBT are:

    a.

    b.

10. Two factors that produce <u>low</u> results on a PBT are:

    a.

    b.

SESSION IX

TEST BATTERY DEMONSTRATIONS

SESSION IX

TEST BATTERY DEMONSTRATIONS

Upon successfully completing this session, the participant will be able to:

o   Demonstrate the appropriate administrative procedures for the Standardized
Field Sobriety Testing Battery.

CONTENT SEGMENTS   LEARNING ACTIVITIES

A. Live Classroom Demonstrations   o   Instructor-Led Demonstration

B. Video Demonstration   o   Participant Demonstration

                                          o   Video Presentation

TEST BATTERY DEMONSTRATIONS

In this session, you will have the opportunity to observe several demonstrations of the three Standardized Field Sobriety Tests. Your instructors will conduct some of these demonstrations. Other demonstrations will be provided on video.

SESSION X

"DRY RUN" PRACTICE SESSION

SESSION X

"DRY RUN" PRACTICE SESSION

Upon successfully completing this session, the participant will be able to:

o   Demonstrate the proper administration of the three Standardized Field
        Sobriety Tests.

CONTENT SEGMENTS   LEARNING ACTIVITIES

A.   Procedures and Group Assignments   o   Instructor-Led Presentation

B.   Live Administration of SFST Battery   o   Instructor-Led Demonstration

C.   Hands On Practice   o   Participant Practice Session

"DRY RUN" PRACTICE SESSION

In this session, you will work with other participants, taking turns administering

the Standardized Field Sobriety Tests to each other. When you are not

administering a test or serving as the test subject, you will be expected to observe

the test administrator and subsequently help critique their performance.

The Student Performance Checklist (shown on the next two pages) should be used

to help you monitor a fellow student's performance as a test administrator.

PARTICIPANT PERFORMANCE CHECKLIST

STANDARDIZED FIELD SOBRIETY TEST BATTERY

Student Name: _____   Date: _____

I.   HORIZONTAL GAZE NYSTAGMUS

_____1.   Have subject remove glasses if worn.

_____2.   Stimulus held in proper position (approximately 12"-15" from nose,

slightly above eye level).

_____3.   Check for equal pupil size and resting nystagmus.

_____4.   Check for equal tracking.

_____5.   Smooth movement from center of nose to maximum deviation in

approximately 2 seconds and then back across subject's face to

maximum deviation in right eye, then back to center. Check left eye,

then right eye. (Repeat)

_____6.   Eye held at maximum deviation for a minimum of four seconds (no

white showing). Check left eye, then right eye.   (Repeat)

_____7.   Eye moved slowly (approximately 4 sec.) from center to 45 angle.

Check left eye, then right eye.   (Repeat)

_____8.   Check for Vertical Gaze Nystagmus.   (Repeat)

II.   WALK-AND-TURN

_____1.   Instructions given from a safe position.

_____2.   Tells subject to place feet on line in heel-to-toe manner (left foot behind

right foot) with arms at sides and gives demonstration.

_____3.   Tells subject not to begin test until instructed to do so and asks if

subject understands.

_____4.   Tells subject to take nine heel-to-toe steps and demonstrates.

_____5.   Explains and demonstrates turning procedure.

_____6.   Tells subject to return with nine heel-to-toe steps.

_____7.   Tells subject to count steps out loud.

_____8.   Tells subject to look at feet while counting.

_____9.   Tells subject not to raise arms from sides.

_____10.   Tells subject not to stop once they begin.

_____11.   Asks subject if all instructions are understood.

III.   ONE-LEG STAND

_____1.   Instructions given from a safe position.

_____2.   Tells subject to stand straight, place feet together, and hold arms at
             sides.

_____3.   Tells subject not to begin test until instructed to do so and asked if
             subject understands.

_____4.   Tells subject to raise one leg, either leg, approximately 6" from the
             ground, keeping raised foot parallel to the ground, and gives
             demonstration.

_____5.   Tells subject to keep both legs straight and to look at elevated foot.

_____6.   Tells subject to count by thousands in the following manner: one

thousand and one, one thousand and two, one thousand and three,

until told to stop, and gives demonstration.

_____7.   Checks actual time subject holds leg up.

Instructor: _____

SESSION XIV-A

"TESTING SUBJECTS" PRACTICE: SECOND SESSION
(OPTION TWO ONLY)

SESSION XIV-A

"TESTING SUBJECTS" PRACTICE: SECOND SESSION (OPTION TWO ONLY)

Upon successfully completing this session, the participant will be able to:

o   Properly administer the SFST's.

o   Properly observe and record subject's performance utilizing the standard
     notetaking guide.

o   Properly interpret the subject's performance.

o   Proper use and maintenance of SFST Field Arrest Log.

CONTENT SEGMENTS   LEARNING ACTIVITIES

A. Procedures   o   Instructor-Led Presentation

B. Practical Exercise (OPTION TWO ONLY)   o   Video Presentations

C. Session Wrap-Up   o   Instructor-Led Discussion

"TESTING SUBJECTS" PRACTICE: SECOND SESSION

During this session, if you are attending the OPTION TWO version of this training program, you will be administering the SFSTs to other participants and viewing videoed volunteers who have consumed alcoholic beverages. Some of these volunteers will have BACs above 0.08. Others will be below that level. You will carefully note and record the volunteers' performance, and attempt to distinguish those "0.08 and above" from those "below 0.08".

You will record your results on the SFST Field Arrest Log. Participants trained using this option must continue to maintain this log following their training.

SFST FIELD ARREST LOG

Date	Name	HGN	WAT	OLS	BAC +/- .08	Arrest Not Arrest	Measured BAC	Remarks

ATTACHMENT(S)

The Detection of DWI at BACs Below 0.10

Final Report

Submitted to:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

Jack Stuster, PhD, CPE
Project Director

12 September 1997

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Executive Summary

This report documents the research activities and presents the results of a study conducted for the National Highway Traffic Safety Administration (NHTSA) to identify driving and other behavioral cues that are associated with blood alcohol concentrations (BACs) below the 0.10 level. The ultimate objective of the research has been to develop training materials to assist law enforcement officers in the accurate detection of motorists who are driving while impaired (DWI).

Description of the Research

The research and development project was composed of 13 major project tasks, conducted in two phases. During Phase I, a work plan was developed to guide all subsequent tasks, a comprehensive review of the low BAC literature was performed, interviews were conducted with DWI experts from across the United States, a data base of low BAC arrest reports was assembled, and two field studies were conducted. The analysis of archival, interview, arrest report, and field data collected by observers led to the identification of 34 driving cues and 10 post-stop cues for further evaluation.

Five law enforcement agencies participated in the second of the field studies, known as the preliminary field study, by recording the driving and post-stop cues observed for all enforcement stops, regardless of the disposition of the stop; the BACs of all drivers who exhibited objective signs of having consumed alcohol also were recorded. By collecting data about all enforcement stops that were made, it was possible to calculate the proportions of the stops in which specific cues were found in association with various BAC levels. All archival, interview, and field study data were analyzed, and recommendations for draft training materials were developed, as the final Phase I task.

A draft DWI detection guide, training booklet, and training video were developed based on the results of the preliminary field study; the materials included 24 driving and 10 post-stop cues. Law enforcement agencies representing 11 of the 15 states with 0.08 BAC limits for DWI were recruited to participate in the Phase II validation study. Participating officers reviewed the video and printed training materials, then completed a data collection form following every enforcement stop made, regardless of the disposition of the stop; the same form was used as in the preliminary field study, conducted previously. The validation study data were analyzed and a final version of the training materials, and this technical report, were prepared as the final Phase II project tasks.

Data were collected during more than 12,000 enforcement stops during this research project. The stops were made by several hundred participating officers, representing more than 50 law enforcement agencies from across the United States.

Results

The results of the preliminary field study largely supported the 20 cues at the 0.08 BAC level that were presented on the original NHTSA DWI detection guide, which was developed in 1980 for the 0.10 BAC level. However, no cues were found that reliably predicted BACs below 0.08; that is, the cues that are key predicotrs of DWI at the 0.08 BAC level failed to emerge with useful probabilities at BAC levels below 0.08. The results of the Phase II validation study further confirmed the key cues that were contained in the original NHTSA guide, a few additional driving cues, and the 10 post-stop cues. The DWI driving cues were presented in functional categories in both the printed materials and the training video: Problems Maintaining Proper Lane Position, Speed and Braking Problems, Vigilance Problems, and Judgment Problems.

Slight modifications were made to the training materials, based on the results of the Phase II validation study. The final version of the DWI detection guide is reproduced below.

DWI DETECTION GUIDE
Weaving plus any other cue: p = at least .65
Any two cues: p = at least .50

PROBLEMS MAINTAINING PROPER LANE POSITION
- Weaving   • Weaving across lane lines **p=.50-.75**
- Straddling a lane line   • Swerving
- Turning with a wide radius   • Drifting
- Almost striking a vehicle or other object

SPEED AND BRAKING PROBLEMS   **p=.45-.70**
- Stopping problems (too far, too short, or too jerky)
- Accelerating or decelerating for no apparent reason
- Varying speed   • Slow speed (10+ mph under limit)

VIGILANCE PROBLEMS   **p=.55-.65**
- Driving in opposing lanes or wrong way on one-way
- Slow response to traffic signals
- Slow or failure to respond to officer's signals
- Stopping in lane for no apparent reason
- Driving without headlights at night*
- Failure to signal or signal inconsistent with action*

JUDGMENT PROBLEMS   **p=.35-.90**
- Following too closely
- Improper or unsafe lane change
- Illegal or improper turn (too fast, jerky, sharp, etc.)
- Driving on other than the designated roadway
- Stopping inappropriately in response to officer
- Inappropriate or unusual behavior (throwing, arguing, etc.)
- Appearing to be impaired

POST STOP CUES   **p≥.85**
- Difficulty with motor vehicle controls
- Difficulty exiting the vehicle
- Fumbling with driver's license or registration
- Repeating questions or comments
- Swaying, unsteady, or balance problems
- Leaning on the vehicle or other object
- Slurred speech
- Slow to respond to officer/officer must repeat
- Provides incorrect information, changes answers
- Odor of alcoholic beverage from the driver

*p≥.50 when combined with any other cue:
- Driving without headlights at night
- Failure to signal or signal inconsistent with action

The probability of detecting DWI by random traffic enforcement stops at night has been found to be about three percent (.03).

<div align="center">

DWI Cues At BACs Below 0.10
A Review of the Literature

</div>

The purpose of this review is to prepare information for the research team concerning the determination and validation of visual cues for the detection of motorists who are driving while impaired (DWI) with blood alcohol concentrations (BACs) below 0.10.

BACKGROUND

An emphasis on DWI enforcement during the past decade has been a factor in the significant improvement in traffic safety, as represented by declining fatal and alcohol-involved crash rates. Despite the significant improvements in traffic safety during the past 30 years, particularly during the past decade, more than 40,000 people still perish each year as a result of motor vehicle crashes. The current US traffic fatality rate amount to a daily average of about 126 people – the equivalent of a Boeing 727 crashing every day of the year.

The economic losses from alcohol involved crashes are staggering at an estimated $21 to $24 billion annually (for property damage alone) (Miller, 1992). In 1990, the combined cost of all traffic collisions was $137.5 billion, including 28 million vehicles damaged, 5.4 million people injured, and 44,531 lives lost (Blincoe & Faigin, 1992).

A reduction in the number of alcohol-involved crashes and the number of alcohol-impaired drivers on the road is a top priority. Numerous studies indicate that when DWI enforcement levels are increased, the number of alcohol involved collisions decrease (Hause, Chavez, Hannon, Matheson, 1977; Voas & Haus, 1987; Blomberg, 1992). However, many officers are unable to identify legally impaired drivers from their driving behavior, or even during the brief interview customary at a sobriety checkpoint. For example, in the Netherlands, as many as 32 percent of drivers with BACs above .05 might escape detection at checkpoint, when officers have the advantage of a face-to-face exchange (Gundy & Verschuur, 1986).

There are at least two clear solutions to the low BAC DWI detection problem: 1) Random Breath Testing (RBT) to objectively detect drivers operating above the legal limit; and, 2) increased officer sensitivity to behavioral cues exhibited at lower BAC levels. Although the RBT method is operating effectively in Australia (McCaul & McLean, 1990), it is probably not an appropriate program for the United States. Fourth Amendment rights currently prevent random breath testing; for example, testing only can occur at a sobriety checkpoint after probably cause has been established (Voas, 1991). Thus, the most likely solution to improving detection of low BACs is to improve the DWI detection ability of law enforcement officers.

In 1980, Harris et al. conducted NHTSA sponsored research to determine the behavioral cues for on-the-road detection of DWI. The final product of this Anacapa Sciences' study was a DWI Detection Guide providing 20 visual cues commonly exhibited by impaired drivers with a BAC equal to or greater than 0.10. The Guide provides the probability for each cue of discriminating between Driving While Impaired (DWI) and Driving While Sober (DWS). The DWI Detection Guide and supporting training materials are part of the DWI Detection and Standardized Field Sobriety Testing course currently distributed by NHTSA (NHTSA, 1990). Surprisingly, although there has been a limited evaluation of the DWI Detection Guide (Vingilis et al., 1983), the only additional research of this type that has been performed since 1980 was a NHTSA sponsored study to develop a motorcycle DWI detection guide (Stuster, 1993).

It is legitimate to question whether a cue guide calibrated for the 0.08 level would appear very similar if not identical to the DWI detection guide developed nearly 20 years ago by Anacapa Sciences. A new, lower BAC limit DWI detection guide might ultimately appear similar to the old guide, but the research is important for at least three reasons.

1. The research that supported the development of the DWI Detection Guide was conducted 18 years ago. Many things have changed considerably since the late 1970s. It is not unreasonable to suspect that some fundamental changes might be reflected in the behavioral cues associated with driver impairment. And, there *might* be behaviors that correlate more closely with lower than higher BACs.

2. At the very least, a periodic reprise of a research and development effort is warranted if the work involved important public policy and enforcement implications. The DWI Detection Guide and training program have not been reviewed or revised since they were developed. Increased awareness of DWI issues and public support for DWI enforcement in recent years contribute to the need to upgrade and make current an important decision aid and training program that is used by law enforcement personnel from across the U.S.

3. It is essential for researchers to view the issue of DWI detection form the perspective of an officer on patrol. A patrol officer wants to know the likelihood that a specific driver behavior is indicative of DWI at the (new) 0.08 level *or above*, or at the 0.04 level *or above*. The "or above" is important because as the BAC level is reduced the probability that a given cue is predictive of DWI rises – because all of the *or aboves* are included in the calculation. From the officer's perspective (in an 0.08 jurisdiction) it is usually irrelevant if the motorist is 0.08, 0.10, or some higher value – it is only important to determine that the motorist is 0.08 *or above*.

