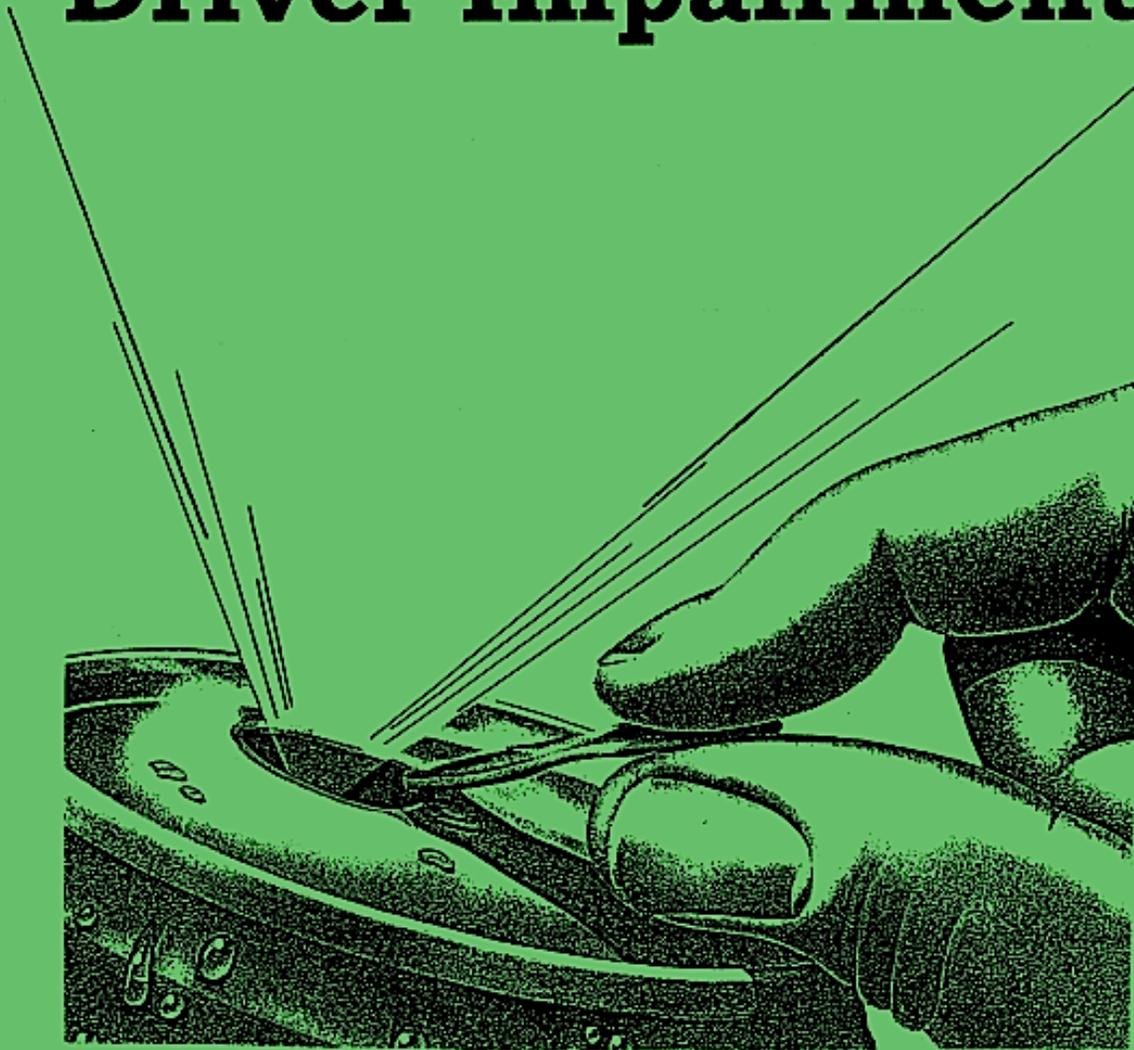


# **Low BAC Driver Impairment**



**John B. Kwasnoski, 1998**

**Legal Sciences, Inc.**

## Preface

In working on over 200 alcohol-related crashes as an accident reconstructionist it is startling how little attention has been paid to educating the jury about the complexity of the driving task and the true meaning of "impairment". Toxicologists typically talk about decision-making, risk-taking, perception-reaction time, and a few other areas where alcohol has an effect, but seldom, if ever, are the effects of alcohol on the driving skills or tasks related to the specific crash discussed. The scientific literature is full of research on impairment threshold BAC's, and for some of the driving skills the threshold is as low as .02 g/100 ml. It can be very convincing to a jury for them to understand how many cognitive skills are involved in the successful operation of a motor vehicle, and the degree of impairment presented by the defendant's BAC at the time of the crash. This information has been documented in the scientific literature but has been much underused. Prosecutors seeking to "paint the picture" for the trier of fact will find this information extremely helpful.

