TDI-B05.01

Course Title:	TIME-DISTANCE OPERATOR TRAINING / TIME-DISTANCE OPERATOR RE-CERTIFICATION TRAINING
Lesson Title:	Legal and Operational Considerations
Lesson Purpose:	To present to the participants the processes through which Time-Distance evidence has come to be accepted in courts and operational procedures necessary for judicial acceptance. The student must apply the scientific principles learned in the previous section to specific Time-Distance instruments. The principles for each device are the same; however, their application to the mode of operation for the devices may be different.
Performance Objectives:	At the end of this block of instruction, the student will be able to achieve the following objectives in accordance with the information received during the instructional period.

1. Identify and describe those factors which may affect the selection of various speed measurement sites.

2. Describe the five basic operating configurations required when employing Time-Distance speed measuring instruments.

3. Describe the calibrating procedures for Time-Distance speed measuring instruments and what intervals the instruments are required to be calibrated.

4. Define a reference point and describe at least ten (10) reference points.

5. Define reaction time and anticipation time and distinguish between the two.

6. Identify the four facts required by the RADAR Reliability Act pertaining to the admissibility of results from speed measuring instruments.

7. Identify and describe the fundamental law affecting the use of time-distance for speed measurement and enforcement.

8. Discuss the essential elements necessary for the successful prosecution of a speeding offense.

Hours:	4 Hours
Instructional Method:	Lecture/Demonstration
Materials Required:	Time-Distance Operator Course Manual Pen/Pencil Handout: G.S. 8-50.2
References:	*Speed Offenses*, Northwestern University Traffic Institute (1966). Trimmer, Reece. "Legal Update In-Service." *2005 In-Service Law Enforcement Training - Student*. Salemburg, NC: North Carolina Justice Academy, 2005. U.S. Department of Transportation. *Basic Training Program in VASCAR Speed Measurement*: Washingon, DC: National Highway Safety Administration, n.d.
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Date Prepared:	Spring 1981
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Date Revised:	March 1999
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TDI-B05.03

Course Title: TIME-DISTANCE OPERATOR TRAINING / TIME-DISTANCE OPERATOR RE-CERTIFICATION TRAINING

Lesson Title: Legal and Operational Considerations

Note: The instructor should be familiar with case law affecting speed enforcement. These cases should be prepared and incorporated, with the key points of these decisions highlighted in the lesson plan. Feel free to augment the lesson plan as appropriate, using information drawn from the references and from previous personal experience.

The instructor must prepare or obtain all instructional aids specific in the lesson plan. Feel free to use any additional instructional aids that will enhance learning.

I. Introduction

A. Opening Statement

Ever since the automobile appeared on the American scene, the problems of speed and speed regulation have been present. In order to deal with this problem of speed, law enforcement personnel have sought to develop newer and more efficient methods to measure vehicle speed accurately.

Perhaps the earliest mechanical device for measuring speed was the stopwatch. Police officers simply timed the motorist over a measured distance and established his speed by the simple calculation of distance over elapsed time. If the motorist was found to be in violation of the speed limit, he would be pursued and stopped by the officer.

However, in 1903 the major pursuit vehicle used by law enforcement was the bicycle, and it was quite difficult to pursue a motor vehicle capable of speeds up to 40 mph. To solve this problem, police in Westchester County, New York, introduced a more "scientific" application of the stopwatch. In effect they developed the first speed trap.

New York City Police Commissioner William McAdoo set up a series of three dummy tree trunks along the Hudson drives at one-mile intervals. A policeman equipped with a stopwatch and a telephone was concealed inside each fake tree. When a car sped past the first station, the policeman inside telephoned the exact

time to the officer in the next tree. The second officer set his watch accordingly. When the car passed his post, he computed its speed for the mile. If the speed was above the posted limit, he telephoned the policeman in the third tree who lowered a pole across the road and stopped the car.

The year 1910 saw the introduction of another new scientific advancement in speed detection, the "Photo-Speed Recorder." It consisted of a camera synchronized with a stopwatch, which operated by taking pictures of a receding vehicle at various time intervals, and then comparing the size of the vehicle in each photograph taken, a mathematical formula could then be applied to determine the speed of that vehicle. William S. Buxton was found guilty of violating the speed limit while driving along Commonwealth Avenue in Boston on the basis of evidence obtained through the use of a Photo-Speed Recorder. At the trial the defendant objected to the introduction of the speed-recorder evidence contending that its accuracy and reliability had not been established. The court ruled against Mr. Buxton.

Note: Show Slides, "Performance Objectives"

B. Performance Objectives

At the end of this block of instruction, the student will be able to achieve the following objectives in accordance with the information received during the instructional period:

1. Identify and describe those factors which may affect the selection of various speed measurement sites.

2. Describe the five basic operating configurations required when employing Time-Distance speed measuring instruments.

3. Describe the calibrating procedures for Time-Distance speed measuring instruments and what intervals the instruments are required to be calibrated.

4. Define a reference point and describe at least ten (10) reference points.

5. Define reaction time and anticipation time and distinguish between the two.

6. Identify the four facts required by the RADAR Reliability Act pertaining

to the admissibility of results from speed measuring instruments.

7. Identify and describe the fundamental law affecting the use of time-distance for speed measurement and enforcement.

8. Discuss the essential elements necessary for the successful prosecution of a speeding offense.

C. Reasons

Attacking the equipment used to measure the defendant's speed and the operating officer's use of that equipment are favorite methods of attack for defense attorneys. Officers must be prepared to demonstrate that their equipment was suitable for the speed measurement; that the equipment was in proper working order when the defendant's speed was measured; and that the operating officer was qualified to use the device.

In order to use speed measuring instruments legally as tools for traffic law enforcement, the patrol officer must comply with certain prerequisites and procedures that have evolved from court decisions. The courts have established these guidelines to ensure that speed measurements are accurate and valid. Failure to comply with these guidelines implies a possibility of error that can result in the court's refusal to admit the speed measurement into evidence.