Although the modal BAC limit for DWI continues to be 0.10 in the United States, there is a definite trend towards lowering the limit. When the current project started in 1993, only five states had adopted a 0.08 percent legal limit, but by the conclusion of the research the number of states with a 0.08 limit had increased to 15. Further, the Commercial Motor Vehicle Safety Act of 1986 established a nationwide maximum BAC of 0.04 percent for all commercial drivers. In addition, several states have adopted a zero tolerance statute or a 0.02 percent BAC limit for youthful drivers. Studies that suggest low officer DWI detection rates, and improved low BAC detection when using passive alcohol sensors (Kiger et al., 1983; Jones et al., 1985: Vingilis and Gingilis, 1985), suggest the need for a DWI detection guide for levels below 0.10 percent BAC.

RELEVANT RESEARCH

The trend of lowering BAC limits is a reflection of the growing body of evidence that alcohol begins to impair nervous function at BAC levels below 0.10 percent. Moskowitz and Robinson (1988) conducted a comprehensive literature review concerning the effects of alcohol on driving behavior, emphasizing the BACs at which impairment begins. A majority of studies found impairment at low BACs (below 0.07). Many studies found impairment at the 0.04 level and below.

Moskowitz and Robinson computed BACs for all studies, even those that included BAC data in the original report. Often these calculations resulted in higher BACs than were reported in the original study, probably because the older devices were inaccurate. The calculations also allowed for gender differences (by taking into account the different percentages of body water in females and males). If anything, the calculations performed by Moskowitz and Robinson lead to an over-estimation of BAC level. If this is the case, the impairments they report at various BAC levels actually might occur at lower BACs than reported later in this review.

In the Moskowitz study, factors were grouped into behavioral categories pertinent to driving. The following categories were affected at 0.05 percent BAC.

- Reaction time
- Tracking
- Divided attention
- Information processing
- Visual functions
- Perception

Driving behaviors that showed impairment at 0.08 percent to as low as 0.03 percent included:

- Steering
- Gear changing
- Braking
- Speed judgment
- Speed control
- Distance judgment
- Lane tracking

In addition, tasks requiring divided attention showed impairment at BACs as low as 0.02 percent. These driver behaviors are listed in the table presented at the end of this section; the table provides a comprehensive inventory of all DWI cues identified during the current review.

Although the Moskowitz and Robinson review is the most extensive source of information available about driver impairment at various BAC levels, several other studies identify potential cues for DWI detection. In an Anacapa Sciences' study conducted for the Insurance Institute for Highway Safety, Casey and Stuster (1982) identified the following 12 risky driving behaviors of both automobile and motorcycle operators.

- Running stop sign or traffic light
- Unsafe passing due to oncoming traffic
- Unsafe turn in front of oncoming or opposing traffic
- Following too closely
- Unsafe lane change or unsafe merging
- Weaving through traffic
- Crossing a double line in order to pass
- Passing on the right
- Excessive speed for conditions
- Improper turn
- Splitting traffic
- Stunts

Similarly, Treat et al. (1980), in a study of risky driving actions and their involvement in traffic collisions, identified the following 13 Unsafe Driving Actions.

- Pulling out in front of traffic
- Following behavior
- Speeding: Absolute/Over limit
- Speeding: Relative/For traffic conditions
- Turning in front of oncoming traffic
- Running stop sign or light
- Changing lanes or merging in front of traffic
- Driving left of center or on centerline
- Passing unsafely
- Driving off road to right
- Backing unsafely
- Turning too wide or too sharp
- Turning from wrong lane

Several of these unsafe driving actions also have been identified as indicators of driving while impaired in the Harris et al (1980) study: *following too closely, fast speed* (deleted from the final version of the DWI Detection Guide), *failing to respond to traffic signals or signs,* and *driving into opposing or crossing traffic.*

Additionally, several studies suggest stopping method as a primary difference between DWI and unimpaired driving (Attwood et al., 1980; Bragg et al., 1981; Compton, 1985). Differences included *braking sooner* and *stopping jerkily* when under the influence of alcohol.

In a study developing and validating the sobriety field test battery, Tharp, Burns, and Moskowitz (1981) reported the reasons for stopping suspected alcohol impaired drivers. The most common reasons were traffic infractions (e.g., speeding, failing to stop) rather than non-infraction driving behaviors such as weaving or drifting. There is significant overlap between the behaviors reported by Tharp et al. (1981) and the DWI on-the-road detection cues identified by Harris et al. (1980).

In a study evaluating screening procedures for police officers at sobriety checkpoints, cues noticed by officers were correlated with the BAC levels of the drivers. Compton (1985) found significant differences in stopping behavior. In general, drivers stopped smoothly at low BAC levels (0-0.04) and "jerkily" at higher BAC levels (0.10-0.15). Drivers with a low BAC did not serve, those with higher BACs (greater than 0.10) did. Cues identified by Compton that related to driving and stopping behaviors, and personal appearance, are presented in the comprehensive table at the end of this review. The cues identified in the Compton study include personal appearance variables not previously identified in the 1980 Harris et al. study. These cues include:

- Odor of alcohol
- Face flushed
- Speech slurred
- Eyes dilated
- Demeanor
- Hair disheveled
- Poor dexterity
- Clothes disheveled

Of these personal appearance variables, *odor of alcohol, face flushed,* and *eyes dilated* appear to be the most promising for DWI detection at low BAC levels.

CONCLUSIONS

The objective of the current study is to develop an appropriate set of behaviors that can be used by field officers to accurately identify motorists who are driving while impaired at the 0.08 level, and to determine if cues are available that predict 0.04 and 0.02 BAC levels. No sources were identified that specifically identify behavioral cues for alcohol impairment at the lower levels. However, a table of potentially applicable behaviors has been prepared, based on a comprehensive review of the literature. This list, presented in the following table, includes all behaviors previously discussed in this review, and shows the considerable agreement among the studies. The behaviors identified here later will be combined with cues identified during interviews with DWI patrol experts, and from the archival research. The resulting comprehensive inventory of DWI cues then will be used to develop data collection forms for the first of the field studies.

A Colorado Validation Study

of the

Standardized Field Sobriety Test (SFST) Battery

Final Report Submitted to
Colorado Department of Transportation
November 1995

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HS 178 R2/06

I. Introduction

A battery of standardized field sobriety tests (SFSTs), which was developed under National Highway Traffic Safety (NHTSA) funding during the 1970's, is now used by police officers nationwide. Traffic officers in fifty states, who have been trained in standardized administration of the tests, routinely use them and incorporate their observations of drivers' test performance into their arrest or release decisions. Defense attorneys, however, often challenge the admissibility of court testimony about the test battery.

Roadside decisions are a critical components of alcohol-and-driving enforcement, and, therefore, of traffic safety. Because the SFSTs aid officers in the often-difficult task of identifying alcohol-impaired drivers, it is likely that the tests have contributed in some unknown measure to the significant decline in alcohol-related fatalities over the last decade. Given that they have exerted a positive impact on traffic safety, it is important to resolve questions about their validity and reliability, to maintain their credibility, and to preserve them as a roadside tool.

Because court arguments about SFSTs focus largely on the research conducted at the Southern California Research Institute (SCRI) and because that research is sometimes misrepresented or misunderstood, it is necessary first to clarify its purpose. Two large-scale laboratory experiments were conducted for the purpose of identifying and standardizing a "best" set of tests (Burns and Moskowitz, 1977; Tharp, burns and Moskowitz, 1981). Although it clearly is relevant at this point in time to inquire whether the methods of those experiments were scientifically sound, it should be recognized that the laboratory data are now only indirectly enlightening about current roadside use of the tests. In particular, note that controlled laboratory conditions are less variable and, therefore, may be less challenging than the highly varied conditions which officers routinely encounter in the field.

Also, officer experience with the SFSTs is key to the skill and confidence with which they use them as a basis for their decisions. Thus it is important to understand that the officers who participated in the SCRI studies had not been trained with the SFSTs until just prior to the experiments. They had not had opportunity and time to gain skill or to develop confidence in the tests. In contrast, many of the officers who now use and testify about the tests have been using them regularly for ten or more years, and it is reasonable to assume they have gained skill and to expect that their decisions based on the tests may be more accurate than those of the officers during the initial research.

The question to be addressed in 1995 by agencies, officers and the courts is, "How accurate are the arrest decisions which are made by experienced, skilled officers under roadside conditions when they rely on SFSTs?". A broadly applicable answer cannot be found in laboratory research. It requires field data; i.e., information about real-world arrest decisions by officers trained by NHTSA guidelines to administer the SFSTs.

The Colorado Department of Transportation funded a 1995 study to obtain such data. Through a grant to the Pitkin County Sheriff's Office and with the cooperative effort of seven Colorado law enforcement agencies, records were collected from drivers tested with the SFSTs at roadside. The seven agencies were:

    Aspen Police Department (APD)
    Basalt Police Department (BPD)
    Boulder County Sheriff's Office (BCSO)
    Colorado State Patrol (CSP)
    Lakewood Police Department (LPD)
    Pitkin County Sheriff's Office (PCSO)
    Snowmass Village Police Dept (SVPD)

With information drawn from impaired-driving records, a data base was created and analyzed at the Souther California Research Institute.

Technical Summary

In the State of Colorado, motor vehicle operators are subject to arrest if they are found to be driving with a blood alcohol concentration (BAC) of 0.05% or higher. At BACs of 0.05% or higher but less than 0.10%, they are charged with Driving While Ability Impaired (DWAI). At BACs of 0.10% and higher, the charge is Driving Under the Influence (DUI). These statutes reflect the evidence from both epidemiological and laboratory studies of alcohol impairment of driving skills.

It is the responsibility of law enforcement officers to detect and arrest alcohol-influenced drivers in accordance with these statutory limits. In an efforts to meet that objective, police officers, not only in Colorado but in all fifty of the United States, rely on a battery of standardized field sobriety tests (SFSTs). Observations of drivers' performance of the tests, together with driving pattern, appearance and manner, odor of alcohol, and other signs, underlie officers' arrest and release decisions.

To be genuinely useful, roadside tests must be valid and reliable; i.e., they must measure changes in performance associated with alcohol and they must do it consistently. To the extent that they meet the validity and reliability criteria, they can be expected to contribute to traffic safety by increasing the likelihood that alcohol-impaired drivers will be removed from the roadway by arrest. Importantly, they also will further serve the driving public's interest by decreasing the likelihood that a driver who is not alcohol-impaired will be mistakenly detained or arrested. Thus, the validity and reliability of the tests are important issues.

This study was undertaken specifically to extend study of the SFSTs from the laboratory setting to field use. The primary study question was, "How accurate are officers' arrest and release decisions when the SFSTs are used by trained and experienced officers?" Over a five-month period, officers from seven Colorado law enforcement agencies who volunteered for the study provided the records (N=305) from every administration of the SFSTs.

Using only the standardized 3-test battery (Walk-and-Turn, One-Leg Stand, Horizontal Gaze Nystagmus), officers seldom erred when they decided to arrest a driver.

Breath or blood specimens confirmed that 93% of the arrested drivers were above 0.05% BAC.

Officers were more likely to err on the side of releasing drivers than on the side of incorrectly arresting drivers. Given the difficulty of the task which confronts officers at roadside, in particular with alcohol-tolerant individuals, the finding that approximately one-third of the released drivers should have been arrested is not unexpected. However, it is important to note that officers' decisions to release *were correct* two-thirds of the time.

Overall, 86% of the officers' decisions to arrest or release drivers who provided blood or breath specimens were correct.

It is concluded that the SFSTs are valid tests; i.e., they serve as indices of the presence of alcohol at impairing levels. The study design did not support an examination of test-retest reliability. It should be noted, however, that the test battery appears to have served equally well across agencies and officers, strongly suggesting that it achieves acceptable reliability as well.

III. Study Design

This study was designed to:

(1) gather data to assign officers' decisions to the four cells of the decision matrix illustrated in Figure 1, and to

(2) examine the accuracy of the SFST battery when used in the widely varying weather conditions of Colorado winter, spring, and summer months.

Both the design and the execution of the study focused on the *integrity, completeness,* and *standardization* of the data.

It is important to note how the study population was defined and how the sample of subjects was drawn. Subjects were a subset of the population of drivers who were detained by police officers during the study period. They were drivers, both those arrested and those released, who were stopped by police officers during the study period *and who were requested to perform the SFSTs.* The officers' decisions about those drivers have been analyzed in terms of correct decisions (Correct Arrests and Correct Releases) and errors (Incorrect Arrests and Incorrect Releases).

In a broader context, the terms Correct Releases and Incorrect Releases could be extended to motorists who were stopped but who were not asked to perform the SFSTs. In many of those cases, the release decisions were correct, but it is likely that some of there were impaired drivers who were released without ever being asked to perform the SFSTs. Those individuals and those decisions are of interest and would be included in an assessment of overall proficiency in DUI detection and arrest. In fact, the entire population of impaired drivers, only some of whom are detected and stopped, is of interest in terms of traffic safety. In a validation study of SFSTs, however, the subjects were only those drivers who were asked to perform the tests.

VI. Summary and Discussion

In 1995, there is a sound base of scientific evidence to support the use of 0.10%, 0.08%, and 0.05% BACs as presumptive and per se alcohol limits for drivers. There also appears to be strong support for those statutes among citizens throughout broad (though not all) segments of society. A clear-cut shift of attitude over the past ten to fifteen years has resulted in anti-drunk driving sentiments by much of the driving population. In many social circles drinking-and-driving now is unacceptable behavior.

Why then, in a largely pro-alcohol enforcement climate, are there negative views of traffic officers' related activities? Citizens often seem to believe that enforcement is hit-or-miss and that officers regularly fail to remove many, if not most, alcohol-impaired drivers from the roadway. Some also seem to believe that the activities at roadside are arbitrary and calculated to harass. Although the multifaceted social and individual variables that underlie this paradox of concurrent anti-enforcement sentiment and anti-drunk driving sentiment are beyond the scope of this report, it is germane to consider one set of factors. At least part of this view of alcohol enforcement is attributable to a general failure to recognize the importance of traffic officers' duties, and to understand not only what their duties encompass but also the difficulty of their task.

Legislators, regulatory agencies, activities groups, and safety-conscious citizens alike sometimes appear to overlook the fact that traffic officers are pivotal in the deterrence of drunk driving. Unless officers are able to detect and arrest impaired drivers, those drivers will never enter the system of sanctions and, therefore, the existence of enabling statutes and anti-drunk driving sentiment will be largely irrelevant to them. Unfortunately, it is also true that the escape of detection and arrest on multiple occasions serves to reinforce the risky behavior. In effect, if no accident and no arrest occur on one or more occasions of drinking and driving, the citizen may conclude that driving after drinking is acceptable behavior on other occasions.