This treatise summarizes the scientific literature in a "hands-on", quick reference that prosecutors can use to identify driving skills specific to a particular crash scenario (left turn in front of oncoming traffic, pedestrian struck while walking along road, rear-end collision with vehicle stopped in break-down lane, etc.). For each scenario the driving skills involved are tabulated, and the lowest BAC at which measureable impairment was found for each skill (termed herein the "impairment threshold") and the literature citation of the research is given.

Prosecutors will find this research helpful in a number of ways, including:

- a) as a reference for the State's toxicology testimony regarding the defendant's impairment
- b) as a source for educating the jury about the connection between the defendant's BAC and the inability to properly operate his/her motor vehicle
- c) as a resource for cross examination of the defendant's toxicology expert
- d) as a resource for impeaching the testimony of the defendant's toxicology expert

In some instances it may be helpful to obtain copies of the actual documents, and this can readily be done on the Internet or through library loan. This research adds the final piece of the picture to the prosecution's case by educating jurors about the complexity of the driving task (which most jurors underestimate) and the adverse effects of even low concentrations of blood alcohol.

## Impairment at .08 BAC and Below

Skill (reference)	Impairment level
Reaction Time	
simple reaction time (1)	.03
choice reaction time (requires decision) (2)	.03
choice reaction time errors (3)	.05
complex reaction time (4)	.07
Tracking	
pursuit tracking (5)	.02
compensatory tracking (6)	.03
multiple tracking (7)	.04
critical tracking task (8)	.05
Concentrated Attention	
attention (9)	.07
Divided Attention	
detection of peripheral stimuli (11)	.02
visual reaction time (12)	.03
choice reaction time (13)	.04
response to peripheral stimuli (14)	.04
response to central stimuli (14)	.04
visual search (15)	.05
visual recognition (15)	.07
Information Processing	
interpretation of signals (16)	.05
visual information processing (17)	.06
information processing rate (18)	.07
information registration (19)	.07
response selection (20)	.07

### Optometric Visual Functions

glare recovery (21)	.01
flicker fusion (22)	.03
visual acuity for distance (23)	.04
smooth pursuit eye movement (24)	.05
double vision (10)	.05
contrast sensitivity (25)	.05
stereoacuity (45)	.05
stimulus detection (26)	.07
dynamic visual acuity (27)	.08
depth perception (28)	.08
distance judgement (28)	.08

### Perception

reaction (to motion) time (17)	.02
peripheral vision with central task (29)	.04
time perception (30)	.04
perception time for visual stimuli (31)	.05
comprehension (41)	.05
visual movement sensitivity (32)	.08

### Psychomotor Performance

coordination (33)	.02
motor performance (13)	.06

### Driver Performance

vehicle alignment (34)	.03
tracking (35)	.03
steering (35)	.03
gear changing (35)	.03
braking (35)	.03
Spatial judgement (44)	.04
impaired driving skills (42)	.04
emergency braking response (36)	.04
curve negotiating (43)	.05
speed changes (37)	.07
distance judgement (38)	.07
glare adaptation (39)	.07
lateral position error (40)	.07
time to make steering correction (40)	.07

## Scenario: Crossing the center line into oncoming traffic

Driving skill (reference #)	Impairment Threshold
<b>simple reaction time</b> (1) Time from decision to the onset of the reaction response.	.03
<b>tracking</b> (6,7,8,35) Ability to keep vehicle on traveled part of road and avoid swerving across fog line or crossing the center line or into another lane of travel.	.03
<b>concentrated attention</b> (9) Ability to focus on roadway and maintain vigilance and forward gaze.	.07
<b>visual reaction time</b> (12,13)	.04
<b>response to central stimuli</b> (14) Impaired response to stimulus within acute field of vision.	.04
<b>visual search</b> (15,24) Ability to maintain searching pattern for objects on or about the roadway.	.05
<b>visual recognition</b> (15) Ability to recognize objects after they have been perceived.	.07
<b>comprehension</b> (41) Subject cannot accurately comprehend what has been perceived, and may misinterpret stimulus or be unable to process the information.	.05
<b>visual information processing</b> (17) Recognition and decision-making ability, using visual information.	.06
<b>information processing rate</b> (18,19) Time to process from the point of perception to the point of recognition.	.07
<b>response selection</b> (20) Ability to make the best response to a visual stimulus, thus giving the optimum chance of avoiding a dangerous situation..	.07
<b>glare recovery</b> (21) Time for eyes to recover from a one-time glare from oncoming traffic.	.01
<b>double vision, other vision impairment</b> (10,22) Ability to focus and perceive an image clearly, thus affecting recognition of an object as being in a dangerous position.	.05
<b>depth perception</b> (28) Ability to determine distance between subject (and subject's vehicle) and object being perceived.	.08
<b>time perception</b> (30) Subject has a distorted perception of time, and may feel that situation is occurring in slow motion, or may portray a distorted perception of time in describing a situation.	.04