In the case of speed measuring instruments such as RADAR, the case law surrounding these instruments is extensive. These units represent somewhat complicated technology which has been accepted through a gradual process by the courts, RADAR was first used for traffic use in the 1940's and court hearings concerning RADAR continue today.

This course topic area deals with the legal ramifications associated with time-distance speed measuring instruments. As you will see, the courts for the most part have readily accepted most of the speed measurement methods which fall into this category. Unlike RADAR, the use of evidence obtained through time-distance instruments has met with little resistance by the courts.

II. Body

A. Foundational Requisites for Introduction of Scientific Evidence

RADAR devices, LIDAR speed measurement equipment, Time-Distance devices,

and even stopwatches share a characteristic critical to successful speed violation prosecutions--each must be proven to accurately perform the task of vehicle speed measurement. The underlying operational principles must be shown to be scientifically reliable.

Fortunately, these devices are receiving almost universal acceptance in court; some jurisdictions take judicial notice of their general suitability, but their scientific validity may need to be demonstrated to others.

Note: Show Slide, "Making It Admissible"

1. Expert Testimony

   The introduction of evidence derived from complex mechanical and/or scientific devices typically meets challenges from the defense as to accuracy and reliability of those devices. The burden then rests on the prosecution to demonstrate to the court that these devices are capable of accurately performing their function. In order to demonstrate this, testimony by recognized experts in a particular scientific field is required.

   Such "expert testimony" is required every time a case comes to court involving a new principle. This process of "expert testimony" is long and tedious and often bogs down the judicial process. The court can dispense with the necessity of this expert testimony if the scientific principle underlying the new device is given "judicial notice." Speed measuring devices fall into this mechanical/scientific category.

2. Judicial Notice

   All courts may take judicial notice of the existence of certain conditions. To expedite the presentation of evidence, courts may recognize or take note of those facts or principles that are so widely known as to be a matter of common knowledge and familiar to all reasonably well-informed people.

   It is important to remember first that judicial notice must extend to the scientific accuracy of the principle upon which a particular device operates. Once judicial notice has been taken of the principle, then it must also be obtained for the type of device employing that principle with respect to both accuracy and reliability. Once the courts accept the scientific principle underlying a particular device, and take judicial notice

of the accuracy and reliability of the devices which employ the principle, it is still necessary to establish the qualifications of those individuals who use the device, that the specific device used was working properly at the time of use, and that the operator was using it properly.

3. Statutes

In North Carolina, evidence of speed derived from mechanical instruments is made admissible by the granting of judicial notice by Statute. Specifically, North Carolina has granted judicial notice of the rules approving the use of speed measurement equipment and the procedures for operating and calibrating these instruments (See G.S. 8-50.2). This statutory provision will be discussed later in this outline.

B. Court Acceptance of Time-Distance Instruments

The ready acceptance by the courts of evidence obtained through the use of these speed measurement instruments results from the fact that these instruments (1) employ universally accepted workings of natural law, and (2) their basic underlying principles are both simple and common place. For example, the Speed Formula which forms the basis for the use of the time-distance instruments states that speed equals distance over time (S = D/T). Every one of us employs this concept in our everyday lives. Whenever we talk of driving our cars at a certain mile-per-hour, we are in effect employing the Speed Formula.

Note: Show Slide, "The Speed Formula"

Since these methods employ concepts and devices which are known and understood by most well-informed individuals, their use as evidence in the prosecution of speed offenses has met with little resistance from the courts. Further, unlike speed measurement instruments such as RADAR, neither their basic underlying principles, nor the individual workings of the instrument employed, require any great scientific expertise.

C. Operator Qualifications

Note: Show Slide, "Other Considerations"

Defense attorneys often attack the operating officer's qualifications. Training and certification records must be kept ready for producing in court. Defense attorneys typically challenge the adequacy of the charging officers training. The

prosecution must be ready to demonstrate that training occurred, the training was adequate, and the equipment used was checked for accuracy and was in proper working order. Most courts follow the reasoning that the operator knew basic operational procedures.

D. Vehicle Identification

Obtaining a conviction for a traffic violation is like obtaining one for a criminal violation--each and every specific element of the charged offense must be established. In cases charging speed law violations, this is true regardless of whether the Basic or Absolute Speed Laws are charged, and regardless of the type instrument used to measure the speed. Above and beyond the establishment of the speed of the vehicle, the officer must also be able to prove that a particular speed law was violated, that the defendant was in fact the driver of the vehicle at the time of the offense, and that the offense occurred on a public thorough-fare. In cases where a Time-Distance instrument was used to obtain the speed measurement, an officer must also be able to identify the violator's vehicle.

1. The officer must be prepared to demonstrate that he or she observed the vehicle for enough time, and under sufficient circumstances, to form an opinion concerning its speed.

2. The vehicle must have been observed for enough time to identify it specifically and to identify it as the speeding vehicle. Testimony must persuade the trier-of-fact that the observation period was long enough to allow the officer to identify the vehicle as the right one.

3. The officer must have observed the vehicle under circumstances that render sufficient identification possible. The officer's testimony must include sufficient details to permit the trier-of-fact to find that the identification was reasonable. Officers must be ready to explain how they identified a speeding vehicle.

4. When vehicle identification is challenged, many courts require proof that:

    a) <u>Visual</u> observation suggested that the vehicle was speeding. The officer must testify that when he or she first saw the vehicle, it appeared to be speeding. This may require testimony indicating the officer had experience "visually estimating" speed violations, such as training in that technique and subsequent field experience.

b) Instrument-based measurement confirmed the initial suspicion. The officer must testify that he or she verified the suspicion by obtaining a timely instrument-based (i.e., RADAR, VASCAR, LiDAR, TDS, stopwatch) reading on the target vehicle. He or she should be ready to demonstrate that standard operating procedures were followed with no interfering conditions.

c) Sufficient tracking history. The officer should be able to show a good tracking history-in essence, that he or she obtained an initial visual estimation and a subsequent instrument-based verification, and then "tracked" the vehicle visually and by instrument to affirm his initial findings.