For a number of reasons, the difficulties associated with traffic officers' alcohol-enforcement responsibilities typically are underestimated. One reason is the misnomer "drunk driving," which suggests that their duty is to apprehend "drunks" or obviously-intoxicated individuals. If that were indeed the sole definition of alcohol enforcement duties, the task would be fairly straightforward. In reality, the risks associated with drinking and driving are not limited to obviously-intoxicated drivers, nor are officers' enforcement responsibilities restricted to those drivers.

Traffic officers are responsible for removing alcohol-impaired drivers from the roadway, and the Colorado statute sets the criterion alcohol levels at 0.10% and 0.05% BAC. In other jurisdictions the BAC limit is 0.08%, with additional lower levels for lesser charges and specific driver groups. Enforcement problems arise in part from the fact that although the evidence clearly establishes that driving skills are impaired at 0.10% BAC and lower, many, possibly even most, individuals who are willing to drive after drinking are not obviously intoxicated at those levels.

Leaving aside the problem of detecting alcohol impairment by the observation of driving behaviors, consider officers' task once they stop vehicles and contact drivers at roadside. Working under widely-varying conditions without special measurement apparatus, they must decide within a few minutes whether a specific driver is impaired by alcohol. Impaired drivers may or may not display atypical speech, appearance, or other personal characteristics, but in either circumstance the officers have no knowledge of any given driver's sober appearance and behavior. The task is further complicated by the tolerant drinker's normal appearance even at very high BACs.

Are there signs and symptoms which are reliably associated with 0.05% and 0.10%? With what level of confidence can the officer arrest or release a driver? With a decision criterion that minimizes incorrect arrests, the risk of releasing impaired drivers rises. On the other hand, a very strict decision criterion will decrease the number of impaired drivers who are released but at the risk of unnecessarily detaining non-impaired drivers. Is one risk preferable to the other? These questions define the context of traffic officers' alcohol enforcement activities and the background of the Colorado Validation Study of the SFSTs.

The records collected and analyzed during this study provide evidence that the SFSTs, as used at roadside by trained and experienced law enforcement officers, are valid indices of the presence of alcohol.

Records of all driver contacts, which resulted in administration of the SFSTs during the study period, were entered into the analysis. Overall, for 234 cases confirmed by breath or blood tests, officers' decisions to arrest and release were 86% correct, and 93% of their arrest decisions were correct.

It was not unexpected to find that officers were almost twice as likely to release incorrectly as to arrest incorrectly. Nonetheless, only 36% of the released drivers were at or above the statutory limit.

These findings obtained in the field with officers experienced with the use of SFSTs can be compared with findings from a laboratory setting with officers recently trained with the SFSTs. It should be kept in mind that the current data are not fully comparable to data from laboratory experiments, since there are differences other than time-since-training and laboratory vs. field. With that caution, the comparisons are instructive.

In an initial study of field sobriety tests with 238 laboratory subjects, officers' decisions overall were 76% correct (Burns and Moskowitz, 1977). Only 54% of their arrest decisions were correct, and only 8% of their release decisions were incorrect. In a second laboratory study, officers' decisions overall were 81% correct, their arrest decisions were 68% correct, and 14% of their release decisions were wrong (Tharp, Burns and Moskowitz, 1981). It is apparent that the arrest criterion was lower in the laboratory. The penalties for mistakes in a laboratory setting are, of course, fairly trivial compared to a real-world setting. The lower criterion, together with lack of experience with the tests, accounts for higher rates of incorrect arrests and lower rates of incorrect releases than found in this study. It is not surprising to find that officers in the field require more certainty about arresting a citizen and adopt a higher criterion with the result that they err in the direction of incorrect releases.

In summary, the data provide clear-cut findings about the use of SFSTs by officers in six Colorado communities. On a broader scale, they provide partial and tentative answers to some important questions. It is hoped that current data from a field setting will facilitate court proceedings with drivers arrested on DUI and DWAI charges. It is hoped, too, that the content of this report will add to the driving public's understanding of roadside enforcement activities, as well as to recognition of police officers' critical role in traffic safety.

A FLORIDA VALIDATION STUDY OF THE STANDARDIZED FIELD SOBRIETY TEST (S.F.S.T.) BATTERY

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HS 178 R2/06

I.   INTRODUCTION

During the years 1975-1981, a battery of field sobriety tests was developed under funding by the National Highway Traffic Safety Administration (NHTSA), U.S. Department of Transportation (Burns and Moskowitz, 1977; Tharp, Burns, and Moskowitz, 1981). The tests include Walk-and-Turn (WAT), One-Leg Stand (OLS), and Horizontal Gaze Nystagmus (HGN). NHTSA subsequently developed a training curriculum for the three-test battery, and initiated training programs nationwide. Traffic officers in all 50 states now have been trained to administer the Standardized Field Sobriety Tests (SFSTs) to individuals suspected of impaired driving and to score their performance of the tests.

At the time the SFSTs were developed, the statutory blood alcohol concentration (BAC) for driving was 0.10% throughout the United States. The limit now has been lowered in a number of states to 0.08% for the general driving population. "Zero tolerance" is in effect in some jurisdictions for drivers under age 21, and commercial drivers risk losing their licenses at a BAC of 0.04%. It is likely that additional states will enact stricter statutory limits for driving. In light of these changes, a re-examination of the battery was undertaken by McKnight et al. (1995). They reported that the test battery is valid for detection of low BACs and that no other measures or observations offer greater validity for BACs of 0.08% and higher.

The three tests have been incorporated into Drug Influence Evaluations (DIEs) which are conducted by certified Drug Recognition Experts (DREs) whenever an individual is suspected of being drug-impaired. As part of a DRE evaluation, the SFSTs provide important evidence of drug impairment and contribute to the DRE's three-part opinion:

- Is the individual impaired by a drug or drugs?
- If yes, is the impairment drug-related?
- If yes, what category or categories of drug account for the impairment?

A study was conducted in Colorado to examine the validity of the SFSTs when used by experienced officers in the field (Burns and Anderson, 1995). The design of the study insured that roadside testing was limited to the three-test battery, and that officers' decisions were not influenced either by the driver's performance of other behavioral tests or by measurement of BAC with a preliminary breath tester (PBT). The obtained data demonstrated that more than 90% of the officers' decisions to arrest drivers were confirmed by analysis of breath and blood specimens.

A recently-reported NHTSA-funded study was conducted by Anacapa Sciences, Inc. in collaboration with the San Diego Police Department to examine the validity of the SFSTs for both 0.08% and 0.04% (Stuster and Burns, 1997). Officers' estimates of whether a driver's BAC was above or below 0.08% or 0.04% were found to be more than 90% correct.

The Colorado and California studies provide relevant and current field data. The validity of the tests when they are administered in the context of drug evaluations was examined in a retrospective analysis of the records of the Phoenix DRE Unit (Adler and Burns, 1994). It was found that a suspect's performance of the tests provides valid clues of drug impairment.

The study reported here was conducted in collaboration with the Pinellas County Sheriff's Office (PCSO) and expands the examination of the SFSTs to the State of Florida. An overview of PCSO and the demographics for Pinellas County can be found in Appendix I.

II.   STUDY BACKGROUND AND RATIONALE

During the early years of SFST use by law enforcement, legal challenges were relatively infrequent. For more than a decade now, however, defense counsel in many jurisdictions has sought to prevent the admission of testimony about a defendant's performance of the three tests. The objections, which continue to be persistent and vigorous in 1997, typically focus on test validity and reliability as demonstrated in the original laboratory research. It is entirely appropriate to inquire whether that early research to identify a best set of sobriety tests was conducted with scientific rigor. Beyond that inquiry, however, the data, which were obtained in a laboratory setting and now are more than twenty years old, are of little interest. Certainly, they are only marginally relevant to current roadside use of the tests. The questions which begs to be addressed in 1997 is whether the tests are valid and reliable indices of the presence of alcohol when they are used at roadside under present day traffic and law enforcement conditions.

Experience and confidence have a direct bearing on an officer's skill with roadside tests. In this regard, note that the officers who participated in the early SCRI studies had been only recently and briefly (4 hrs) trained to administer the test battery. There had been no time for them to use the tests in the field where they might have developed confidence in decisions based on them. Nonetheless, their decisions were 76% correct in the first study and 81% correct in the second study.

At this point in time, many traffic officers have had ten or more years' experience with the test battery and many report that they confidently rely on them. Since it seems unlikely in the extreme that they would continue to rely on tests which repeatedly lead to decision errors, it is a reasonable assumption that more often than not their roadside decisions *to arrest* are supported by measured BACs. Whether their decisions *to release* are correct is largely unknown since the released driver's BAC generally is not measured.

Traffic officers are charged with the detection and arrest of impaired drivers. Although their roadside duties are central to roadway safety, recognition of alcohol-impaired drivers can be difficult and is, therefore, subject to error. If officers are to effectively meet this particular enforcement responsibility, they need to augment their general observations of suspects with sensitive, accurate sobriety tests. The tests not only aid in the removal of dangerously impaired drivers from the roadway, they also protect the driver who is not alcohol or drug impaired from being improperly detained. Thus, rigorous examinations of the SFSTs are important to traffic safety.

V. RESULTS

The first record in the data base is for an arrest which occurred on June 1, 1997, and the last record is dated September 4, 1997. During the study period, 379 records were submitted for the study. Figure 3 graphs the total number of records by month. As expected, the initial activities generated enthusiasm among participants, and the largest number of citizen contacts occurred during the first project month. Although available time of participating officers was affected during July and August by scheduled training days and vacations, and although it typically is difficult to sustain the initial high interest level, the actual decline in arrests over the extended project period was not large. The final month is not comparable, since data collection extended only a few days into September.

FIGURE 3
SFST Records by Month
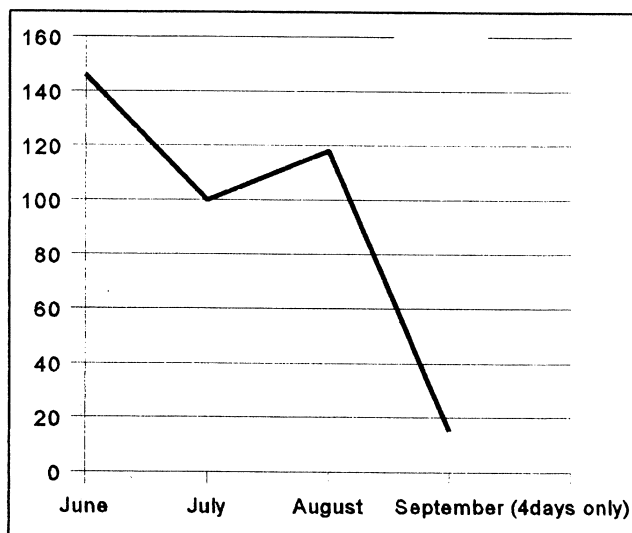
A.   Total Sample and Measured BACs

Table 3 summarizes the disposition of 379 records obtained during this study. As can be seen in the table and in Figure 4, the BACs of 256 drivers were measured. Thus, BACs are available for 81.8% of the 313 cases entered into an analysis of officers' decisions. Evidential testing at the booking facility accounts for 210 of the BACs. Forty-six were obtained with a Preliminary Breath Testing (PBT) device. A log of all cases appears in Appendix IV.

VI.   SUMMARY AND DISCUSSION

Legislators have lowered the limits for alcohol levels in drivers from 0.15%, which was the very early standard, to 0.10% or 0.08%. The lower statutory limits are soundly based in data from scientific experiments and form epidemiology and are an important step toward safer roadways. Whether their *full* potential for reducing alcohol-involved crashes can be reached, however, depends on effective enforcement. Failure to enforce a statute, whatever the reason for the failure, weakens that statute and may actually render it counterproductive to some degree.

Traffic officers are the first link in the series of events that brings a DUI driver into the criminal justice system. Unless officers are able to detect and arrest impaired drivers, those drivers will not experience the sanctions which are intended to deter impaired driving. Although there are many aspects to effective DUI enforcement, certainly it is crucial for officers to be proficient in assessing the alcohol impairment of drivers they detain at roadside.

As an aid to their roadside decisions, officers rely upon a battery of tests, the SFSTs, to augment their general observations of a driver. At this point in time, no other tests have been shown to better discriminate between impaired and unimpaired drivers. Nonetheless, the battery, and in particular Horizontal Gaze Nystagmus, frequently is attached vigorously during court proceedings. Thus, the examination of officers' decisions, based on the SFSTs, is of considerable interest.

If it can be shown that officers' reliance on the tests is misplaced, causing them frequently to err, then the officers, the courts, and the driving public need to be aware that the tests are not valid and that DUI laws are not bing properly enforced. If, on the other hand, it can be shown that officer typically make correct decisions, based on the SFSTs, perhaps the legal controversy that has centered on them for more than a decade can be diffused and court time can be devoted to more substantive issues.

The data obtained during this study demonstrate that 95% of the officers' decisions to arrest drivers were correct decisions. Furthermore, 82% of their decisions to release drivers were correct. It is concluded that the SFSTs not only aid police officers in meeting their responsibility to remove alcohol-impaired drivers from the roadway, they also protect the rights of the unimpaired driver. These data validate the SFSTs as used in the State of Florida by Pinellas County Sheriff's deputies who have been trained under NHTSA guidelines. SFST validity now has been demonstrated in Florida, California (1997) and Colorado (1995). There appears to be little basis for continuing legal challenge.

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VALIDATION OF THE STANDARDIZED FIELD SOBRIETY TEST BATTERY AT BACS BELOW 0.10 PERCENT

FINAL REPORT

Submitted to:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

Jack Stuster
Marcelline Burns

August 1998

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16. Abstract

This study evaluated the accuracy of the Standardized Field Sobriety Test (SFST) Battery to assist officers in making arrest decisions for DWI at blood alcohol concentrations (BACs) below 0.10 percent. NHTSA's SFST battery was validated at 0.10 percent BAC in 1981. The trend to reduce statutory DWI limits to 0.08 percent BAC prompted this research project.

The research was composed of several project tasks, including planning, site-selection, training, data entry, and data analysis, in addition to the actual conduct of a major field study. The City of San Diego, California, was selected as the site. Seven officers of the San Diego Police Department's alcohol enforcement unit were trained in the administration and modified scoring of NHTSA's SFST battery (i.e., Horizontal Gaze Nystagmus-HGN, Walk and Turn, and One Leg Stand). SFST scoring was adjusted: the observation of four HGN clues indicated a BAC 0.08 percent (rather than four clues indicating a BAC 0.10 percent), and the observation of two HGN clues indicated a BAC 0.04 percent. During routine patrols, the participating officers followed study procedures in administering SFSTs and completing a data collection form for each test administered. The officers' final step in each case was the administration of an evidentiary breath alcohol test.