<b>perception time for visual stimulus (31)</b>	.05
Time to "see" impending danger.	
<b>motor performance (13)</b>	.06
Ability to perform motor tasks, movements, and other reactions.	
<b>vehicle alignment (34)</b>	.03
Vehicle suddenly tracks off roadway or crosses fog or center line, or is driving in breakdown lane.	
<b>impaired tracking, steering, braking, gear changing (35)</b>	.03
Basic driving skills are impaired.	
<b>emergency braking response (36)</b>	.04
Operator is not fully able to execute an emergency braking action in response to danger or necessity stimulus.	
<b>spatial judgement, impaired driving skills (42,44)</b>	.04
Ability to judge space between vehicles, or vehicle and object is impaired, and general driving skills are impaired to some extent.	
<b>curve negotiating (43)</b>	.05
Operator cannot steer around curve, or is impaired in ability to judge steering, speed, etc. to successfully negotiate a curve in the roadway.	
<b>glare adaptation (39)</b>	.07
Adaptation to glare from oncoming vehicles' headlights is reduced, and operator is unable to focus on roadway or perceive objects or stimuli in the roadway environment.	
<b>lateral position error, steering correction time (40)</b>	.07
Driver operates in the wrong lane, or in breakdown lane; time to realign the vehicle in response to a stimulus is lengthened	

## Scenario: Pedestrian struck while walking along road

Driving skill (reference #)	Impairment Threshold
<b>simple reaction time (1)</b> Time from decision to the onset of the reaction response.	.03
<b>choice reaction time (2)</b> Time to make response choice- braking, steering, sounding horn.	.03
<b>choice reaction time errors (3)</b> Subject makes errors in selecting the appropriate response from a number of options available.	.05
<b>tracking (6,7,8,35)</b> Ability to keep vehicle on traveled part of road and avoid swerving across fog line or crossing the center line or into another lane of travel.	.03
<b>concentrated attention (9)</b> Ability to focus on roadway and maintain vigilance and forward gaze.	.07
<b>visual reaction time (12,13)</b>	.04
<b>response to peripheral stimuli (14)</b> Response to stimulus outside cone of acute vision (+/- 5 degrees from forward).	.04
<b>response to central stimuli (14)</b> Impaired response to stimulus within acute field of vision.	.04
<b>visual search (15,24)</b> Ability to maintain searching pattern for objects on or about the roadway.	.05
<b>visual recognition (15)</b> Ability to recognize objects after they have been perceived.	.07
<b>visual information processing (17)</b> Recognition and decision-making ability, using visual information.	.06
<b>information processing rate (18,19)</b> Time to process from the point of perception to the point of recognition.	.07
<b>response selection (20)</b> Ability to make the best response to a visual stimulus, thus giving the optimum chance of avoiding a dangerous situation.	.07
<b>glare recovery (21)</b> Time for eyes to recover from a one-time glare from oncoming traffic.	.01
<b>double vision, other vision impairment (10,22)</b> Ability to focus and perceive an image clearly, thus affecting recognition of the pedestrian being in a dangerous position.	.05
<b>contrast sensitivity (25)</b> Ability to "see" an object, based on the contrast of the object with the background or environment.	.05

<b>stereoacuity (45)</b>	.05
Ability to focus both eyes sharply on an object, thus affecting perception and recognition of distance between vehicle and object.	
<b>depth perception (28)</b>	.08
Ability to determine distance between subject (and subject's vehicle) and object being perceived.	
<b>peripheral vision with central task (29)</b>	.04
Limited peripheral vision when driver is making driving decisions.	
<b>time perception (30)</b>	.04
Subject has a distorted perception of time, and may feel that situation is occurring in slow motion, or may portray a distorted perception of time in describing a situation.	
<b>perception time for visual stimulus (31)</b>	.05
Time to "see" the pedestrian before any recognition or reaction can take place.	
<b>coordination (33)</b>	.02
Motor coordination is impaired.	
<b>motor performance (13)</b>	.06
Ability to perform motor tasks, movements, and other reactions.	
<b>vehicle alignment (34)</b>	.03
Vehicle suddenly tracks off roadway or is driving in breakdown lane.	
<b>impaired tracking, steering, braking, gear changing (35)</b>	.03
Basic driving skills are impaired.	
<b>emergency braking response (36)</b>	.04
Operator is not fully able to execute an emergency braking action in response to danger or necessity stimulus.	
<b>spatial judgement, impaired driving skills (42,44)</b>	.04
Ability to judge space between vehicle and pedestrian is impaired, and general driving skills are impaired to some extent.	
<b>curve negotiating (43)</b>	.05
Operator cannot steer around curve, or is impaired in ability to judge steering, speed, etc. to successfully negotiate a curve in the roadway.	
<b>distance judgement (23,28,38)</b>	.07
Ability to judge distance is impaired.	
<b>glare adaptation (39)</b>	.07
Adaptation to glare from oncoming vehicles' headlights is reduced, and operator is unable to focus on roadway or perceive objects or stimuli in the roadway environment.	
<b>lateral position error, steering correction time (40)</b>	.07
Driver operates in the breakdown lane; time to realign the vehicle in response to a stimulus is lengthened	