5. Officers must be able to identify the target vehicle by its external characteristics. They may typically be asked:

   a) What characteristics or factors facilitated the identification?

   b) Was the vehicle damaged?

   c) Could distinctive noises be heard?

   d) Was exhaust present?

   e) What color was the vehicle?

   f) Did it "stand out in the crowd?"

   g) What was its make and model? How did you know?

6. Lighting conditions may affect officer's ability to identify the target vehicle. They may be asked:

   a) Was it light or dark?

   b) If it was dark, how was the vehicle readily identified?

   c) Was the sun in the officer's eyes? If so, how could he identify the target vehicle?

7. Some delay is inherent in speed enforcement--officers using stationary

speed measurement must start from a stopped position and catch up to the target; officers operating "moving" devices must sometimes slow, turn around, and then catch up to the target vehicle. Defense attorneys frequently ask these questions when challenging identification:

a) How long did it take to turn the police car around to pursue the target vehicle?

b) How long did it take to catch up?

c) If a turn-around was necessary, did the officer lose sight of the target vehicle?

d) If the officer lost sight of the target, how long was visual contact lost?

e) Did the officer identify characteristics of the target vehicle before the turn-around?

E. Traffic Density

The defense may challenge the officer's identification of the target vehicle by claiming that traffic was too dense to permit proper target recognition.

Attorneys may ask:

1. How dense was surrounding traffic?

2. Was the speeding vehicle surrounded by vehicles? If so, were they smaller, the same size, or much larger?

3. How many other vehicles were near the target vehicle?

4. If other vehicles were near, how could the target vehicle be singled out and identified as speeding?

F. Opinion Concerning Speed

In North Carolina, an officer must present an <u>independent</u> opinion regarding an alleged speed regardless if a speed measuring instrument is used or not. This means the opinion must not be derived through the use of any corroborating

instruments or information. Furthermore, opinion evidence, in the form of the officer's testimony, is inadmissible without a proper showing of foundation; in other words, the officer must demonstrate that he or she has some experience or training upon which to base the opinion. Courts generally find that opinion testimony may be based on foundation consisting of experience driving a car, training, basis of knowledge, and sufficient observation.

The act of estimating or "approximating" speed is referring to the process of visually observing a moving vehicle with enough time and experience to form an independent accurate opinion as to the speed of a vehicle without having to rely solely on the use of corroborating information such as a speed measuring instrument.

An officer may form an opinion as to the speed of a vehicle while either stationary alongside or traveling down the road. Once proficient, they can observe vehicles passing by and form an independent opinion as to the speed of the car by how much time it takes the car to travel over a given distance. A faster vehicle will cover the same amount of distance quicker than a slower vehicle. For example, let's suppose you are observing the same area of roadway extending for approximately 300 yards in length. If one vehicle passes through this area at 35 miles per hour, it will require 17.5 seconds for the car to negotiate this distance. On the other hand, if another vehicle passes through at 80 miles per hour, it will only require 7.6 seconds for that car to negotiate the same distance. Therefore, you will be able to identify the faster vehicle from the slower vehicle with relative ease because of the time (quicker or slower) it takes either vehicle to travel that same distance. This may seem elementary, but this is the essence of basic visual speed estimation. As you build upon these basic skills, you can become more proficient and precise in your estimations.

Precise estimation requires better detail observing how quickly the vehicle moves along a roadway at speed, and requires a heightened ability to judge the distance covered and the time required covering that distance. Normally, you accomplish this more precise technique through experience from seeing countless vehicles on the road every day and associating the speed the vehicle is traveling across a distance with known speeds you have observed before during training sessions. It also helps to take a little more time to observe, or track, the vehicle as the desired precision increases. In the earlier example of two different vehicles traveling at a difference in speed of 45 miles per hour, it was stated that you would easily be able to discern which one is "faster." But if you are attempting to identify a specific vehicle traveling 22 miles-per-hour out of a group of cars traveling 20 miles-per-hour, you will need to utilize more observation time and distance in

your technique, and depend upon past experience in correctly identifying speeding cars due to this narrow margin of difference.

An important aspect In North Carolina relating to speed measuring instrument operators is the fact that we are not only trained, but then tested in order to establish reasonably accurate and independent estimations. Furthermore, during your RADAR Operator course, your RADAR Instructor will provide you with time to learn, practice, and master this ability through demonstration and teaching techniques. You will also have the benefit to use the RADAR device during this learning experience so your independent estimations of speed are corroborated while practicing therefore building your confidence in estimation abilities. However, once testing begins the target and target lock windows will be covered so you are then relying solely on your ability to estimate the speeds of anonymous passing cars. The target and target lock speed windows are only uncovered once you have given and confirmed your independent opinion of the speed, which must then meet the specified criteria for that training session.

Take note that this language does not require the independent estimate and the speed measuring instrument reading to coincide within a 5 miles-per-hour range. For example, suppose a Trooper is operating RADAR in a 55 miles-per-hour zone and forms an opinion of the speed for an approaching car at 86 miles-per-hour. But, when the Trooper measures the speed of the vehicle with the RADAR, it displays 80 miles-per-hour in the target window after a solid tracking history is obtained. At this point, the Trooper would lock the 80 miles-per-hour reading in and stop the vehicle to enforce the speed law by charging the driver with traveling 80 miles-per-hour in a 55 miles-per-hour zone. The Trooper should charge the measured and displayed speed on the RADAR because, according to the RADAR Reliability Act, the instrument simply makes more certain an officer's independent estimate of the vehicle's speed. However, if the independent estimate of speed formed by the officer significantly differs from the measured speed displayed by a speed measuring instrument, the officer should restart his tracking process to ensure correct measurement occurs. **WHEN IN DOUBT; TAKE NO ENFORCEMENT ACTION!**

One may question the ability of a person to accurately estimate the speed of a passing vehicle. However, also consider that we are not born with the ability to speak a language, ride a bicycle, or estimate the speed of a traveling vehicle. They all require training, technique, and practice to become comfortable and proficient. But with enough time, a person can and does learn to do any of these objectives quite well.