Data analysis found the SFSTs to be extremely accurate in discriminating between BACs above and below 0.08 percent. The mean estimated and measured BACs of the 297 motorists tested were 0.117 and 0.122, respectively; the difference between the means (0.005 percent BAC) is very small and operationally irrelevant. Further, analyses found the HGN test to be the most predictive of the three components of the SFST battery (r=0.65), however a higher correlation was obtained when the results of all three tests were combined (r=0.69).

Decision analyses found that officers' estimates of whether a motorist's BAC was above or below 0.08 or 0.04 percent were extremely accurate. Estimates at the 0.08 level were accurate in 91 percent of the cases, or as high as 94 percent if explanations for some of the false positives are accepted. Officers' estimates of whether a motorist's BAC was above 0.04 percent but lower than 0.08 percent were accurate in 94 percent of the decisions to arrest and in 80 percent of cases overall. Also, the officers and prosecutors who were interviewed about the SFSTs found the test battery to be acceptable for field use to establish probable cause for DWI arrest.

The results of this study provide clear evidence of the validity of the Standardized Field Sobriety Test Battery to discriminate at 0.08 percent BAC, using a slightly modified scoring procedure. Further, study results strongly suggest that the SFSTs also accurately discriminate at 0.04 percent BAC.

17. Key Words DWI, DUI, detection, field sobriety, performance tests, alcohol, law enforcement, highway safety		18. Distribution Statement	
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EXECUTIVE SUMMARY

This report documents the research activities and presents the results of a study conducted for the National Highway Traffic Safety Administration (NHTSA) to evaluate the accuracy of the Standardized Field Sobriety Test (SFST) Battery to assist officers in making arrest decisions and to discriminate blood alcohol concentrations (BACs) below 0.10 percent. NHTSA's SFST battery was validated at 0.10 percent BAC in 1981. The trend to reduce statutory DWI limits to 0.08 percent BAC prompted this research project.

DESCRIPTION OF THE RESEARCH

The research was composed of several project tasks, including planning, site-selection, training, data entry, and data analysis, in addition to the actual conduct of a major field study. The City of San Diego, California, was selected as the site of the field study. Seven officers of the San Diego Police Department's alcohol enforcement unit were trained in the administration and modified scoring of NHTSA's SFST battery (i.e., Horizontal Gaze Nystagmus, Walk and Turn, and One Leg Stand). SFST scoring was changed slightly: the observation of four horizontal gaze nystagmus (HGN) clues indicated a BAC $\geq$ 0.08 percent (rather than four clues indicating a BAC $\geq$ 0.10 percent), and the observation of two HGN clues indicated a BAC $\geq$ 0.04 percent. During routine patrols, the participating officers followed study procedures in administering SFSTs and completing a data collection form for each test administered during the study period. The officers' final step in each case was the administration of an evidentiary breath alcohol test.

RESULTS

The participating officers completed a total of 298 data collection forms; only one case was eliminated from analysis because the motorist refused all forms of BAC testing. Data analysis found the SFSTs to be extremely accurate in discriminating between BACs above and below 0.08 percent. The mean estimated and measured BACs of the 297 motorists tested were 0.117 and 0.122, respectively; the difference between the means (0.005 percent BAC) is very small and operationally irrelevant. Further, analyses found the HGN test to be the most predictive of the three components of the SFST battery ($r=0.65$), however a higher correlation was obtained when the results of all three tests were combined ($r=0.69$).

The results of decision analyses provide clear indication of SFST accuracy. Decision analyses found that officers' estimates of whether a motorist's BAC was above or below 0.08 or 0.04 percent were extremely accurate. Estimates at the 0.08 level were accurate in 91 percent of the cases, or as high as 94 percent if explanations for some of the false positives are accepted. Officers' estimates of whether a motorist's BAC was above 0.04 but under 0.08 were accurate in 94 percent of the decisions to arrest and in 80 percent of the relevant cases, overall.

Finally, the officers and prosecutors who were interviewed about the SFSTs found the test battery to be fully acceptable for field use to establish probable cause for DWI arrest.

IMPLICATIONS

The results of this study provide clear evidence of the validity of the Standardized Field Sobriety Test Battery to discriminate above or below 0.08 percent BAC, using a slightly modified scoring procedure. Further, study results strongly suggest that the SFSTs also accurately discriminate above or below 0.04 percent BAC.

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INTRODUCTION

Beginning in 1975, the National Highway Traffic Safety Administration (NHTSA) sponsored research that led to the development of standardized methods for police officers to use when evaluating motorists who are suspected of Driving While Impaired (DWI).[1] Beginning in 1981, law enforcement officers have used NHTSA's Standardized Field Sobriety Test (SFST) battery to help determine whether motorists who are suspected of DWI have blood alcohol concentrations (BACs) greater than 0.10 percent. Since that time, many states have implemented laws that define DWI at BACs *below* 0.10. This report presents the results of research performed to systematically evaluate the accuracy of NHTSA's SFST battery to discriminate above or below 0.08 percent and above or below 0.04 percent blood alcohol concentration.

The report is presented in four sections. This brief Introduction presents the objectives of the research, provides a summary of the relevant traffic safety issues, and discusses the historical context of the study. The second section of the report describes the research tasks that were performed. The third section presents the results of the study. The final section of the report discusses the implications of the study results.

BACKGROUND

Nearly 1.4 million people have died in traffic crashes in the United States since 1966, the year of the National Traffic and Motor Vehicle Safety Act (which led to the creation of NHTSA in 1970). During the late 1960s and early 1970s more than 50,000 people lost their lives each year on our nation's public roads; more than half of the motorists killed had been drinking. Traffic safety has improved considerably since that time: the annual death toll has declined to about 40,000, even though the numbers of drivers, vehicles, and miles driven all have greatly increased. The dramatic improvements in traffic safety are reflected in the change in fatality rate per 100 million vehicle miles traveled: The fatality rate fell from 5.5 in 1966 to 1.7 in 1996 (FARS--Fatal Analysis Reporting System--96), a 69 percent improvement. Figure 1 illustrates this important trend. When miles traveled are considered, the likelihood of being killed in traffic in 1966 was more than three times what it is today.

Despite the significant improvements in traffic safety during the past 17 years, an average of more than 115 people still die each day from motor vehicle crashes in the United States. It is estimated that 41 percent of the drivers who die in crashes have been drinking.

_____
[1] Various terms are used throughout the United States for offenses involving drinking and driving. In this report, Driving While Impaired (DWI) is used to refer to all occurrences of driving at or above the legal blood alcohol concentratiion (BAC) limit of a jurisdiction.

An emphasis on DWI enforcement since 1980 has been a factor in the significant improvement in traffic safety, as represented by declining fatal and alcohol-involved crash rates. NHTSA-sponsored research contributed substantially to the improved condition, in part, by providing patrol officers with useful and scientifically valid information and training materials concerning the behaviors that are most predictive of impairment. In particular, NHTSA sponsored research that led to the development of a DWI detection guide that listed 20 driving cues and the probabilities that a driver exhibiting a cue would have a BAC of at least 0.10 percent (Harris et al., 1980; Harris, 1980). A similar study was conducted recently that identified 24 driving cues that are predictive of DWI at the 0.08 level (Stuster, 1997). NHTSA also sponsored research that led to the development of a motorcycle DWI detection guide (Stuster, 1993). NHTSA's DWI training materials, based on the results of these studies, have exposed the current generation of law enforcement officers in the U.S. to information critical to DWI enforcement by providing a systematic, scientifically valid, and defensible approach to on-the-road DWI detection.
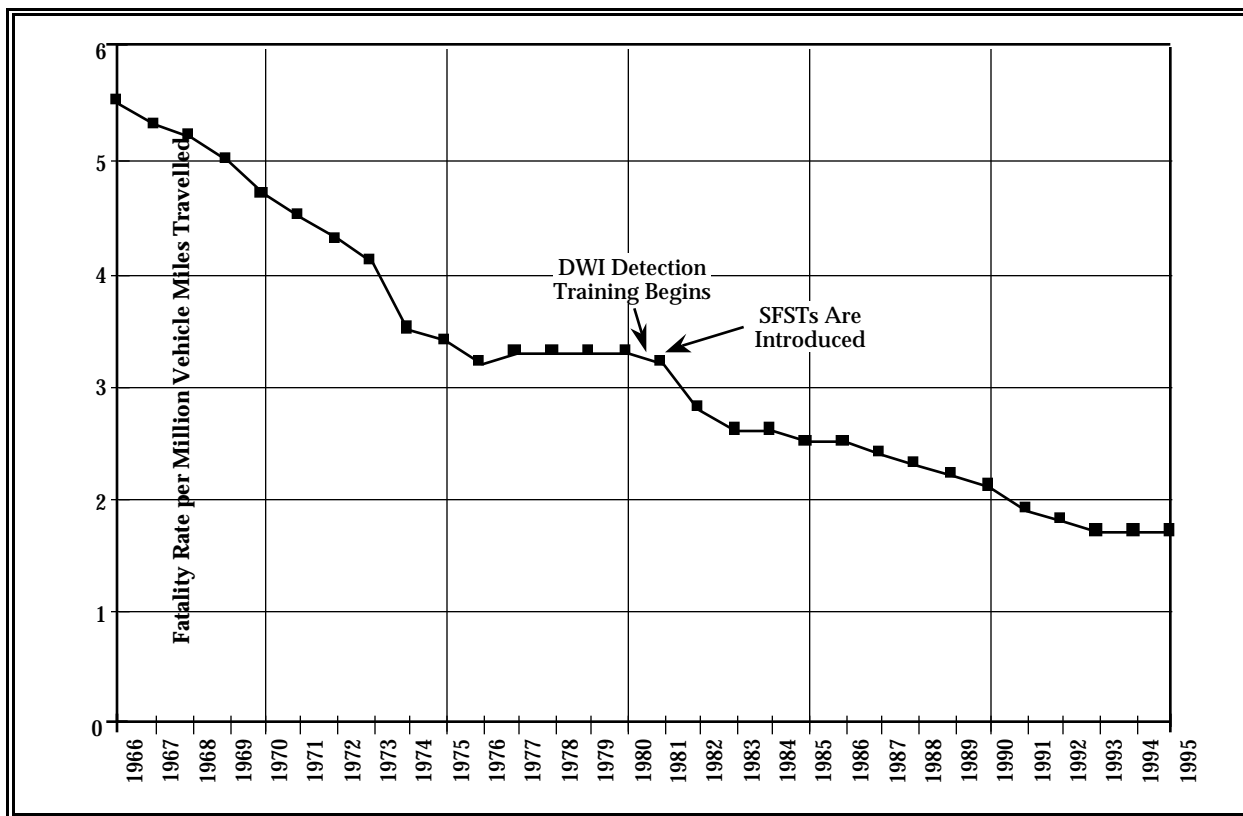

Figure 1. Fatality rates per million miles traveled in the U.S.

At the same time NHTSA was providing patrol officers with information concerning the driving behaviors that are the most predictive of impairment, the agency also sponsored research that led to the development of a standardized battery

of tests for officers to administer to assess driver impairment after an enforcement stop has been made. Drs. Marcelline Burns and Herbert Moskowitz conducted laboratory evaluations of several of the tests that were most frequently-used by law enforcement officers at the time (Burns and Moskowitz, 1977). In addition to a variety of customary roadside tests (e.g., finger-to-nose, maze tracing, backward counting), the researchers evaluated measures of an autonomic reaction to central nervous system depressants, known as horizontal gaze nystagmus. Horizontal gaze nystagmus (HGN) is an involuntary jerking of the eye that occurs naturally as the eyes gaze to the side. Aschan (1958) described studies that linked various forms of nystagmus to BAC, and Wilkinson, Kime, and Purnell (1974) reported consistent changes in horizontal gaze nystagmus with increasing doses of alcohol. At the time Burns and Moskowitz were conducting their seminal research for NHTSA, horizontal gaze nystagmus recently had been found to reliably predict BACs in a study conducted in Finland (Pentilla, Tenhu, and Kataja, 1974). Further, Lehti (1976) had just calculated a strong correlation between BAC and the onset of nystagmus.

All of the field sobriety tests evaluated by Burns and Moskowitz were found to be sensitive to BAC in varying degrees, at least under laboratory conditions. In addition, all of the tests showed a consistent increase in correlations with increasing BACs. Statistical analyses found the horizontal gaze nystagmus test to be the most predictive of the individual measures. However, the combined scores of three of the tests (One-Leg Stand, Walk-and-Turn, and Horizontal Gaze Nystagmus) provided a slightly higher correlation than the horizontal gaze nystagmus test by itself. The combined score correctly discriminated between BACs below or above 0.10 in 83 percent of the subjects tested in the original study (Burns and Moskowitz, 1977).

NHTSA immediately sponsored a subsequent study to standardize the test administration and scoring procedures and conduct further laboratory and field evaluations of the new battery of three tests. The researchers found that police officers tended to increase their arrest rates and were more effective in estimating the BACs of stopped drivers after they had been trained in the administration and scoring of the Standardized Field Sobriety Test battery. The results of this important study were documented in meticulous detail in the technical report, *Development and Field Test of Psychophysical Tests for DWI Arrest* (Tharp, Burns, and Moskowitz, 1981). That report has been cited throughout the U.S. to establish the scientific validity of the SFST battery and to support officers' testimony in court. NHTSA's SFST battery is described in Appendix A.

During the past 16 years, NHTSA's SFSTs largely have replaced the unvalidated performance tests of unknown merit that once were the patrol officer's only tools in helping to make post-stop DWI arrest decisions. Regional and local preferences for other performance tests still exist, even though some of the tests have not been validated. Despite regional differences in what tests are used to assist officers in making DWI arrest decisions, NHTSA's SFSTs presently are used in all 50 states. NHTSA's SFSTs have become the standard pre-arrest procedures for evaluating DWI in most law enforcement agencies.

The horizontal gaze nystagmus (HGN) test is considered by many law enforcement officers to be a foolproof technique (sometimes called a "silver bullet") that provides indisputable evidence of alcohol in a motorist's system. The normal variation in human physical and cognitive capabilities, and the effects of alcohol tolerance, result in uncertainties when arrest decisions are made exclusively on the basis of performance tests. These uncertainties have resulted in large proportions of DWI suspects being released rather than detained and transported to another location for evidentiary chemical testing. This is important because experienced drinkers often can perform physical and cognitive tests acceptably, with a BAC greater than 0.10 percent. However, most experienced drinkers cannot conceal the physiological effects of alcohol from an officer skilled in HGN administration. This is because horizontal gaze nystagmus is an involuntary reaction over which an individual has absolutely no control.