# Scenario: Pedestrian struck while crossing road

Driving skill (reference #)	Impairment Threshold
<b>Reaction Time</b>	
<b>simple reaction time (1)</b> Time from decision to the onset of the reaction response.	.03
<b>choice reaction time (2)</b> Time to make response choice- braking, steering, sounding horn.	.03
<b>concentrated attention (9)</b> Ability to focus on roadway and maintain vigilance and forward gaze.	.07
<b>divided attention - detection of/ response to peripheral stimuli (11)</b> Ability of operator to detect stimuli outside the central field of vision (peripheral view) while performing another task or processing information.	.02
<b>visual reaction time (12,13)</b>	.04
<b>response to peripheral stimuli (14)</b> Response to stimulus outside cone of acute vision (+/- 5 degrees from forward).	.04
<b>response to central stimuli (14)</b> Impaired response to stimulus within acute field of vision.	.04
<b>visual search (15,24)</b> Ability to maintain searching pattern for objects on or about the roadway.	.05
<b>visual recognition (15)</b> Ability to recognize objects after they have been perceived.	.07
<b>comprehension (41)</b> Subject cannot accurately comprehend what has been perceived, and may misinterpret stimulus or be unable to process the information.	.05
<b>visual information processing (17)</b> Recognition and decision-making ability, using visual information.	.06
<b>information processing rate (18,19)</b> Time to process from the point of perception to the point of recognition.	.07
<b>response selection (20)</b> Ability to make the best response to a visual stimulus, thus giving the optimum chance of avoiding a dangerous situation..	.07
<b>glare recovery (21)</b> Time for eyes to recover from a one-time glare from oncoming traffic.	.01
<b>double vision, other vision impairment (10,22)</b> Ability to focus and perceive an image clearly, thus affecting recognition of an object as being in a dangerous position.	.05

<b>contrast sensitivity (25)</b>	.05
Ability to "see" an object, based on the contrast of the object with the background or environment.	
<b>stereoacuity (45)</b>	.05
Ability to focus both eyes sharply on an object, thus affecting perception and recognition of distance between vehicle and object.	
<b>stimulus detection (26)</b>	.07
Ability to detect stimulus so a decision can be made to react	
<b>dynamic visual acuity (27)</b>	.08
Sharpness of vision when viewing moving objects.	
<b>depth perception (28)</b>	.08
Ability to determine distance between subject (and subject's vehicle) and object being perceived.	
<b>reaction (to motion) time (17)</b>	.02
Slow reaction to movement, or to the rate of motion - applicable to cases where pedestrian is crossing in front of vehicle.	
<b>time perception (30)</b>	.04
Subject has a distorted perception of time, and may feel that situation is occurring in slow motion, or may portray a distorted perception of time in describing a situation.	
<b>visual movement sensitivity (32)</b>	.08
Limited ability to sense pedestrian's motion or rate of motion.	
<b>coordination (33)</b>	.02
Motor coordination is impaired.	
<b>motor performance (13)</b>	.06
Ability to perform motor tasks, movements, and other reactions.	
<b>impaired tracking, steering, braking, gear changing (35)</b>	.03
Basic driving skills are impaired.	
<b>emergency braking response (36)</b>	.04
Operator is not fully able to execute an emergency braking action in response to danger or necessity stimulus.	
<b>distance judgement (23,28,38)</b>	.07
Ability to judge distance is impaired.	
<b>glare adaptation (39)</b>	.07
Adaptation to glare from oncoming vehicles' headlights is reduced, and operator is unable to focus on roadway or perceive objects or stimuli in the roadway environment.	

## Scenario: Single vehicle collision - loss of control, leaves roadway

Driving skill (reference #)	Impairment Threshold
<b>Reaction Time</b>	
<b>simple reaction time (1)</b> Time from decision to the onset of the reaction response.	.03
<b>choice reaction time errors (3)</b> Subject makes errors in selecting the appropriate response from a number of options available.	.05
<b>tracking (6,7,8,35)</b> Ability to keep vehicle on traveled part of road and avoid swerving across fog line or crossing the center line or into another lane of travel.	.03
<b>concentrated attention (9)</b> Ability to focus on roadway and maintain vigilance and forward gaze.	.07
<b>visual reaction time (12,13)</b>	.04
<b>visual search (15,24)</b> Ability to maintain searching pattern for objects on or about the roadway.	.05
<b>comprehension (41)</b> Subject cannot accurately comprehend what has been perceived, and may misinterpret stimulus or be unable to process the information.	.05
<b>visual information processing (17)</b> Recognition and decision-making ability, using visual information.	.06
<b>information processing rate (18,19)</b> Time to process from the point of perception to the point of recognition.	.07
<b>response selection (20)</b> Ability to make the best response to a visual stimulus, thus giving the optimum chance of avoiding a dangerous situation..	.07
<b>glare recovery (21)</b> Time for eyes to recover from a one-time glare from oncoming traffic.	.01
<b>stereoacuity (45)</b> Ability to focus both eyes sharply on an object, thus affecting perception and recognition of distance between vehicle and object.	.05
<b>stimulus detection (26)</b> Ability to detect stimulus so a decision can be made to react	.07
<b>dynamic visual acuity (27)</b> Sharpness of vision when viewing moving objects.	.08