The most prevalent court cases concerning the opinion as to the speed of a vehicle include;

Note: Show Slide, "Stafford v. Karmann (Kansas)"

1. *Stafford v. Karmann*, 2 Kan. App. 2d 248, 577 P.2d 836 (Kansas law, 1978). An officer's testimony is admissible as "lay opinion" even if he or she cannot be considered an expert in the field. Upon a proper showing of foundation; North Carolina, like most jurisdictions, requires lay testimony to be rationally based upon the witnesses' observation and helpful to a clearer understanding of his or her testimony. Rule 701 of the North Carolina Rules of Evidence.

   The following factors may bear upon the admissibility of an officer's opinion:

   a) Observation Time. The more time and distance you observe a vehicle travel, the better your estimate will normally be. Some questions you should be able to answer include; how long did the officer observe the target vehicle? How much actual time did you use, and how far in distance did you observe the vehicle. If you testify that you observed a vehicle travel a quarter of a mile in 10 seconds; how fast is he/she going according to that math?

   b) Experience. How much experience does the officer have in speed estimation/measurement? Was this the officer's first speed enforcement experience, or has he/she been involved in speed enforcement for some time? What is in his/her training background that demonstrates their ability to independently estimate speed of moving vehicles? What is the officer's technique for estimating speed?

2. *State v. Barnhill*, 601 S.E.2d 215 (N.C. Ct. App. 2004). An officer justified a speeding stop based on his estimate of observed speed even though he never received training in speed estimation.[1]

   a) An ECU police officer heard a truck approach an intersection next to his parked patrol car. The officer believed the truck was exceeding a safe speed and estimated the truck's speed as 45 M.P.H. in a 25 M.P.H. zone. The officer testified his speed estimate was based on seeing the truck travel 750 feet in 5 to 10

seconds. The officer stopped the truck and eventually arrested the driver for DWI. On cross-examination, the officer admitted he testified at an earlier revocation hearing that the truck covered 750 feet in 35-40 seconds. The loud engine sound was also part of the speed estimate and the fact the truck bounced when it crossed the crowned intersection. The officer admitted he never received any training in visual estimation of speed and was not certified to operate any speed detection device. He did not measure the truck's actual distance traveled but estimated the distance. The trial judge suppressed all evidence of impairment gained after the truck's stop because the officer's estimation of speed was not objectively justified.

b) The Court of Appeals reversed the trial court's suppression of impairment evidence and ruled the officer's estimate of speed justified the stop even though he was never trained in speed estimation. North Carolina evidence law does not require any objective standard before an ordinary adult can express an opinion about speed in court, given ordinary intelligence and a reasonable opportunity to observe the vehicle. If any ordinary citizen can estimate speed, so can the officer. "[I]t is not necessary that an officer have specialized training to be able to visually estimate the speed of a vehicle." The officer had an unobstructed view and an adequate opportunity to observe the truck's approach. The officer heard the loud noise of the truck engine and saw it bounce in the intersection, adding to his observation of vehicle speed. All factors combined, the officer had a fair probability the truck was exceeding the speed limit. The stop was lawful.

Note: Show Slide, "US v. Sowards"

3. *U.S. v. Sowards*[10], *5:06-cr-00024-RLV-DSC-1* (4th Circuit Court of Appeals; 2012). A North Carolina officer's uncorroborated opinion as to the speed of a vehicle traveling 75 MPH in a 70 MPH zone is not considered reasonable. The Court reached this decision based partly upon his testimony that he had no technique for estimating speed of a moving vehicle; the fact that he demonstrated trouble with judging distances and its relationship with a moving vehicle during cross examination testimony by the defense attorney; and that his personal estimate was not an excessively significant difference from the posted speed limit.

a) This Court of Appeals case established that visual speed estimates without corroborating information from speed measuring instruments or speedometers are considered just that; estimates that are not exact. These uncorroborated estimates may not be considered "reasonable" by the Court, and therefore a stop should not be made when slight differences exist between the uncorroborated estimate and the posted speed limit. For example, if an officer is visually estimating the speed of a vehicle at 75 miles-per-hour in a 70 miles-per-hour zone, the court has said that the officer should not stop the vehicle for a speed violation based solely off his/her independent estimation of the target vehicle's speed without having some type of corroborating evidence. This is due to the courts concern that the accuracy of a person visually estimating speed, without that corroborating evidence and within a narrow 5 miles-per-hour window, is simply too narrow to apply probable cause.

b) Albeit not specified, the same court seemed to establish that if a vehicle were observed and estimated by a lay person to be traveling at 80 miles-per-hour in a 70 miles-per-hour zone the margin of error in the ability of the person to estimate the vehicle is speeding is much wider, and thus, reasonable for the purposes of establishing reasonable suspicion to stop the vehicle and probable cause to charge an offense. This seems to support the North Carolina Basic Law Enforcement Training manual where it states that it is accepted that the standard expectation for a lay witness to visually estimate the speed of a vehicle where "it is accurate to the actual speed within 1 mile per hour is usually uncommon; within 5 miles per hour is practical; and within 10 miles per hour is relatively common."

c) Prepare for your testimony before court. The ability to clearly articulate the foundation for your opinion as to the speed of a vehicle is a key fact to reaching a successful conclusion to any trial. However, without possessing a thorough understanding of the concepts, rules, techniques, and procedure; your testimony will be inconclusive and you risk not only losing the case, but creating an unnecessary hardship on the law enforcement community as well. Prior to any trials, officers should first meet with the District Attorney (or the U.S. Attorney representing the government in any Federal court) to plan and discuss key points of the evidence.