THE RESEARCH

This section provides a detailed description of all tasks performed during the field validation of the Standardized Field Sobriety Test Battery for use at 0.08 percent BAC. The technical approach to the research involved the performance of six major project tasks, as summarized in Figure 2 and described in the following pages.
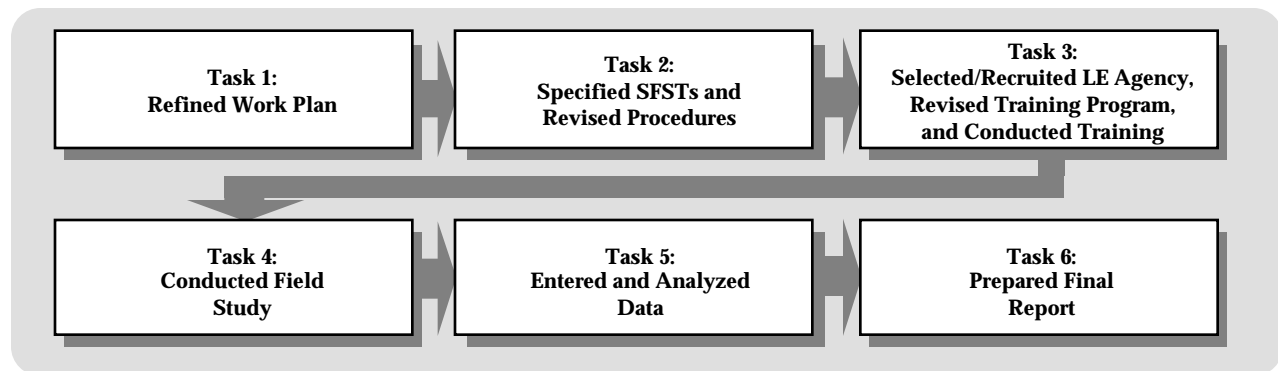
Task 1: Refined Work Plan	Task 2: Specified SFSTs and Revised Procedures	Task 3: Selected/Recruited LE Agency, Revised Training Program, and Conducted Training
Task 4: Conducted Field Study	Task 5: Entered and Analyzed Data	Task 6: Prepared Final Report

Figure 2. Sequence of major project tasks.

TASK 1: REFINED WORK PLAN

The objectives of the first project task were to meet with the Contracting Officer's Technical Representative (COTR) and other NHTSA SFST experts to discuss the project and to refine the proposed Work Plan based on those discussions. The project kick-off meeting was held at NHTSA headquarters on 24 October 1995. Substantive discussions with NHTSA personnel during and following the meeting contributed to the development of the technical approach described here.

TASK 2: SPECIFIED SFSTS AND REVISED PROCEDURES

Based on the widespread use and acceptance of NHTSA's Standardized Field Sobriety Test (SFST) Battery, validated at 0.10 percent BAC, NHTSA sponsored the current study to evaluate the SFSTs at lower BACs. The only modifications to be made to the SFSTs would be: 1) for officers to use the exhibition of four clues as an indication of BACs at the 0.08 level or greater (as officers presently are trained to use four clues as an indicator of BACs at 0.10 percent or greater), and 2) for officers to use the exhibition of two HGN clues as an indication of BACs greater than zero, but *below* 0.08 percent.

TASK 3: SELECTED AND RECRUITED LAW ENFORCEMENT AGENCY AND CONDUCTED TRAINING

This project task was composed of four subtasks, as described in the following paragraphs.

SUBTASK 3.1: IDENTIFIED SITE SELECTION CRITERIA

The site-selection criteria were:

- Candidate sites must employ lower legal BAC levels (0.08 for adults and zero tolerance for youth under 21 years).

- Candidate sites must generate a sufficient number of traffic enforcement stops and DWI arrests for accurate assessment of the tests' reliability and validity.

- Participating officers must have received NHTSA-approved SFST training from a certified instructor, possess at least one year of field experience administering SFSTs, and receive refresher training from project staff.

- Managers and officers of the participating law enforcement agency must agree to abide by the research procedures for the duration of the field study. For example, officers may use only the SFST Battery (and no other tests) together with their observations of the driver's general appearance and speech to make their arrest decisions; and, all test administrations must be recorded and submitted. Only agencies that could assure an extremely high level of cooperation and commitment would be recommended for participation.

- The site must have the capability of generating cases that represent the full range of alcohol experience. For example, a city with a disproportionate number of younger drivers might be more appropriate to ensure samples of sufficient size for the younger age categories.

SUBTASK 3.2: IDENTIFIED CANDIDATE SITES AND APPLIED SELECTION CRITERIA

Several factors constrained the site-selection process and limited the possible candidates for participation in this study. First, at the time the project was conducted, California, Oregon, and Utah were the only states that met both of the BAC-related site-selection criteria, namely a 0.08 BAC limit for DWI and a zero tolerance law for drivers under 21 years of age. Second, it was important to restrict the data collection period, to the extent possible, because it was believed that an extremely long data collection period might result in officers deviating from the study procedures. Strict adherence to study procedures was considered essential to ensuring the internal validity of the study.

The site-selection strategy adopted was to recruit a police department that serves one large city--a city large enough to generate a sufficient number of SFST administrations for statistical analysis by itself. A large city also was likely to have a traffic division with a dedicated DWI unit composed of trained experts. Focusing on traffic enforcement specialists would permit us to restrict participation in the study to officers who already had received NHTSA-approved SFST training and had additional field experience administering the test battery. Prior training in SFST administration was an important site-selection and methodological issue.

In the study that validated the SFST battery in 1981, all officers of an agency could participate, following training provided by the researchers. The procedure followed during the original study was appropriate then because no other officers (anywhere) had yet to receive the training. However, that procedure could not be followed in the current study because thousands of officers have received SFST

training since 1981. Only trained and experienced test administrators could be permitted to participate in the *current* study to avoid confounding study results with the effects of substantially different officer skill and experience levels in SFST administration and scoring. Officers who are formally trained and experienced in SFST administration tend to be concentrated in traffic enforcement and special DWI units.

This site-selection strategy was judged to provide the best approach to achieve the objectives of the current study, and the City of San Diego, California, was identified as the leading candidate community when the site-selection criteria were applied. The San Diego Police Department serves a resident population of more than one million, with a much larger service population attributable to tourism and several local military installations. The manner in which the San Diego Police Department satisfied the site-selection criteria is outlined below.

Number of SFST Administrations
The San Diego Police Department maintains a traffic division composed of 50 officers, including ten officers and a sergeant who form the alcohol enforcement unit. The alcohol enforcement unit deploys four or five officers on each night, Wednesday through Sunday. The time necessary to complete the associated paperwork usually limits each officer to a maximum of two DWI arrests each night. This results in about 130 arrests by officers of the special unit during a four week period. The other members of the traffic division, combined, make an additional 130 DWI arrests each month. San Diego Police Department officers do not hesitate to arrest drivers for BACs below 0.08 percent if they exhibit any evidence of impairment, even though low-BAC arrests usually are not prosecuted by the local district attorney.

Demographic Considerations
The Work Plan discussed the importance of selecting a site that offers cases for analysis that represent the full range of driver ages and BACs of interest. It was believed that a younger, rather than an older, driver population would result in more cases of zero tolerance violations and more SFST administrations overall. In this regard, San Diego and the surrounding area is home to four major US Navy bases and both the Navy and Marine Corps training centers. The area also is home to three major universities and several smaller colleges and technical schools.

Willingness to Participate
Naturally, formal approval by senior managers is required before any law enforcement agency can participate in a traffic safety study. Further, a manager's personal interest in a study that results in command emphasis concerning participation greatly contributes to the success of a project because of the quasi-military organizational structure of law enforcement agencies. That is, if managers believe participation to be of value to an agency they will direct their officers to follow the study procedures. In this regard, the commanding officer and other senior managers of the San Diego Police Department expressed their considerable interest in the study and directed their personnel to cooperate with the study team.

Command emphasis is an important component to ensure adherence to study procedures, but it is not sufficient; the participating officers also must be committed to the study. The willingness of a law enforcement agency to participate in a traffic safety study also can be measured, although subjectively, by the attitudes of field officers when discussing the general and specific issues involved in the study. The officers of the San Diego Police Department with whom we spoke about the field validation expressed genuine interest in the study and eagerness to be selected for participation.

Finally, the requirement for an agency to modify its established procedures to accommodate special study procedures usually is somewhat negotiable in a traffic safety study, but deviations from established study procedures were not negotiable in this field validation. It was explained that police managers and all participating officers must agree to abide by the study procedures to ensure the internal validity of study results. This was an area for concern to the project team because the San Diego Police Department's established DWI procedures included administering three field sobriety tests in addition to the three NHTSA SFSTs. A firm study requirement was that no other tests be administered to subjects because they might influence an officer's BAC estimates; that is, all officer-estimates of BAC must be based *exclusively* on results of the NHTSA SFST battery using the slightly modified scoring system. In this regard, San Diego police managers inquired with their district attorney and DWI supervisors, those who might object to the restriction, and found no opposition. In fact, it was mentioned that restricting sobriety testing to the three SFSTs would help streamline the procedures for everyone.

Prior SFST Training

All members of the San Diego Police Department's special alcohol-enforcement unit previously had received SFST training that was administered according to NHTSA-approved procedures and curriculum by certified DWI instructors. Although approximately half of the other members of the Traffic Division also had received SFST training, it was determined that the alcohol-enforcement unit would generate a sufficient number of SFST administrations for statistical analysis. All of the participating officers would receive a four-hour refresher training course prior to beginning the field study.

SUBTASK 3.3: RECRUITED LAW ENFORCEMENT AGENCY TO PARTICIPATE IN THE STUDY

NHTSA reviewed the site recommendations and approved San Diego as the site for the field study. Further discussions were held with managers and officers of the San Diego Police Department and a Memorandum of Agreement was signed that specified all study procedures and requirements.

SUBTASK 3.4: DEVELOPED SFST TRAINING PROGRAM

The experimental requirement that all participating officers be both trained and experienced in SFST administration eliminated the need to develop a special training program for this study. It was considered essential that the existing, NHTSA-approved SFST training program remain the training standard for the field evaluation. Because all participating officers already had received NHTSA-approved

SFST training, only a refresher program would be required. A four-hour refresher-training program was developed, based on the (October 1995) NHTSA curriculum. The purposes of the refresher training were to instruct the officers concerning the modified scoring system and obtain confirmation that all participants were administering and scoring the SFST battery correctly before beginning the field study.

TASK 4: CONDUCTED THE FIELD VALIDATION STUDY

Systematic evaluation of the SFSTs to assist officers in making arrest decisions at BACs below 0.10 percent, under field conditions, was the ultimate objective of this research. Although existing tests were the subject of the evaluation, the reasons for conducting the field study were the same as if the tests previously had not been validated. First, it was necessary to determine the accuracy of the modifications to test scoring, compared to actual BAC levels measured through other means. For cases in which the driver was arrested for DWI, correspondence would be assessed between scored performance on the SFSTs and BAC, as determined by breath test (blood and urine tests were discouraged but used if subjects refused to comply with breath testing). For cases in which a subject was administered SFSTs but then released on the basis of low estimated BAC, hand-held breath testing devices were used to establish actual BAC. The second purpose of the evaluation was to identify problems with test application in the field, which might include test administration, scoring procedures, or other factors that might affect the use of the tests by law enforcement personnel. Third, the courts' acceptance of evidence gathered using the slightly revised scoring procedures in the field evaluation would be assessed.

SUBTASK 4.1: PREPARED FIELD EXPERIMENT PLAN

A Field Experiment Plan was developed and approved by NHTSA to guide the conduct of the field study. The plan included the seven components depicted in Table 1 and discussed below.

TABLE 1
COMPONENTS OF THE FIELD EXPERIMENT PLAN

Component 1: Subjects
Component 2: Independent Variables
Component 3: Criterion Measures
Component 4: Materials
Component 5: Procedures
Component 6: Controls
Component 7: Data Analyses

Components 1 and 2: Subjects and Independent Variables

The primary independent variable of interest, BAC, was inextricably linked to the subjects in this study. Specifically, the experiment plan focused on obtaining data from adult motorists who were suspected of exceeding the legal limit of 0.08 percent BAC and youths under 21 who were suspected of exceeding the "zero-tolerance"

legal limit of 0.00. The accuracy of the SFSTs to discriminate at 0.08 and 0.04 percent BAC could not be assessed without data from individuals who had BACs over and *under* these values. Therefore, it was important to obtain BAC estimates from individuals who had both passed and failed the standardized field sobriety tests.

Component 3: Criterion Measures

The only appropriate criterion measure to assess the accuracy of SFSTs is BAC. Measures of impairment are irrelevant because performance of the SFSTs must be correlated with BAC level, rather than driving performance. BAC provides an objective and reliable measure that states have recognized as presumptive and/or per se evidence of impairment, depending on the statute. To obtain these criterion measures, it was determined that all drivers who were administered the SFST Battery must be tested for BAC, regardless of the results of the SFSTs. In other words, it would be essential to test the individuals who were judged to have BACs below the relevant statutory level and who subsequently would be released. Participating officers were instructed concerning the importance of obtaining BAC data for all subjects, in order to calculate the accuracy of the tests.

All police officers participating in the study were equipped with NHTSA-approved, portable breath testing devices to assess the BACs of all drivers who were administered the SFSTs, including those who were released without arrest. Further, arrested subjects were tested both in the field with a portable device and at the booking site. The use of passive alcohol sensors (PAS) during the study was not permitted.

Component 4: Materials

Only the existing SFSTs were to be administered, which require no equipment. A pen, pencil, or small flash light frequently are used by officers as a stimulus or target for the HGN test, but a finger can be used with equal effectiveness.

The data collection form used in the study is presented as Figure 3. The data collection form was extremely important in this study for several reasons. As is the case in most field studies, the form must be as simple to complete as possible to minimize the workload of participating officers. In the present case, it also was important for the form to be designed to guide the officer in the administration of the SFSTs, to facilitate standardization and systematic scoring of the tests. In addition, the form designed for this study had to both encourage and provide assurances that officers had followed the study procedures. Most important, it was essential that officers would conduct a breath test and record actual subject BAC as the final step of the process; that is, actual BACs were to be entered on the form only after BAC estimates based on SFST performance had been recorded. Hand-held breath testing devices with digital displays were used for this purpose.