<b>depth perception (28)</b>	.08
Ability to determine distance between subject (and subject's vehicle) and object being perceived.	
<b>time perception (30)</b>	.04
Subject has a distorted perception of time, and may feel that situation is occurring in slow motion, or may portray a distorted perception of time in describing a situation.	
<b>coordination (33)</b>	.02
Motor coordination is impaired.	
<b>motor performance (13)</b>	.06
Ability to perform motor tasks, movements, and other reactions.	
<b>vehicle alignment (34)</b>	.03
Vehicle suddenly tracks off roadway or crosses fog or center line, or is driving in breakdown lane.	
<b>impaired tracking, steering, braking, gear changing (35)</b>	.03
Basic driving skills are impaired.	
<b>emergency braking response (36)</b>	.04
Operator is not fully able to execute an emergency braking action in response to danger or necessity stimulus.	
<b>curve negotiating (43)</b>	.05
Operator cannot steer around curve, or is impaired in ability to judge steering, speed, etc. to successfully negotiate a curve in the roadway.	
<b>distance judgement (23,28,38)</b>	.07
Ability to judge distance is impaired.	
<b>glare adaptation (39)</b>	.07
Adaptation to glare from oncoming vehicles' headlights is reduced, and operator is unable to focus on roadway or perceive objects or stimuli in the roadway environment.	
<b>lateral position error, steering correction time (40)</b>	.07
Driver operates in the wrong lane, or in breakdown lane; time to realign the vehicle in response to a stimulus is lengthened	

## Scenario: Entering roadway, failure to yield to oncoming MV

Driving skill (reference #)	Impairment Threshold
<b>simple reaction time (1)</b> Time from decision to the onset of the reaction response.	.03
<b>choice reaction time errors (3)</b> Subject makes errors in selecting the appropriate response from a number of options available.	.05
<b>visual search (15,24)</b> Ability to maintain searching pattern for objects on or about the roadway.	.05
<b>visual recognition (15)</b> Ability to recognize objects after they have been perceived.	.07
<b>interpretation of signals (16)</b> Ability of the operator to interpret brake lights, traffic signals, etc. is impaired, even though the operator perceives the signal.	.05
<b>comprehension (41)</b> Subject cannot accurately comprehend what has been perceived, and may misinterpret stimulus or be unable to process the information.	.05
<b>visual information processing (17)</b> Recognition and decision-making ability, using visual information.	.06
<b>information processing rate (18,19)</b> Time to process from the point of perception to the point of recognition.	.07
<b>response selection (20)</b> Ability to make the best response to a visual stimulus, thus giving the optimum chance of avoiding a dangerous situation..	.07
<b>stereoacuity (45)</b> Ability to focus both eyes sharply on an object, thus affecting perception and recognition of distance between vehicle and object.	.05
<b>stimulus detection (26)</b> Ability to detect stimulus so a decision can be made to react	.07
<b>dynamic visual acuity (27)</b> Sharpness of vision when viewing moving objects.	.08
<b>depth perception (28)</b> Ability to determine distance between subject (and subject's vehicle) and object being perceived.	.08
<b>time perception (30)</b> Subject has a distorted perception of time, and may feel that situation is occurring in slow motion, or may portray a distorted perception of time in describing a situation.	.04

<b>impaired tracking, steering, braking, gear changing (35)</b>	.03
Basic driving skills are impaired.	
<b>distance judgement (23,28,38)</b>	.07
Ability to judge distance is impaired.	

## Scenario: Left turn in front of oncoming vehicle

Driving skill (reference #)	Impairment Threshold
<b>Reaction Time</b>	
<b>choice reaction time (2)</b> Time to make response choice- braking, steering, sound horn.	.03
<b>choice reaction time errors (3)</b> Subject makes errors in selecting the appropriate response from a number of options available.	.05
<b>concentrated attention (9)</b> Ability to focus on roadway and maintain vigilance and forward gaze.	.07
<b>visual reaction time (12,13)</b>	.04
<b>response to central stimuli (14)</b> Impaired response to stimulus within acute field of vision.	.04
<b>visual search (15,24)</b> Ability to maintain searching pattern for objects on or about the roadway.	.05
<b>visual recognition (15)</b> Ability to recognize objects after they have been perceived.	.07
<b>interpretation of signals (16)</b> Ability of the operator to interpret brake lights, traffic signals, etc. is impaired, even though the operator perceives the signal.	.05
<b>comprehension (41)</b> Subject cannot accurately comprehend what has been perceived, and may misinterpret stimulus or be unable to process the information.	.05
<b>visual information processing (17)</b> Recognition and decision-making ability, using visual information.	.06
<b>information processing rate (18,19)</b> Time to process from the point of perception to the point of recognition.	.07
<b>response selection (20)</b> Ability to make the best response to a visual stimulus, thus giving the optimum chance of avoiding a dangerous situation..	.07
<b>glare recovery (21)</b> Time for eyes to recover from a one-time glare from oncoming traffic.	.01
<b>double vision, other vision impairment (10,22)</b> Ability to focus and perceive an image clearly, thus affecting recognition of an object as being in a dangerous position.	.05
<b>stereoacuity (45)</b> Ability to focus both eyes sharply on an object, thus affecting perception and recognition of distance between vehicle and object.	.05