4. *U.S. v. Mubdi*[11], 5:08-cr-00051-RLV-DCK-1 (4th Circuit Court of Appeals; 2012). Two independent North Carolina officers' opinions as to the speed of the same vehicle traveling 63 or 64 MPH in a 55 MPH zone is considered reasonable; 1) based partly upon the fact there was more than one estimate – two officers visually tracked the moving car and formed a similar opinion, and 2) that both personal estimates suggested the defendant was in "significant excess" of the posted speed limit.

   There are a couple of similarities we, as Operators, must acknowledge between the thoughts of these two different panels of Judges for the Fourth Circuit:

   a) First, the *Mubdi* decision reiterated the thoughts held in the *Sowards* case that, anytime an insignificant difference exists between the uncorroborated opinion as to speed of a vehicle and the posted speed limit for that particular area, the Court requires more *indicia of evidence* to support a traffic stop. In *Mubdi*, the personal estimate of speed was in significant excess of the posted speed limit. The difference between these two cases clearly specifies that a 5 mph difference between the uncorroborated estimate and the posted speed limit is insignificant, while a difference of 8-9 mph difference between the uncorroborated estimate and the posted speed limit is significant.

   b) Second, the *Mubdi* case offered the Court two independent opinions as to the speed of the moving vehicle. The Fourth Circuit clearly acknowledged that this fact was very important by stating that, even without a significant difference between the posted speed limit and the officer's opinion as to the speed of the vehicle, the tandem evidence (multiple estimations acting as corroboration) acts to support a finding of probable cause alone.

5. *State v. Royster*[13], COA12-458 (North Carolina Court of Appeals); 09-CRS-252931 (December 2012). The officer's personal estimate of speed is considered reasonable based upon his testimony of the time of observation, a thorough distance by which he observed the vehicle travel, and his training and experience estimating speed.

   The officer testified that he routinely worked the area where he observed the defendant, and formed an opinion that the defendant's vehicle was

traveling 52 mph in a 35mph zone for a period of three to five seconds observation time. The officer also testified to the fact he held North Carolina RADAR operator certification, and although not perfect, he did testify substantially correct to the procedure by which an operator is tested to obtain operator certification.

Notable points from this case include;

a) The Court noted that while 3 seconds is seemingly quick for observation, the officer testified in this case that he continued observing the vehicle beyond the 3 second period he formally testified to. Therefore, a longer observation period is recommended beyond the 3 second period.

b) Establishing your training and testing accurately as a certified RADAR Operator training is imperative to gaining specialized training acknowledgement by the Court. Understand the testing protocol, and be prepared to accurately testify to it under oath.

c) The officer testifying in this case had no knowledge that it had exceeded the Superior Court level. His initial testimony in Superior Court was forwarded throughout the appellate process. Therefore, you must prepare accordingly for each District or Superior Court trial as you never know when your testimony will become case law, or in this case, part of the operator manual viewed by the entire state as an example.

G. RADAR Reliability Act - G.S. 8-50.2

In the second session of the 1979 General Assembly, North Carolina's legislature enacted the RADAR Reliability Act which provided for the admissibility in court of the results of speed-measuring instruments. This law was codified as G.S. 8-50.2. It became effective July 1, 1982 and was amended effective October 1, 2005.

The most significant impact of the Radar Reliability Act to the individual enforcement officer is that if the statutory requirements for admissibility are proven, the results of a speed-measuring instrument are not subject to challenge on the basis of being unreliable. In order for the officer to be able to testify to the results of a reading given by radar, he must be able to testify in accordance with the statute. Radar and other speed-measuring instrument results are admissible

only for the purpose of corroborating the opinion of a person as to the speed of an object based upon the visual observation of the object by such person. In other words, the officer must form an opinion of the speed of the vehicle prior to measuring its speed. After the speed has been measured, the officer must be able to testify to four facts before the results of that measurement are admissible to corroborate his or her opinion.

Note: Show Slide, "RADAR Reliability Act"

These four facts are:

1. The officer held certification from the North Carolina Criminal Justice Education and Training Standards Commission authorizing him or her to operate the speed-measuring instrument from which the results were obtained.

2. The officer operated the speed-measuring instrument in accordance with the procedure established by the Commission;

3. The instrument employed was approved for use by the Commission and the Secretary of Public Safety; and

4. The speed-measuring instrument had been calibrated and tested for accuracy in accordance with the standards established by the Commission for that particular instrument.

H. Case Preparation and Presentation

Note: Show Slide, "Case Preparation and Review"

We have, to this point, discussed several elements essential to the successful prosecution of a speeding offense. When preparing each case, it may be helpful for the officer to keep these elements in mind.

1. As an aid to the officer these elements are summarized below:

   a) The officer must establish the time, place and location of the time-distance use; the location of the offending vehicle at the time the offense took place; that the offending person was the operator of the vehicle; and that state law regarding the posted speed limit and time-distance instrument rules and procedures were complied with.

In those states where no prima facie unlawful speed is established, officers must testify to the unreasonableness of the speed of the offending vehicle.

b) The officer must state his qualifications and training.

c) The officer must establish that the unit was operating normally.

d) The officer must establish that the unit was tested for accuracy in accordance with State standards.

e) The officer must identify the vehicle as well as his/her visual observation of its apparent excessive speed.

f) The officer must obtain a tracking history in order to establish the accuracy of the reading.

2. These elements should be incorporated into a clear and concise account of the incident.

3. In testifying, the officer should cite only those facts of which he or she is sure.

I. A review of judicial examination of speed measurement using Time-Distance instruments follows.

These following cases are from jurisdictions outside of North Carolina and thus have no precedential value in our courts. The cases do provide valuable information regarding the acceptance of time-distance theory and equipment.