Component 5: Procedures

The sixth component of the field experiment plan was the specification of procedures to be used for administering the tests and obtaining independent measures of BAC. The procedures to be followed by participating officers were listed

as a series of six numbered steps on the data collection form that was used in the field study. The study procedures were to be followed whenever a participating officer suspected an adult driver of being alcohol impaired or a youth under 21 of having a BAC greater than zero. In practice, officers administered the SFSTs to all motorists who exhibited *any* objective behavior or other cue associated with having consumed alcohol, even if impairment was not evident. A breath, blood, or urine test was administered to all motorists who performed the SFSTs, but only after the officer had made an arrest/no arrest decision based on the officer's scoring of the driver's SFST performance, and recorded a BAC estimate. The data collection form structured the procedure by presenting all officer actions as a series of numbered steps. Requiring officers to record the time of BAC estimates and BAC tests ensured that officers' estimates were not influenced by the results of the chemical tests. Completed data collection forms were sent to Anacapa Sciences on a weekly basis for data entry.

In some states, such as California, officers have the right to administer a breath test to a driver who has exhibited any objective sign of alcohol-consumption. Compliance is mandatory if the officer can articulate a reasonable suspicion of the motorist having consumed alcohol (such as the odor of an alcoholic beverage). SFSTs were administered only to drivers who exhibited some objective DWI cue, thus, no problems were experienced in obtaining BAC data, even from subjects whose SFST performance was acceptable. The field breath test was conducted as the final step after the SFST procedure was completed, which is the *de facto* procedure followed by most officers who are equipped with field breath testing devices.

To further ensure compliance with study procedures, the participating law enforcement officers signed a statement affirming that they would abide by the established study procedures. In addition, project staff monitored the data collection effort, periodically riding along with participating officers to ensure that study procedures were being followed.

Component 6: Controls

Extraneous variables that could affect the outcome of the study must be controlled to the extent possible. The controls that were implemented to ensure the validity of study results have been discussed in this section, including systematic procedures and the use of only trained and experienced officers.

Component 7: Data Analyses

The data analysis plan was designed to answer the following research questions.

- How accurately do the tests discriminate between subjects who are above or below 0.08 and 0.04 percent BACs?

- Which of the components of the SFST battery is/are the best predictor(s) of BAC?

- How reliable, or consistent, are the tests?

- Are the tests usable by police officers? Are they readily accepted by officers and prosecutors?

NHTSA/ANACAPA SFST VALIDATION DATA FORM

Officer ID:_____   Driver: ☐ Adult   ☐ Male
                                      ☐ Under 21 ☐ Female
                                      ↳Age:_____

Month_____Day_____1996 Time of Stop:_____hr _____min

FIELD SOBRIETY TESTS ADMINISTERED ☐

1. **HORIZONTAL GAZE NYSTAGMUS TEST** ☐

	Clues	
	Right Eye	Left Eye
Lack of smooth pursuit	☐	☐
Nystagmus at maximum deviation	☐	☐
Nystagmus onset before 45 degrees	☐	☐
Clues	☐ +	☐ =

Total HGN Clues (6 clues maximum) ☐ ←
4 or more   0.08 / 2 or more   0.04

2. **ONE LEG STAND TEST** ☐   *(seconds)*

	Clues		
	0-10	11-20	21-30
Sways while balancing	☐	☐	☐
Uses arms for balance	☐	☐	☐
Hops to maintain balance	☐	☐	☐
Puts foot down	☐	☐	☐
Cannot perform test (4 clues -- maximum)	☐		
Total One Leg Stand Clues	☐		

2 or more   0.08

3. **WALK AND TURN TEST** ☐

	Clues	
Loses balance while listening to instructions	☐	
Starts before instructions are finished	☐	
	1st 9	2nd 9
Stops while walking	☐	☐
Does not touch heel to toe	☐	☐
Steps off the line	☐	☐
Raises arms for balance	☐	☐
Incorrect number of steps	☐	☐
Trouble with turn (explain)_____	☐	
Cannot perform the test (8 clues -- maximum)	☐	
Total Walk and Turn Clues	☐	

2 or more   0.08

4. **ESTIMATE OF BAC BASED ON SFSTs:** ☐

   Time of estimation _____hr _____min

5. **SUBJECT BAC**   ☐ Refused

   PBT➤ ☐   **Time of PBT test _____hr _____min**

   Other➤ ☐   **Time of other test _____hr _____min**
                      ➤ ☐ Breath ☐ Blood ☐ Urine

6. **DISPOSITION:** ☐ Warning ☐ Citation ☐ DUI Arrest

Figure 3. Data collection form used in the validation study.

SUBTASK 4.2. TRAINED OFFICERS IN THE USE OF THE SFSTs

Dr. Marcelline Burns, one of the investigators who developed the SFST battery, developed and conducted the refresher training for the participating officers. Dr. Burns' research and training experience in this field ensured that officers received effective and credible refresher instruction. Dr. Burns was assisted in the training session by the project director and NHTSA COTR.

SUBTASK 4.3. IMPLEMENTED EXPERIMENTAL DESIGN AND COLLECTED DATA

Implementation of the experiment design began immediately following the completion of officer refresher training on 23 May 1996 and continued through 9 November. Specific study procedures were:

- Only officers who were members of the San Diego Police Department's alcohol-enforcement unit and who received NHTSA-approved SFST training participated directly in the study. Dr. Marcelline Burns provided brief "refresher" training to all participating officers to ensure a consistent and systematic approach to SFST administration during the study.

- Upon commencement of the study period, participating officers used only the SFST Battery (i.e., Horizontal Gaze Nystagmus, Walk and Turn, One Leg Stand) together with their observations of a driver's general appearance and speech, to establish inferences about a subject for whom there was reasonable suspicion of driving while impaired. In other words, no tests other than the three SFSTs were performed.

- Participating officers performed the administration steps in the sequence specified on the data collection form; that is, they,

    1. Administered the **Horizontal Gaze Nystagmus** test and recorded results.

    2. Administered the **One Leg Stand** test and recorded results.

    3. Administered the **Walk and Turn** test and recorded results.

    4. Used the scoring systems that were printed on the data collection form (by counting test "clues") to estimate the subject's BAC. Recorded their estimate of the subject's BAC based on SFST performance, together with their observations of the subject's general appearance and speech. Also, they recorded the time when their estimate was made.

    5. Checked the box that indicated the disposition of the stop: Warning, Citation, or Arrest.

    6. Recorded the subject's BAC obtained from a field breath test; or, checked the appropriate box for other tests or responses. Blood and urine test results were provided later; every effort was made to obtain a breath test result for all subjects. Recorded the time when the BAC test was performed.

- Obtained a BAC for all subjects who were administered SFSTs as the final step in the test administration procedure. BACs were obtained for all subjects tested including those subjects who officers estimated, on the basis of SFST results, to have BACs below the legal limit.

- Participating officers completed and submitted a data collection form for each subject tested during the study period; that is, all administrations of the SFST battery by

participating officers were recorded on a data collection form and submitted for analysis.

- All completed data collection forms were sent to Anacapa Sciences, Inc., for data entry and analysis.

SUBTASK 4.4 CONDUCTED COURT AND POLICE INTERVIEWS

The final data collection task was the conduct of open-ended interviews with participating police officers and prosecutors who were exposed to the new SFSTs during DWI cases. The purposes of the interviews were to determine if the tests were acceptable to the officers for use in the field and to the prosecutors for use of test results in court.

TASKS 5 AND 6: ANALYZED DATA AND PREPARED FINAL REPORT

All data collection forms were returned to Anacapa Sciences, Inc., sequentially numbered, and the contents entered into a computerized data base. Data analyses were performed by the project director and Dr. Marcelline Burns. The results of those analyses are presented in the following section of this report.

RESULTS

This study was conducted to evaluate the accuracy of NHTSA's Standardized Field Sobriety Test Battery in assisting officers to make arrest decisions at BACs above and below 0.08 percent under field conditions. A secondary objective of the study was to evaluate the possibility that the test battery also could be used to assist officers in making arrest decisions at BACs lower than 0.08 percent.

The seven participating officers from the San Diego Police Department's alcohol-enforcement unit completed a total of 298 data collection forms during the study period; only one case was eliminated from analysis because the subject refused to submit to any form of BAC testing. Officer compliance with study procedures and motivation to participate in the study remained high throughout the data collection period.

EVALUATION OF SFST ACCURACY

Three methods were used to evaluate the accuracy of the SFST battery to discriminate at the BACs of interest: comparison of means, correlation analyses, and decision analyses.

COMPARISON OF MEANS

Table 2 presents a summary of the estimated and measured BAC data by age category. The table shows that 91.9 percent of the motorists tested were adults, compared to 8.1 percent youth, defined as motorists under the age of 21 years. The mean estimated and measured BACs of the younger motorists were approximately 0.035 lower than the BACs of the adults tested during the field study. The officers' mean estimated BACs, however, were very close to the mean measured BACs for both adults and youth; on average, the difference between officers' estimates and the actual BACs were only 0.005 percent for adults and 0.007 percent for youth.

TABLE 2
ESTIMATED AND MEASURED BAC (%) BY AGE CATEGORY

Age Category	Number	Percent	Estimated BAC (Mean)	Measured BAC (Mean)
Adults	273	91.9	0.120	0.125
Youth	24	8.1	0.083	0.090
Total	297	100.0	**0.117**	**0.122**

Table 3 presents a summary of the estimated and measured BAC data by gender category. The table shows that 87.9 percent of the motorists tested were males, compared to 12.1 percent females, with adults and youth combined. The mean estimated BACs of the male and female motorists tested were identical (i.e., 0.117 percent). Again, for both categories, the officers' mean estimated BACs were very close to the mean measured BACs; on average, the difference between officers' estimates and the actual BACs were only 0.004 percent for males and 0.012 percent for females.

TABLE 3
ESTIMATED AND MEASURED BAC (%) BY GENDER

Gender	Number	Percent	Estimated BAC (Mean)	Measured BAC (Mean)
Male	261	87.9	0.117	0.121
Female	36	12.1	0.117	0.129
Total	297	100.0	**0.117**	**0.122**

Table 4 presents a more detailed accounting of the estimated and measured BAC data by age and gender category, and by the disposition of the enforcement stop. In addition, the table shows that 73 percent of all motorists who were tested during the field study were arrested for DWI based on SFST performance and officer evaluations. Approximately 22 percent of the motorists tested received warnings and five percent were cited for a motor vehicle violation other than DWI.

TABLE 4
ESTIMATED AND MEASURED BAC (%) BY DISPOSITION, AGE CATEGORY, AND GENDER

Disposition & Category	Number	Percent	Estimated BAC (Mean)	Measured BAC (Mean)
Warnings	**65**	**21.9**	**0.060**	**0.044**
Adults	57		0.063	0.045
Male Adults	53		0.063	0.044
Female Adults	4		0.070	0.054
Youth	8		0.036	0.038
Male Youth	6		0.037	0.038
Female Youth	2		0.035	0.040
Citations	**15**	**5.1**	**0.055**	**0.046**
Adults	11		0.050	0.040
Male Adults	9		0.047	0.043
Female Adults	2		0.065	0.029
Youth	4		0.070	0.062
Male Youth	2		0.060	0.055
Female Youth	2		0.080	0.070
Arrests	**217**	**73.0**	**0.138**	**0.150**
Adults	205		0.139	0.152
Male Adults	180		0.139	0.150
Female Adults	25		0.139	0.160
Youth	12		0.119	0.135
Male Youth	11		0.121	0.134
Female Youth	1		0.100	0.140
Total	**297**	**100.0**	**0.117**	**0.122**

The data presented in Table 4 also show that officers tended to slightly over-estimate the BACs of motorists who had lower BACs, and slightly under-estimate BACs at the higher levels. Overall, however, officers' estimates were extremely accurate. Based on SFST results and officers' observations, the officers' mean estimated BAC of the 297 motorists was 0.117 percent, compared to the mean measured BAC of 0.122. Although statistically significant, the difference of 0.005 percent BAC is a trivial and operationally irrelevant under-estimate of actual BACs that is within the margin of error of sophisticated evidentiary testing equipment.

CORRELATION ANALYSES

The accuracy of the SFSTs was further evaluated by conducting a series of correlation analyses to identify the degree to which officers' individual estimates of BAC corresponded with subjects' actual, or measured, BAC. A correlation coefficient is a statistic, usually represented as r, that expresses the relatedness of two variables, that is, the degree to which the variables co-vary. In this case, the two variables were an officer's estimate and the subject's actual BAC. The Pearson product-moment correlation method was used to calculate the relationship between these variables; cases with complete SFST results (n=261) were used in this analysis.

If officers had predicted the precise BACs of all subjects (to three decimal points), the correlation coefficient would be +1.00; the correlation coefficient would be zero if there were no relationship between the estimated and actual BACs. For predictive measures, especially those administered under field conditions, a correlation of 0.65 to 0.70 is considered to be very high.

Table 5 presents the results of the correlation analyses. The table shows that HGN test results had the highest correlation with measured BAC of the three components of the SFST battery (r=0.65). However, a slightly higher correlation was obtained when the results of the three component tests were combined (r=0.69). The table also shows strong correlations between test results and officers' estimated BACs, indicating that officers were following procedures and interpreting test results correctly. All of the correlations were found to be statistically significant (p=.005).

TABLE 5
CORRELATIONS OF SFST SCORES TO ESTIMATED AND MEASURED BAC (%)
N=261 CASES WITH COMPLETE SFST SCORES

Rank	SFST(s)	Correlation (r) with Estimated BAC	Correlation (r) with Measured BAC
1	3 Tests Combined	0.75	0.69
2	HGN	0.71	0.65
3	Walk-and-Turn	0.64	0.61
4	One Leg Stand	0.61	0.45

DECISION ANALYSES

The third method used to evaluate the accuracy of the SFST battery was to construct a decision matrix that describes the four possible combinations of the two variables of interest, estimated and actual BACs above and below the levels of interest. Figure 4 presents the first decision matrix, with the four major cells of the matrix representing the four possible decisions at 0.08 percent BAC. The numbers in the major cells are the number of cases for each type of decision out of the 297 SFST administrations. The two shaded cells represent correct decisions based on SFST results: 1) 210 motorists who officers estimated to have BACs equal to or greater than 0.08 percent, who later were found to have BACs 0.08 by BAC testing (by breath, blood, or urine analysis); and, 2) 59 motorists who officers estimated to have BACs below 0.08 percent, who later tested below 0.08.

Figure 4 also reveals the incorrect decisions: 1) 24 motorists who officers estimated to have BACs greater than 0.08 who later were found to have BACs below that level (false positives); and, 2) four subjects who officers estimated to have BACs below 0.08 who later tested above 0.08 (false negatives).