<b>dynamic visual acuity (27)</b>	.08
Sharpness of vision when viewing moving objects.	
<b>depth perception (28)</b>	.08
Ability to determine distance between subject (and subject's vehicle) and object being perceived.	
<b>time perception (30)</b>	.04
Subject has a distorted perception of time, and may feel that situation is occurring in slow motion, or may portray a distorted perception of time in describing a situation.	
<b>motor performance (13)</b>	.06
Ability to perform motor tasks, movements, and other reactions.	
<b>impaired tracking, steering, braking, gear changing (35)</b>	.03
Basic driving skills are impaired.	
<b>distance judgement (23,28,38)</b>	.07
Ability to judge distance is impaired.	

## Scenario: Rear-end collision

Driving skill (reference #)	Impairment Threshold
<b>Reaction Time</b>	
<b>simple reaction time (1)</b> Time from decision to the onset of the reaction response.	.03
<b>complex reaction time (4)</b> Reaction to stimulus when there is not a simple choice of response.	.07
<b>concentrated attention (9)</b> Ability to focus on roadway and maintain vigilance and forward gaze.	.07
<b>visual reaction time (12,13)</b>	.04
<b>response to central stimuli (14)</b> Impaired response to stimulus within acute field of vision.	.04
<b>visual recognition (15)</b> Ability to recognize objects after they have been perceived.	.07
<b>interpretation of signals (16)</b> Ability of the operator to interpret brake lights, traffic signals, etc. is impaired, even though the operator perceives the signal.	.05
<b>comprehension (41)</b> Subject cannot accurately comprehend what has been perceived, and may misinterpret stimulus or be unable to process the information.	.05
<b>visual information processing (17)</b> Recognition and decision-making ability, using visual information.	.06
<b>information processing rate (18,19)</b> Time to process from the point of perception to the point of recognition.	.07
<b>glare recovery (21)</b> Time for eyes to recover from a one-time glare from oncoming traffic.	.01
<b>double vision, other vision impairment (10,22)</b> Ability to focus and perceive an image clearly, thus affecting recognition of an object as being in a dangerous position.	.05
<b>stereoacuity (45)</b> Ability to focus both eyes sharply on an object, thus affecting perception and recognition of distance between vehicle and object.	.05
<b>depth perception (28)</b> Ability to determine distance between subject (and subject's vehicle) and object being perceived.	.08

<b>time perception (30)</b>	.04
Subject has a distorted perception of time, and may feel that situation is occurring in slow motion, or may portray a distorted perception of time in describing a situation.	
<b>coordination (33)</b>	.02
Motor coordination is impaired.	
<b>motor performance (13)</b>	.06
Ability to perform motor tasks, movements, and other reactions.	
<b>impaired tracking, steering, braking, gear changing (35)</b>	.03
Basic driving skills are impaired.	
<b>emergency braking response (36)</b>	.04
Operator is not fully able to execute an emergency braking action in response to danger or necessity stimulus.	
<b>spatial judgement, impaired driving skills (42,44)</b>	.04
Ability to judge space between vehicles, or vehicle and object is impaired, and general driving skills are impaired to some extent.	
<b>speed changes (37)</b>	.07
Operator cannot adjust to speed changes or make appropriate speed changes in his/her vehicle in response to driving demands.	
<b>distance judgement (23,28,38)</b>	.07
Ability to judge distance is impaired.	

## Scenario: Rear-end collision with MV stopped in breakdown lane

Driving skill (reference #)	Impairment Threshold
<b>simple reaction time (1)</b> Time from decision to the onset of the reaction response.	.03
<b>pursuit tracking (5)</b> Operator must keep vehicle within marked lanes as his/her vehicle follows another moving vehicle, or must keep his/her vehicle aligned behind the leading vehicle.	.02
<b>tracking (6,7,8,35)</b> Ability to keep vehicle on traveled part of road and avoid swerving across fog line or crossing the center line or into another lane of travel.	.03
<b>concentrated attention (9)</b> Ability to focus on roadway and maintain vigilance and forward gaze.	.07
<b>divided attention - detection of/ response to peripheral stimuli (11)</b> Ability of operator to detect stimuli outside the central field of vision (peripheral view) while performing another task or processing information.	.02
<b>visual reaction time (12,13)</b>	.04
<b>response to central stimuli (14)</b> Impaired response to stimulus within acute field of vision.	.04
<b>visual recognition (15)</b> Ability to recognize objects after they have been perceived.	.07
<b>interpretation of signals (16)</b> Ability of the operator to interpret brake lights, traffic signals, flashers, etc. is impaired, even though the operator perceives the signal.	.05
<b>comprehension (41)</b> Subject cannot accurately comprehend what has been perceived, and may misinterpret stimulus or be unable to process the information.	.05
<b>visual information processing (17)</b> Recognition and decision-making ability, using visual information.	.06
<b>glare recovery (21)</b> Time for eyes to recover from a one-time glare from oncoming traffic.	.01
<b>double vision, other vision impairment (10,22)</b> Ability to focus and perceive an image clearly, thus affecting recognition of an object as being in a dangerous position.	.05
<b>stereoacuity (45)</b> Ability to focus both eyes sharply on an object, thus affecting perception and recognition of distance between vehicle and object.	.05