The PEOPLE of the State of New York v. Alan R. Persons,

60 Misc. 2d 803, 303 N.Y.S. 2d 728 (Monroe County Court, 1969)

Court of Special Sessions, Town of Pittsford, Monroe County.

Sept. 3, 1969.

Defendant was charged with speeding. The Court of Special Sessions, Monroe County, Thomas E. Goldman, Town Justice, held that where it was shown that the arresting officer tested the speed-recording device by using an accurately measured course and an accurate stopwatch on the day of arrest, and that the arresting officer operated the speed-recording device in such manner so as to accurately measure the defendant's speed, the accuracy of the speed recording device, showing defendant to have been traveling at 74.5 miles per hour in 60-mile per hour zone, was proven.

Order accordingly.

1. Criminal Law

Where the speed-recording device was new and its accuracy and reliability had not yet been challenged, the scientific principle, the construction, the operation, accuracy and reliability of the device had to be proven beyond reasonable doubt by expert testimony.

2. Criminal Law

When expert witnesses amply attest to scientific principle, construction, operation, accuracy and reliability of a speed-recording device, the machine was an accurate and proper instrument for detecting speeding violations when properly tested and used.

3. Criminal Law

The showing of extensive training and testing of operators of speed-recording devices satisfactorily proved that individuals could be and were trained in such a manner that if the device were used as directed, it would accurately measure the speed of a vehicle.

4. Criminal Law

Establishing the accuracy of a speed-recording device requires proof that the device was operated in such a manner that it would in fact measure the distance the suspected violator traveled and the time during which he traveled that distance, requires a showing that the device

was tested to determine if it was working properly and that it was in fact properly used.

5. Criminal Law

Where it was shown that the arresting officer tested the speed-recording device by using an accurately measured course and an accurate stopwatch on the day of the arrest, and that the arresting officer operated the speed-recording device in such a manner so as to accurately measure the defendant's speed, the accuracy of the speed-recording device, showing the defendant to have been traveling at 74.5 miles per hour in 60-mile per hour zone, was proven.

John C. Little, Jr., Dist. Atty., Monroe County, James E. Morris, Rochester, of counsel, for plaintiff.

Alan R. Persons, Rochester, for defendant.

DECISION

THOMAS E. GOLDMAN, Town Justice

The defendant is charged with speeding and the sole evidence produced by the People concerning his speed was that derived from the use of a new device known as VASCAR (visual average speed computer recorder). This instrument is supposed to measure the distance a vehicle travels and the time which it takes the vehicle to cover that distance. By using the mathematical formula of speed equals distance divided by time, the unit computes the average speed of a vehicle over the distance measured and visually displays that speed to the operator.

(1) VASCAR's accuracy and reliability has not yet been challenged and this is the first test case in the State of New York dealing with this device. Since the instrument is new, expert testimony as to the scientific principle, construction, operation, accuracy and reliability of the device must be proven beyond a reasonable doubt, City of Buffalo v. Beck, 205 Misc. 757, 130 N.Y.S.2d 354 (Sup. Ct., Erie County, 1954); People of City of Rochester v. Torpey, 204 Misc. 1023, 128 N.Y.S.2d 864 (Monroe County Court, 1953); People v. Martirano, 52 Misc.2d 64, 275 N.Y.S.2d 215 (Westchester County Court, 1966).

The proof submitted by the People consisted of testimony of duly qualified experts who were in charge of the development, manufacture and marketing of this device. This proof established the following facts: The VASCAR unit is composed of four modules: an odometer module which measures distance, a switch module which is used by the operator to activate the time and distance measuring devices, a display module on which the resulting speed is displayed

and lastly, a computer module which records the distance, measures time and divides the time into the distance.

The odometer module is connected to the speedometer cable of the vehicle in which the unit is installed. When the distance switch is activated, the revolutions of the cable are transformed into impulses which are counted by the computer. In this manner the computer measures the distance traveled by the vehicle in which it is installed. The accuracy of the speedometer is immaterial. The important factor here is that the cable will be consistent in the number of revolutions per mile.

Time is measured by use of an oscillator which produces impulses at the rate of 170.7 each second. When the time switch is activated, the computer counts the number of impulses and in this way it measures time. There is a voltage regulator in the computer which ensures the accuracy of the oscillator.

(2) There was ample proof concerning the various tests made of the equipment and it is the Court's finding that the machine "is an accurate and proper instrument for detecting speed violations on our highways," if properly tested and used. People v. Sachs, 1 Misc.2d 148, 154, 147 N.Y.S.2d 801, 807 (City Magistrate's Court, City of New York, 1955).

(3) There was considerable proof concerning the extensive training and testing of VASCAR operators. The People satisfactorily proved that individuals could and were trained in such a manner that if the device were used as directed it would accurately measure the speed of a vehicle. People v. Sachs, supra. The Court recognizes that because of the human factor it is impossible to measure exact speed. However, proof was presented that demonstrated that after proper training of VASCAR operators, human error would result in a measurement error of less than one mile per hour.

(4) The key to the accuracy of VASCAR is proof that the device was operated in such a way that it would in fact measure the distance a suspected violator travels and the time during which he traveled that distance. People v. Sachs, supra. This requires proof that the device was tested to determine if it was working properly, People v. Rothstein, 1 Misc.2d 516, 152 N.Y.S.2d 757 (Westchester County Court, 1955); People v. Martirano, supra, and that it was, in fact, properly used. People v. Sachs, supra.

Thus, the real issue here presented is whether, after testing the machine by using an accurately measured course and an accurate stopwatch on the day in question, Trooper Gorenflo operated the machine in such a way so as to accurately measure the defendant's speed.

(5) The arresting trooper, William Gorenflo, has successfully completed the requisite training and his test results showed a maximum error of four-tenths of a mile per hour and his

average error was seventeen hundredths of a mile per hour. His testimony concerning the testing of the machine was, in the Court's judgment, sufficient and convincing. Shortly before the arrest of the defendant, he properly tested the machine by use of a one-half mile course which was shown to have been measured by a certified measuring tape and by use of a stopwatch whose accuracy had been tested by WWV, the radio station whose accuracy is universally recognized. Contrary to the defendant's arguments, it is not necessary in testing a VASCAR device to prove the speedometer on the car is properly calibrated since, as above stated, its accuracy is not material in operation of this device.