It can be calculated from the data contained in Figure 4 that officers' decisions were accurate in 91 percent of the 297 cases (i.e., $[210+59] \div 297 = .906$). Further, officers' decisions to arrest were correct in 90 percent of the cases in which BAC was estimated to be 0.08 (i.e., $210 \div 234 = .897$), and decisions not to arrest were correct in 94 percent of the cases in which BAC was estimated to be below 0.08 (i.e., $59 \div 63 = .937$). These results indicate a high degree of accuracy, but it will be instructive to consider more closely those cases in which incorrect decisions were made.

	Officers' Estimated BACs		
	<0.08%	0.08%	
Measured BACs 0.08%	n=4	**n=210**	n=214
<0.08%	**n=59**	n=24	n=83
	n=63	n=234	**N=297**

Accurate in 91% of cases overall
90% accurate in "yes" decisions
94% accurate in "no" decisions

Figure 4. Decision matrix at 0.08 percent BAC.

Table 6 presents a summary of the data for each of the 24 false positives (FPs). These cases are labeled False Positives because the officers estimated the subjects' BACs to be   0.08 percent, but subsequent testing found BACs below 0.08. However, in several cases, officers were correct in identifying impairment, which probably influenced their estimates of BAC.

TABLE 6
SUMMARY OF FALSE POSITIVES

	Case Number	Estimated BAC (%)	Number of HGN Clues	Measured BAC (%)	Is Estimate Consistent with Clues?
1	30	0.08	4	0.050	yes
2	34	0.08	4	0.058	yes
3	121	0.08	6	0.060	yes
4	186	0.08	4	0.063	yes
5	226	0.08	6	0.058	yes
6	227	0.08	4	0.060	yes
7	129	0.09	4	**0.070**	yes
8	175	0.09	4	**0.070**	yes
9	32	0.09	6	**0.076**	yes
10	127	0.09	6	0.028	yes
11	224	0.10	4	**0.070**	yes
12	16	0.10	6	**0.070**	yes
13	196	0.10	6	**0.074**	yes
14	52	0.11	4	0.050	yes
15	178	0.12	6	**0.070**	yes
16	246	0.12	6	**0.069**	yes
17	12	0.08	2	0.060	no
18	164	0.08	2	**0.070**	no
19	165	0.08	2	0.020	no
20	135	0.08	3	**0.078**	no
21	137	0.09	n/a	0.030	?
22	75	0.09	2	0.048	no
23	104	0.09	3	0.037	no
24	13	0.12	0	0.043	no

In 16 of the cases listed in Table 6, the officers' estimates of BAC were consistent with the number of HGN clues observed (i.e., four or more HGN clues to

support an estimate 0.08), however, the motorists subsequently were found to have actual BACs below 0.08 percent. In seven of the cases, the officers' estimated BACs were inconsistent with the number of HGN clues observed. It is important to note that six of the 24 false positives had measured BACs of 0.07 percent, and three had BACs greater than 0.07 but less than 0.08 (i.e., 0.074, 0.076, and 0.078). All nine of these BACs are within the margin of error of the testing devices. Further, Case Number 16 was a juvenile (0.069), which rendered the difference between estimated and measured BACs irrelevant in a zero tolerance jurisdiction; that is, it was a correct arrest decision despite the BAC estimate. In addition, two of the subjects with measured BACs of 0.07 were arrested for DWI, because the officers' believed that they were too impaired to be permitted to drive. Finally, Case Number 30, with an estimated BAC of 0.08 and a measured BAC of 0.05 percent, was found to be a psychiatric patient, which helped to explain her erratic behavior, poor SFST performance, and apparent impairment.

Although the proportions of correct decisions presented in Figure 4 reflect a high degree of accuracy, the accuracy of officers' decisions is even better if some of the borderline cases are accepted. An accuracy rate of 94 percent for all officer decisions based on SFST results was calculated by including as correct decisions Case 16 (the youth with a 0.069 percent BAC) and the nine false positives with BACs between 0.07 and 0.08, discussed in the previous paragraph.

Table 7 summarizes the four cases in which officers estimated the subjects' BACs to be below 0.08 percent, but later found the measured BACs to be 0.08. Six HGN clues would be expected for Case Number 193 (0.10 percent) and Case Number 99 (0.12 percent). It is unknown why the officers observed only two HGN clues. In contrast, officers recorded four HGN clues for Case Number 131 and Case Number 114, which would indicate BACs greater than 0.08, however, the officers' estimated-BACs were only 0.06 percent. It is unknown why the officers did not follow the test interpretation guidelines in these two cases; their low estimates probably reflect other observations made in combination with SFST performance.

TABLE 7
SUMMARY OF FALSE NEGATIVES

	Case Number	Estimated BAC (%)	Number of HGN Clues	Measured BAC (%)	Is Estimate Consistent with Clues?
1	193	0.06	2	0.100	yes
2	99	0.06	2	0.120	yes
3	131	0.06	4	0.080	no
4	114	0.06	4	0.116	no

Similarly, in seven of the false positive cases listed previously in Table 6, officers apparently did not follow the test interpretation guidelines; that is, fewer than four HGN clues were reported, yet the officers' estimated-BACs were at least

0.08 percent. It is possible that other factors influenced the officers' estimates. For example, the subjects might have appeared to be more impaired than indicated by HGN results as a consequence of prescription or recreational drugs taken in addition to alcohol.

A series of decision analyses was performed to calculate the contributions of the component tests of the battery to officers' estimates of BAC. Figure 5 presents three decision matrices, one for each of the SFSTs. The matrices are similar to the one in Figure 4, but with the criterion numbers of clues at 0.08 percent BAC substituted for officers' estimates. Figure 5 shows the HGN test to be the most accurate independent predictor of whether a motorist's BAC is above or below 0.08 percent.
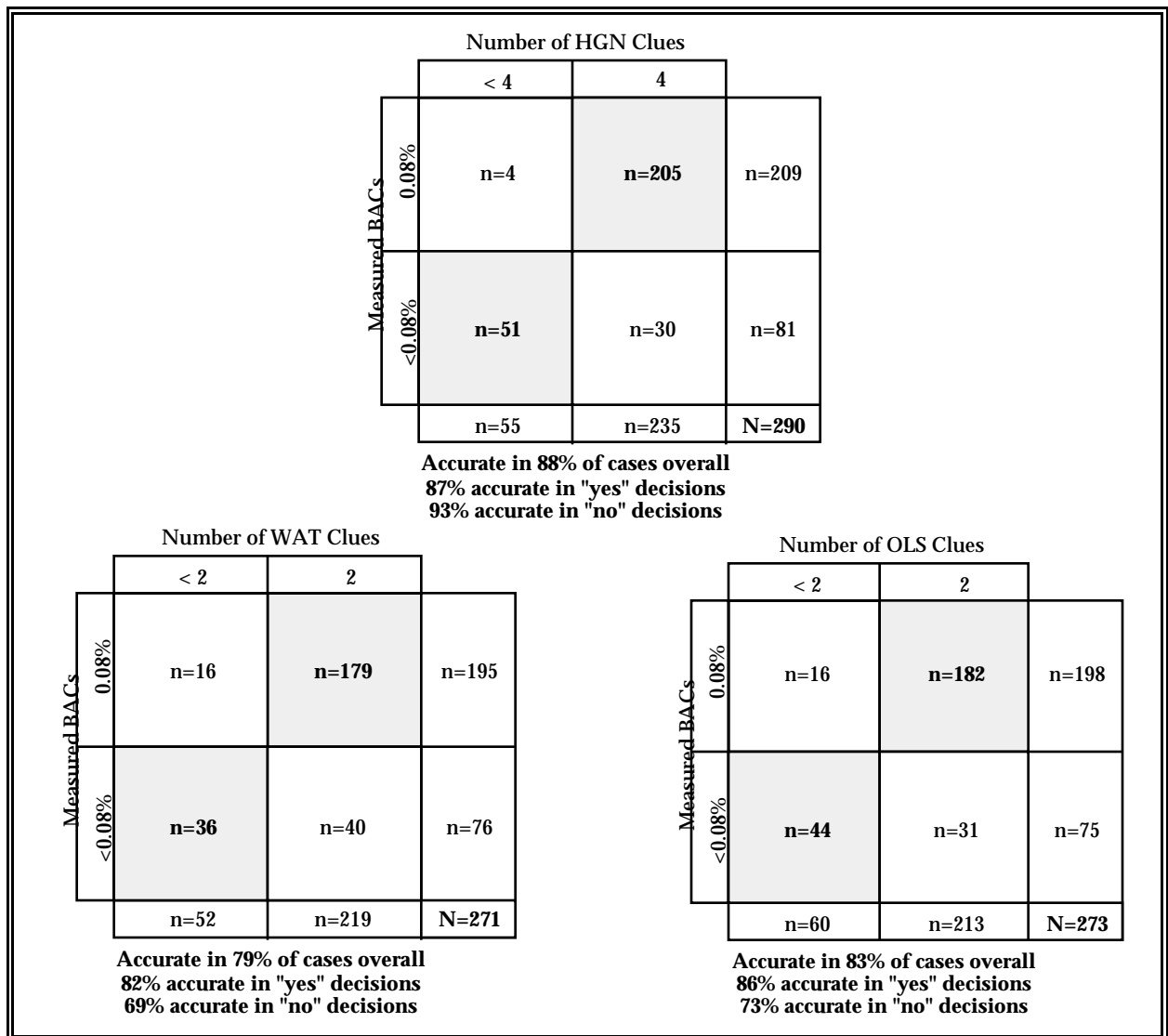

Figure 5. Decision matrices at 0.08 percent BAC for each component test of the SFST battery.

Further analyses were performed to explore methods for combining the results of the three component tests. Only the 261 cases that included test results for all three component tests could be used in this analysis. Of those cases, 73 were found to have BACs below 0.08 percent and 188 cases had measured BACs 0.08 percent. In 162 of the 188 cases (86 percent), all three component SFSTs were unanimous in their predictions.

Figure 6 presents a Venn diagram that illustrates the contributions of the three tests to the 14 percent of cases in which a discrepancy occurred. The figure shows there were 162 cases with BACs 0.08 in which all three SFSTs indicated a BAC 0.08 (the number outside the circles in Figure 6), and 26 cases in which one or more test disagreed (the numbers inside the circles). A single test indicated a BAC below 0.08 in 17 of the cases (8+2+7), and two tests were involved in nine of the cases (1+1+7). There were no cases in which all three tests predicted incorrectly.

162 Cases 0.08% BAC in which all three tests agree
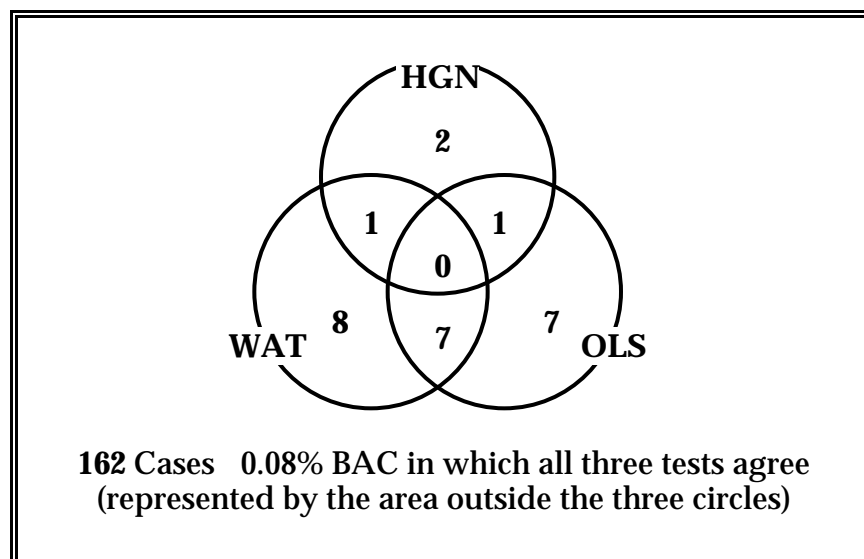(represented by the area outside the three circles)

Figure 6. Venn diagram of 188 cases 0.08% BAC; 26 cases in which all three tests do not agree.

The horizontal gaze nystagmus test (HGN in the diagram) was about four times less likely to be the source of a discrepancy than the other two tests. Only two of the single-test discrepancies were attributable to HGN results, compared to eight cases for the Walk and Turn test (WAT), and seven cases for the One Leg Stand (OLS). Overall, the HGN test was involved in only four of the discrepancies, compared to 16 cases for the Walk and Turn and 15 cases for the One Leg Stand.

The question of the SFST battery's accuracy in discriminating BACs above and below 0.04 percent is addressed by the following decision matrix, presented in Figure 7; the shaded cells of the matrix again represent correct decisions based on SFST results. The figure shows that officers estimated motorists' BACs to be equal to or greater than 0.04 but under 0.08 percent in 54 cases, and in 51 of those cases their estimates were found to be correct by subsequent breath, blood, or urine testing;

these values result in an accuracy rate of 94 percent for these decisions (i.e., 51÷54=.94). The figure also shows that officers estimated that 29 motorists had BACs below 0.04, and in 15 of those cases their estimates were found to be correct by subsequent testing, resulting in a 52 percent accuracy rate (15÷29=.52). Overall, officers were accurate in 80 percent of the cases when discriminating between subjects who were above 0.04 but below 0.08 percent BAC (i.e., [51+15]÷83=.80).

Figure 7. Decision matrix at 0.04 percent BAC.

EVALUATION OF SFST ACCEPTABILITY

In interviews and during ride-along observations, the officers who participated in the study fully accepted the SFSTs for evaluating motorists for DWI at BACs below 0.10 percent. All of the officers were formally trained in SFST administration and scoring and all had sufficient field experience to develop confidence in their abilities to discriminate at the 0.08 level. Further, it was the officers' experience with the SFST battery that the component tests could be administered to all but a small proportion of drivers and under all reasonable environmental conditions.

Interviews also were conducted with representatives of the San Diego City Attorney's Office to inquire concerning the acceptability of the SFSTs to prosecutors and judges in DWI cases. The attorneys interviewed reported that none of the 298 DWI arrests made by participating officers during the study period was negatively affected by the SFST battery, or by excluding the other tests that traditionally had been used by the department.

The attorneys further explained that as prosecutors they normally prefer as much evidence as possible, and in a DWI case more tests usually generate more evidence they can use. However, it has been their recent experience that a test used by another local law enforcement agency has negatively affected cases they have prosecuted. Defense attorneys have been unsuccessful in their challenges of NHTSA's SFST battery, but they have successfully challenged the validity of the other test because it has not been evaluated in a systematic and scientific manner. Prosecutors who were interviewed suggested that the optimum situation would be for all law enforcement agencies to restrict their field sobriety evaluations to the same standardized battery of three tests.