<b>depth perception (28)</b>	.08
Ability to determine distance between subject (and subject's vehicle) and object being perceived.	
<b>vehicle alignment (34)</b>	.03
Vehicle suddenly tracks off roadway or crosses fog or center line, or is driving in breakdown lane.	
<b>impaired tracking, steering, braking, gear changing (35)</b>	.03
Basic driving skills are impaired.	
<b>emergency braking response (36)</b>	.04
Operator is not fully able to execute an emergency braking action in response to danger or necessity stimulus.	
<b>spatial judgement, impaired driving skills (42,44)</b>	.04
Ability to judge space between vehicles, or vehicle and object is impaired, and general driving skills are impaired to some extent.	
<b>curve negotiating (43)</b>	.05
Operator cannot steer around curve, or is impaired in ability to judge steering, speed, etc. to successfully negotiate a curve in the roadway.	
<b>distance judgement (23,28,38)</b>	.07
Ability to judge distance is impaired.	
<b>glare adaptation (39)</b>	.07
Adaptation to glare from oncoming vehicles' headlights is reduced, and operator is unable to focus on roadway or perceive objects or stimuli in the roadway environment.	
<b>lateral position error, steering correction time (40)</b>	.07
Driver operates in the wrong lane, or in breakdown lane; time to realign the vehicle in response to a stimulus is lengthened	

## Scenario: Intersection collision

Driving skill (reference #)	Impairment Threshold
<b>simple reaction time (1)</b> Time from decision to the onset of the reaction response.	.03
<b>choice reaction time errors (3)</b> Subject makes errors in selecting the appropriate response from a number of options available.	.05
<b>complex reaction time (4)</b> Reaction to stimulus when there is not a simple choice of response.	.07
<b>concentrated attention (9)</b> Ability to focus on roadway and maintain vigilance and forward gaze.	.07
<b>divided attention - detection of/ response to peripheral stimuli (11)</b> Ability of operator to detect stimuli outside the central field of vision (peripheral view) while performing another task or processing information.	.02
<b>visual reaction time (12,13)</b>	.04
<b>response to peripheral stimuli (14)</b> Response to stimulus outside cone of acute vision (+/- 5 degrees from forward).	.04
<b>response to central stimuli (14)</b> Impaired response to stimulus within acute field of vision.	.04
<b>visual search (15,24)</b> Ability to maintain searching pattern for objects on or about the roadway.	.05
<b>visual recognition (15)</b> Ability to recognize objects after they have been perceived.	.07
<b>interpretation of signals (16)</b> Ability of the operator to interpret brake lights, traffic signals, etc. is impaired, even though the operator perceives the signal.	.05
<b>comprehension (41)</b> Subject cannot accurately comprehend what has been perceived, and may misinterpret stimulus or be unable to process the information.	.05
<b>visual information processing (17)</b> Recognition and decision-making ability, using visual information.	.06
<b>information processing rate (18,19)</b> Time to process from the point of perception to the point of recognition.	.07
<b>response selection (20)</b> Ability to make the best response to a visual stimulus, thus giving the optimum chance of avoiding a dangerous situation..	.07
<b>double vision, other vision impairment (10,22)</b> Ability to focus and perceive an image clearly, thus affecting recognition of an object as being in a dangerous position.	.05

<b>stimulus detection (26)</b>	.07
Ability to detect stimulus so a decision can be made to react	
<b>dynamic visual acuity (27)</b>	.08
Sharpness of vision when viewing moving objects.	
<b>depth perception (28)</b>	.08
Ability to determine distance between subject (and subject's vehicle) and object being perceived.	
<b>peripheral vision with central task (29)</b>	.04
Limited peripheral vision when driver is making driving decisions.	
<b>time perception (30)</b>	.04
Subject has a distorted perception of time, and may feel that situation is occurring in slow motion, or may portray a distorted perception of time in describing a situation.	
<b>visual movement sensitivity (32)</b>	.08
Limited ability to sense other vehicle's motion or rate of motion.	
<b>coordination (33)</b>	.02
Motor coordination is impaired.	
<b>motor performance (13)</b>	.06
Ability to perform motor tasks, movements, and other reactions.	
<b>impaired tracking, steering, braking, gear changing (35)</b>	.03
Basic driving skills are impaired.	
<b>emergency braking response (36)</b>	.04
Operator is not fully able to execute an emergency braking action in response to danger or necessity stimulus.	
<b>distance judgement (23,28,38)</b>	.07
Ability to judge distance is impaired.	