Trooper Gorenflo's testimony concerning his clocking of the defendant was clear and exact. As the defendant's car passed into the shadow of the Washington Road overpass, the Trooper activated the time switch and as the patrol car passed into this shadow the distance switch was activated. The time switch was turned off as the defendant's car passed into the shadow of the Golf Avenue bridge some four to five-tenths of a mile later and the distance switch was turned off as the patrol car entered into this same shadow. Despite intensive cross-examination, the Trooper proved beyond a reasonable doubt that he did not miss any one of the reference points. In response to being asked how close the Trooper felt he came to his reference points, he replied:

> "A. To my knowledge, I hit them exactly. I have no doubt. I had no doubt in my mind that I missed them. My own feelings and observations at this time, I hit these points exactly, to my knowledge."

After this clocking was completed, 74.5 was displayed on the display module. Thus, the Court finds that the average speed of the defendant's vehicle between these two points has been proven to have been 74.5 miles per hour. Even allowing for the human error factor, the defendant's speed was in excess of the posted limit for this highway of 60 miles per hour.

The Court finds the defendant guilty.

STATE of New Jersey, Plaintiff-Respondent
v.
Martin SCHMIEDE, Defendant-Appellant.

289 A. 2d 281, 118 N.J. Super 576 (1972)

Somerset County Court, New Jersey

March 29, 1972.

Motorist appealed by way of trial de novo from speed conviction in the Bedminster Township Municipal Court. The County Court, Meredith, J. C. C., held that the guilt of a motorist of speeding at 72 miles an hour in a 60-mile-an-hour zone was proved beyond a reasonable doubt by evidence stating that the officer obtained a reading of 72.7 miles per hour on a speed-recording device over a distance of 4.8 miles, that the device was a scientifically accurate instrument, that the officer was adequately trained in its use, and that his use on the particular occasion was proper.

Affirmed.

1. Criminal Law

The testimony of a program manager of a manufacturer of a speed-recording device as to, inter alia, the principles, calibration, and operation of the device and the margin of error involved in its use established that the device, as being essentially a simple computer type calculator which measures speed through measurement of time and distance, and that it was a scientifically accurate instrument.

2. Criminal Law

The testimony of the officer who charged the motorist who was speeding as to his training in use of speed-recording device, tests administered to him, and experience with the device, together with demonstration of the device to the court, established that the officer was adequately trained in its use.

3. Criminal Law

The testimony of the officer as to the calibration of the speed-recording device on the date of the alleged speeding offense and as to the manner in which he used the device established that the officer properly used the device on the occasion which gave rise to the speeding charge.

4. Automobiles

The guilt of the motorist of speeding at 72 miles an hour in a 60 mile-an-hour zone was proved beyond a reasonable doubt by evidence stating that the officer obtained a reading of 72.7 miles per hour on a speed recording device over a distance of 4.8 miles, that the device was a scientifically accurate instrument, that the officer was adequately trained in its use, and that his use on the particular occasion was proper. N.J.S.A. 39:4-98.

David Linett, Assistant Prosecutor, for the State (Michael R. Imbriani, Prosecutor of Somerset County, attorney).

Thomas E. O'Gorman, Newark, for defendant (O'Gorman & McMann, Newark, attorneys).

MEREDITH, J. C. C.

This is an appeal by way of trial de novo of a conviction of defendant Martin Schmiede for violation of N.J.S.A. 39:4-98 in the Bedminster Township Municipal Court. He was charged by a state trooper with driving at an average speed of 72 miles an hour on Interstate Highway 78 in Bedminster Township, a 60 mile-an-hour zone, on September 10, 1971 at about 3 p.m. A state trooper testified that he had clocked defendant over a 4.8-mile course at an average speed of 72.7 miles an hour by the use of an electronic device known as Vascar.

The questions presented are whether the Vascar unit is a scientifically accurate instrument; whether the state trooper as an operator of that unit was adequately trained in its use, and whether the use of the device by the state trooper on this particular occasion was proper.

(1) The State presented the testimony of the program manager for Vascar, which is manufactured by the Federal Sign and Signal Corporation. Defendant presented no expert witness. The court determined that the witness was qualified to testify with respect to the scientific basis for the operation of the Vascar unit. The expert testified that Vascar is a special purpose electronic digital computer set to accept increments of distance and time computing the average speed to the nearest tenth of a mile an hour. Its principle is based upon the accepted formula that speed equals distance divided by time. It consists of three modules: the odometer module, which works directly into the transmission and is turned on by the speedometer cable activator; the control module, which is the control center operation for the Vascar operator, and a computer module, which is placed on the inside of the vehicle. Its power is obtained from the car battery.

The control module contains two switches, one for measuring distance and one for measuring time. The odometer module is geared to measure 6,000 pulses a mile, on one pulse for every 10.56 inches of roadway travel. When the distance is measured in this manner, the distance can be locked into the device to await the time interval. The time interval is measured by switching the time switch on and off, and the time is computed by an oscillator which has a fixed rate of 170.7 cycles a second. Once the distance and time factor are fed into the computer module, an automatic reading to the tenth of a mile is flashed on the control module which will signify the average speed of the vehicle clocked over the distance traversed. The maximum distance that the unit will store is approximately 5-1/2 miles and the maximum time is 6-1/2 minutes.

The unit has an adjustment of the time factor by way of a screw on the control module which is used to calibrate the instrument. The calibration is done by clocking in a fixed distance and a fixed time. Other than a changing of tires which would affect the reading, the calibration would not change more than 2/10ths of a mile an hour in a six-month period. Changing of tires requires calibration.