IMPLICATIONS

The research documented in this report found that NHTSA's Standardized Field Sobriety Test Battery accurately and reliably assists officers in making DWI arrest decisions at 0.08 percent BAC. The study also found that the SFSTs can be used to assist officers in making arrest decisions at 0.04 percent BAC by using two HGN clues as the criterion rather than four clues, which is the criterion for a 0.08 percent or above BAC determination. The primary implication of the study results is that the SFST battery is a valid method for making roadside DWI decisions at 0.08 and 0.04 percent BAC. Specific implications of the study results are presented in the following paragraphs in response to the research questions listed previously.

HOW ACCURATELY DO THE TESTS DISCRIMINATE BETWEEN SUBJECTS WHO ARE ABOVE OR BELOW 0.08 AND 0.04 PERCENT BACS?

This study found NHTSA's SFST battery to be an accurate method for discriminating motorists' BACs above and below 0.08 percent and above and below 0.04 percent, when the tests are conducted by trained officers, as summarized below.

COMPARISON OF MEANS

The mean estimated BAC of the 297 motorists included in the study was 0.117 percent, compared to the mean measured BAC of 0.122. The difference of 0.005 percent BAC (i.e., five one-thousandths of a percent BAC) is very small and operationally irrelevant. The accuracy of officers' estimates during this study, in large measure, confirms the anecdotal accounts and observations of officers in the field that suggest remarkable abilities to predict a motorists' BAC on the basis of SFST results.

CORRELATION ANALYSES

Correlation analyses found the HGN test to be very predictive of measured BACs ($r=0.65$). A higher correlation was obtained when the results of the three component tests were combined ($r=0.69$). All of the correlations are statistically significant, meaningful, and in the rank order expected from previous SFST research.

DECISION ANALYSES

Decision analyses found that officers' estimates of whether a motorist's BAC was above or below 0.08 or 0.04 percent were extremely accurate. Estimates at or above the 0.08 level were accurate in 91 percent of the cases, or as high as 94 percent if explanations for ten of the false positives are accepted. Estimates at or above the 0.04 level (but below 0.08) were accurate in 94 percent of the relevant cases. It is important to note that officers' decisions not to arrest were more accurate at 0.08 than at 0.04 (94 percent compared to 52 percent).

Although the relatively small number of low BACs in the data base (n=83) might constrain confidence in the SFSTs at the 0.04 level, the data strongly suggest

operational utility to accurately discriminate above or below 0.04 percent BAC. Further, these results are consistent with the results of a recent study conducted to evaluate the SFST battery for use by officers in Colorado.

Colorado has a two-tier statute that permits officers to arrest motorists for driving under the influence (DUI) if found to have a BAC 0.10 percent, and for a lesser offense, driving while ability impaired (DWAI), if found to have a BAC 0.05 but below 0.099 percent. Of the 234 drivers tested during the Colorado study for whom BACs were known, 93 percent of the officers' decisions to arrest at the 0.05 percent criterion were correct, and 64 percent of the decisions to release were correct. Overall in the Colorado study, 86 percent of the officers' decisions at the 0.05 level were correct, based on SFST results (Burns and Anderson, 1995; Anderson and Burns, 1997).

WHICH OF THE COMPONENTS OF THE SFST BATTERY IS/ARE THE BEST PREDICTOR(S) OF BAC?

The horizontal gaze nystagmus test was found to be the most predictive of the three component tests, but correlations with measured BACs were higher when the results of all three tests were combined, as reported earlier. The implications of this study result are that all components of the SFST battery should be administered when possible or practical. However, the data indicate that the HGN test alone can provide valid indications to support officers' arrest decisions at both 0.08 and 0.04 percent BAC.

HOW RELIABLE, OR CONSISTENT, ARE THE TESTS?

Reliability is a measurement concept that represents the consistency with which a test measures a type of performance or behavior. In the current context, a reliable field sobriety test provides consistent results when administered to the same individual by two different officers, under nearly identical conditions. This type of "inter-rater" reliability was impossible to measure directly during this study, due to the constraints imposed by field conditions. In particular, it would have been unrealistic to subject motorists to the SFST battery twice, or to require that officers operate in pairs during their patrols.

Evidence of SFST reliability can be found in the results of the previous laboratory studies, in which the constraints on repeated measure were eliminated by the use of paid subjects and officers. Tharp, Burns, and Moskowitz (1981) found relatively high inter-rater reliability for BAC estimates based on SFST results (r=.72). The researchers also found that inter-rater reliability increased in subsequent sessions (r=.80), indicating the important role of training and experience in achieving accuracy, reliability, and overall proficiency.

In addition, correlation coefficients, in general, are measures of reliability. For this reason, the correlations between estimated and actual BACs obtained during the field study (r=.69) indicate a high degree of reliability for tests designed to be administered at roadside.

ARE THE TESTS USABLE BY POLICE OFFICERS UNDER A VARIETY OF ROADSIDE CONDITIONS? ARE THEY READILY ACCEPTED BY OFFICERS AND PROSECUTORS?

All of the officers who participated in this study were members of the San Diego Police Department's alcohol enforcement unit, all had previously received NHTSA-approved training in DWI detection and SFST administration, and all had at least three years of experience in the Traffic Division before joining the special unit. Prior to beginning the field study, the officers demonstrated competence in the administration of the component tests and interpretation of test results. Participation was limited to members of the alcohol-enforcement unit of a single law enforcement agency. These experience and training requirements were imposed, to control variables, to the extent possible, that might affect study results.

As a consequence of the selection criteria, all participating officers were proficient in the use of the SFST battery. The officers reported that they use their SFST skills daily in their work, and their experience has made them confident in the ability of the test battery to discriminate at 0.08 percent BAC, and at lower levels. Further, officers reported that the tests can be administered in all reasonable environmental conditions. In short, the officers who participated in this study consider the SFST battery to be extremely useful, in fact, essential tools for the performance of their professional duties.

The prosecutors interviewed during the study reported that the SFST battery has been acceptable to them and the courts because it was developed and validated in a systematic and scientific manner. They suggested that all law enforcement agencies should limit officers to use of the SFST battery in performance evaluations of DWI because other tests usually lack credibility in court. No problems were experienced in any of the 298 cases resulting from the field study, indicating the SFSTs to be fully acceptable to the courts in establishing probable cause to arrest a motorist for DWI.

NOTE ABOUT THE ACCEPTABILITY OF THE HGN TEST

Many law enforcement officers from across the United States have reported their sincere appreciation to NHTSA for developing the SFST battery, and in particular, the horizontal gaze nystagmus test. However, some officers have expressed frustration about the resistance of some courts to accept HGN results, despite the clear and unequivocal support of scientific research and field experience. It is likely that this remaining resistance to the horizontal gaze nystagmus test is attributable to a misunderstanding concerning the purpose of a field sobriety test, and can be explained by reference to "face validity," a term used in the behavioral sciences to describe one component of a measure's acceptability.

Many individuals, including some judges, believe that the purpose of a field sobriety test is to measure driving impairment. For this reason, they tend to expect tests to possess "face validity," that is, tests that appear to be related to actual driving tasks. Tests of physical and cognitive abilities, such as balance, reaction time, and information processing, have face validity, to varying degrees, based on the

involvement of these abilities in driving tasks; that is, the tests seem to be relevant "on the face of it." Horizontal gaze nystagmus lacks face validity because it does not appear to be linked to the requirements of driving a motor vehicle. The reasoning is correct, but it is based on the incorrect assumption that field sobriety tests are designed to measure driving impairment.

Driving a motor vehicle is a very complex activity that involves a wide variety of tasks and operator capabilities. It is unlikely that complex human performance, such as that required to safely drive an automobile, can be measured at roadside. The constraints imposed by roadside testing conditions were recognized by the developers of NHTSA's SFST battery. As a consequence, they pursued the development of tests that would provide statistically valid and reliable indications of a driver's BAC, rather than indications of driving impairment. The link between BAC and driving impairment is a separate issue, involving entirely different research methods. Those methods have found driving to be impaired at BACs as low as 0.02 percent, with a sharp increase in impairment at about 0.07 percent (Moskowitz and Robinson, 1988; Stuster, 1997). Thus, SFST results help officers to make accurate DWI arrest decisions even though SFSTs do not *directly* measure driving impairment.

Horizontal gaze nystagmus is the most accurate diagnostic of BAC available to officers in the field. HGN's apparent lack of face validity to driving tasks is irrelevant because the objective of the test is to discriminate between drivers above and below the statutory BAC limit, not to measure driving impairment. Throughout the United States, DWI laws permit arrest decisions to be made on the basis of the statutory BAC limit, irrespective of a specific motorist's degree of impairment. Motorists also can be arrested at BACs *below* the statutory limit if their driving performance is demonstrably impaired by alcohol or other drugs.

CONCLUSIONS

The results of this study provide clear evidence of the validity of the Standardized Field Sobriety Test Battery to discriminate above or below 0.08 percent BAC. Further, study results strongly suggest that the SFSTs also accurately discriminate above or below 0.04 percent BAC.

Finally, in addition to establishing the validity of the SFST battery, this study has found the tests to be acceptable, indeed welcomed, by law enforcement officers and DWI prosecutors.

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APPENDIX A

STANDARDIZED FIELD SOBRIETY TESTING

STANDARDIZED FIELD SOBRIETY TESTING

The Standardized Field Sobriety Test (SFST) is a battery of three tests administered and evaluated in a standardized manner to obtain validated indicators of impairment and establish probable cause for arrest. These tests were developed as a result of research sponsored by the National Highway Traffic Safety Administration (NHTSA) and conducted by the Southern California Research Institute. A formal program of training was developed and is available through NHTSA to help police officers become more skillful at detecting DWI suspects, describing the behavior of these suspects, and presenting effective testimony in court. Formal administration and accreditation of the program is provided through the International Association of Chiefs of Police (IACP). The three tests of the SFST are:

- Horizontal gaze nystagmus (HGN),
- Walk-and-turn, and
- One-leg stand.

These tests are administered systematically and are evaluated according to measured responses of the suspect.

HGN TESTING

Horizontal gaze nystagmus is an involuntary jerking of the eye which occurs naturally as the eyes gaze to the side. Under normal circumstances, nystagmus occurs when the eyes are rotated at high peripheral angles. However, when a person is impaired by alcohol, nystagmus is exaggerated and may occur at lesser angles. An alcohol-impaired person will also often have difficulty smoothly tracking a moving object. In the HGN test, the officer observes the eyes of a suspect as the suspect follows a slowly moving object such as a pen or small flashlight, horizontally with his or her eyes. The examiner looks for three indicators of impairment in each eye: if the eye cannot follow a moving object smoothly, if jerking is distinct when the eye is at maximum deviation, and if the angle of onset of jerking is within 45 degrees of center. If, between the two eyes, four or more clues appear, the suspect likely has a BAC of 0.10 or greater. NHTSA research indicates that this test allows proper classification of approximately 77 percent of suspects. HGN may also indicate consumption of seizure medications, phencyclidine, a variety of inhalants, barbiturates, and other depressants.

WALK AND TURN

The walk-and-turn test and one-leg stand test are "divided attention" tests that are easily performed by most unimpaired people. They require a suspect to listen to and follow instructions while performing simple physical movements. Impaired persons have difficulty with tasks requiring their attention to be divided between simple mental and physical exercises.

In the walk-and-turn test, the subject is directed to take nine steps, heel-to-toe, along a straight line. After taking the steps, the suspect must turn on one foot and

return in the same manner in the opposite direction. The examiner looks for eight indicators of impairment: if the suspect cannot keep balance while listening to the instructions, begins before the instructions are finished, stops while walking to regain balance, does not touch heel-to-toe, steps off the line, uses arms to balance, makes an improper turn, or takes an incorrect number of steps. NHTSA research indicates that **68** percent of individuals who exhibit two or more indicators in the performance of the test will have a BAC of **0.10** or greater.

ONE LEG STAND

In the one-leg stand test, the suspect is instructed to stand with one foot approximately six inches off the ground and count aloud by thousands (One thousand-one, one thousand-two, etc.) until told to put the foot down. The officer times the subject for 30 seconds. The officer looks for four indicators of impairment, including swaying while balancing, using arms to balance, hopping to maintain balance, and putting the foot down. NHTSA research indicates that **65** percent of individuals who exhibit two or more such indicators in the performance of the test will have a BAC of **0.10** of greater.

COMBINED MEASURES

NHTSA's SFST training materials instruct officers in the use of the following decision table for combining the results of the HGN and Walk and Turn test.

Along the top of the table, circle the number of the subject's HGN clues. Along the left side of the table, circle the number of the subject's Walk and Turn clues. Draw a line down from the number of HGN clues and a line across from the number of Walk and Turn clues. If the intersection is within the shaded area, the subject has a BAC 0.10 percent.

OVERHEAD(S)

HANDOUT(S)

SFST ONE-DAY REFRESHER COURSE
PARTICIPANT MANUAL
COLLATING PRINT GUIDE

1.   Agenda
        Agenda.SFST One-day Refresher.pdf

2.   Preface
        Preface.pdf

3.   Introduction and Overview
        Introduction and Overview.pdf

4.   Session One: Phase One: Vehicle in Motion & Phase Two: Personal Contact
        Session 1.Part 1.Phase 1.pdf
        Session 1.Part 2.Phase 2.pdf

5.   Session Two: Concepts and Principles of the Standardized Field Sobriety
        Tests & Phase Three: Pre-Arrest Screening
        Session 2.Part 1.Concepts & Principles.pdf
        Session 2.Part 2.Phase 3.pdf

6.   Session Three: Test Battery Demonstrations & Dry Run Practice Session
        Session 3.part 1.Demo.pdf
        Session 3.Part 2.Dry Run.pdf

7.   Sessions 4 & 5: "Testing Subjects" Practice – Dry Lab – Video subjects
        Session 4 & 5.Dry Lab.pdf

8.   Attachments
        ATTACHMENT COVER PAGE.pdf
        Attach 1.Detection Below.10.pdf
        Attach 2.Colorado Validation Study.pdf
        Attach 3.Florida Validation Study.pdf
        Attach 4.Detection Below .10.pdf

9.   Overheads (optional based on instructor preferences)
        Into & Overview.ppt
        Session 1.Part 1.Phase 1.ppt
        Session 1.Part 2.Phase 2.ppt
        Session 2.Part1.Concepts & Principles.ppt
        Session 2.Part 2.PreArrestScreen.ppt
        Session 3.Demo.ppt
        Session 4& 5.Dry Lab.ppt

10.   Handouts (Specific to each instructor)
        HANDOUT COVER PAGE.pdf