## Scenario: Driving skills related to field sobriety test observations

Driving skill (reference #)	Impairment Threshold
<b>simple reaction time</b> (1) Time from decision to the onset of the reaction response.	.03
<b>choice reaction time errors</b> (3) Subject makes errors in selecting the appropriate response from a number of options available.	.05
<b>concentrated attention</b> (9) Ability to focus on roadway and maintain vigilance and forward gaze.	.07
<b>visual recognition</b> (15) Ability to recognize objects after they have been perceived.	.07
<b>comprehension</b> (41) Subject cannot accurately comprehend what has been perceived, and may misinterpret stimulus or be unable to process the information.	.05
<b>visual information processing</b> (17) Recognition and decision-making ability, using visual information.	.06
<b>information processing rate</b> (18,19) Time to process from the point of perception to the point of recognition.	.07
<b>double vision, other vision impairment</b> (10,22) Ability to focus and perceive an image clearly, thus affecting recognition of an object as being in a dangerous position.	.05
<b>depth perception</b> (28) Ability to determine distance between subject (and subject's vehicle) and object being perceived.	.08
<b>time perception</b> (30) Subject has a distorted perception of time, and may feel that situation is occurring in slow motion, or may portray a distorted perception of time in describing a situation.	.04
<b>coordination</b> (33) Motor coordination is impaired.	.02
<b>motor performance</b> (13) Ability to perform motor tasks, movements, and other reactions.	.06
<b>distance judgement</b> (23,28,38) Ability to judge distance is impaired.	.07

## Scenario: Skills associated with behavior that triggers the stop

Driving skill (reference #)	Impairment Threshold
<b>simple reaction time</b> (1) Time from decision to the onset of the reaction response.	.03
<b>choice reaction time errors</b> (3) Subject makes errors in selecting the appropriate response from a number of options available.	.05
<b>pursuit tracking</b> (5) Operator must keep vehicle within marked lanes as his/her vehicle follows another moving vehicle, or must keep his/her vehicle aligned behind the leading vehicle.	.02
<b>tracking</b> (6,7,8,35) Ability to keep vehicle on traveled part of road and avoid swerving across fog line or crossing the center line or into another lane of travel.	.03
<b>concentrated attention</b> (9) Ability to focus on roadway and maintain vigilance and forward gaze.	.07
<b>divided attention - detection of/ response to peripheral stimuli</b> (11) Ability of operator to detect stimuli outside the central field of vision (peripheral view) while performing another task or processing information.	.02
<b>visual search</b> (15,24) Ability to maintain searching pattern for objects on or about the roadway.	.05
<b>interpretation of signals</b> (16) Ability of the operator to interpret brake lights, traffic signals, etc. is impaired, even though the operator perceives the signal.	.05
<b>comprehension</b> (41) Subject cannot accurately comprehend what has been perceived, and may misinterpret stimulus or be unable to process the information.	.05
<b>visual information processing</b> (17) Recognition and decision-making ability, using visual information.	.06
<b>information processing rate</b> (18,19) Time to process from the point of perception to the point of recognition.	.07
<b>double vision, other vision impairment</b> (10,22) Ability to focus and perceive an image clearly, thus affecting recognition of an object as being in a dangerous position.	.05
<b>depth perception</b> (28) Ability to determine distance between subject (and subject's vehicle) and object being perceived.	.08

<b>peripheral vision with central task (29)</b>	.04
Limited peripheral vision when driver is making driving decisions.	
<b>time perception (30)</b>	.04
Subject has a distorted perception of time, and may feel that situation is occurring in slow motion, or may portray a distorted perception of time in describing a situation.	
<b>coordination (33)</b>	.02
Motor coordination is impaired.	
<b>motor performance (13)</b>	.06
Ability to perform motor tasks, movements, and other reactions.	
<b>vehicle alignment (34)</b>	.03
Vehicle suddenly tracks off roadway or crosses fog or center line, or is driving in breakdown lane.	
<b>impaired tracking, steering, braking, gear changing (35)</b>	.03
Basic driving skills are impaired.	
<b>spatial judgement, impaired driving skills (42,44)</b>	.04
Ability to judge space between vehicles, or vehicle and object is impaired, and general driving skills are impaired to some extent.	
<b>curve negotiating (43)</b>	.05
Operator cannot steer around curve, or is impaired in ability to judge steering, speed, etc. to successfully negotiate a curve in the roadway.	
<b>speed changes (37)</b>	.07
Operator cannot adjust to speed changes or make appropriate speed changes in his/her vehicle in response to driving demands.	
<b>lateral position error, steering correction time (40)</b>	.07
Driver operates in the wrong lane, or in breakdown lane; time to realign the vehicle in response to a stimulus is lengthened	

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