The Vascar device is used by determining two fixed points and measuring the time and distance between these points to ascertain the average rate of speed. The input may be either the clocking of the time first or the measuring of the distance first. In order to obtain an accurate setting of the unit to the target points, usually the shadow from a bridge or overpass is used to overcome problems of depth perception. The expert testified that in the event there was a ten-foot error on the reference point at a car traveling 70 miles an hour for a clock of one mile, the error in the resulting reading would be only .133 miles an hour. In the event of a 100-foot error on the reference point at a car traveling 70 miles an hour for a clock of one mile, the error in the resulting reading would be 1.326 miles an hour. The greater the distance used in the clocking of the speeding vehicle, the greater the accuracy obtained.

The instrument has a built-in-warning device. In the event that the instrument is not properly warmed up or there is insufficient power from the battery source or any other malfunction, the reading obtained will be 00.1. Thus, the operator is alerted to any possible malfunction of the instrument.

For the training for the operation of the Vascar unit, it is recommended by the manufacturer that a half-day of classroom work be given to the trainee involving the theory and operation of the Vascar unit, and that the trainee then be given a month to practice in the use of the unit, at the end of which time a test of 30 clockings under different situations is administered. In that test the trainee, in order to be qualified, must not have a single error greater than two miles an hour and must have an average error of no more than .75 miles an hour. Of the 6,000 certified tests throughout the United States approximately one year ago, the national average was found to be .416 miles an hour error.

The Vascar device had its first use by the State Police of the State of Indiana in 1966. As of the present date, there are 6,500 units in use throughout the United States. The Court has found no reported cases in the State of New Jersey and only one reported case elsewhere determining the scientific validity of the Vascar device. In People of State of New York v. Persons, 60 Misc.2d 803, 303 N.Y.S.2d 728 (Court of Special Sessions, 1969), decided by a County Court Judge of that State, the Court after hearing the scientific testimony, upheld the scientific accuracy of the Vascar device and upheld the conviction based thereon. In an unreported decision in the State of New Jersey v. Salvatore Profaci, decided by Judge John E. Bachman of the Middlesex County District Court, Judge Bachman, without any evidence regarding the scientific accuracy of Vascar and with testimony of inadequate training of the Vascar operator, reversed the conviction in municipal court. Based on the testimony of the State's expert, this Court is of the opinion that the Vascar device is essentially a simple computer type calculator which scientifically measures speed through the measurement of time and distance based upon the formula of speed equals distance divided by time. Its accuracy is qualified only by its proper calibration, the proper training of an operator and the proper operation in the particular case.

(2) This, then leads to the second question of whether the trooper involved in the instant case received the proper training. The trooper testified that he was given a full day's training by another trooper who had previously been qualified as an operator and instructor on Vascar, and that this was followed by a one-month use of Vascar by the trooper on many occasions. At the end of the one-month period, the qualified trooper administered a series of 30 tests to the training trooper. These tests involved five separate clockings each of meeting a target vehicle, of approaching the target vehicle from the rear, of following a target vehicle, on a parked, premeasured distance, on a T-intersection with no premeasured distance, and during the night hours. Of these tests, 7/10ths of a mile was the greatest deviation and the average deviation was .229 miles an hour -- well below the national average and well below the standard of deviation of not in excess of .75 miles an hour. Having passed the test, the state trooper was certified as an operator of Vascar. In addition, the complaining trooper used the Vascar unit continuously on routine patrol for nine months prior to the instance with this particular motorist on September 10, 1971. Furthermore, the court went out on the road with the trooper where he demonstrated Vascar's use and calibration and demonstrated his complete familiarity with the unit.

Therefore, the court finds that the complaining trooper in this case was fully qualified in the use and operation of the Vascar device.

(3) The final question presented is whether the complaining state trooper properly operated the Vascar unit on the day in question. He testified that on the morning of that day he calibrated the Vascar unit by running the car over a premeasured half-mile measured by the State Bureau of Weights and Measures on Interstate Highway 287. Once this distance had been put

into the Vascar unit, from a stopwatch previously checked by radio time, he clocked 30 seconds into the time bank in the Vascar unit and obtained a reading of 60.0 miles an hour. He then erased the time factor and put in 20 seconds which, when computed together with the half-mile, gave a reading of 90 miles an hour. Both tests indicated that the Vascar unit was properly calibrated.

He testified that at 3 p.m. on that date he was parked alongside of Interstate Highway 78 when he noticed defendant's car proceeding in a fast manner. When that car hit the shadow of an overpass which was in his view, he set the time switch in motion. He then proceeded to the same overpass and as he passed the shadow put in motion the distance switch. Although he lost sight of the car during some of the period, the trooper caught up with him and as it passed the shadow of another overpass he turned off the time switch, and as he went under the shadow of the same overpass he also turned off the distance switch. As a result thereof, he received a reading of 72.7 miles an hour. The trooper testified that the distance between the first overpass and the final overpass was 4.8 miles.

Although there was some question raised with respect to whether the state trooper had the proper identification of the car, this court is fully satisfied that the trooper clocked the same car.

Therefore, the court is of the opinion that the Vascar unit was properly calibrated and thus accurate, and that the complaining state trooper properly operated that unit in determining defendant's speed.

(4) The court concludes that the State has proved defendant guilty beyond a reasonable doubt of speeding at 72 miles an hour in a 60 mile-an-hour zone, and the conviction below is affirmed.

The PEOPLE of the State of New York vs. John C.

LEATHERBARROW, Defendant-Appellant.

Erie County Court.

April 11, 1972.

Defendant was convicted in the Town of Brant Justice Court, Gugino, J., of operating a motor vehicle at a speed of 94 miles per hour in a 55-mile per hour zone, and he appealed. The Erie County Court, Frank R. Bayger, J., held that in absence of evidence that speed measuring device used to measure defendant's speed was accurate, reading from the device was not sufficient to sustain defendant's conviction.

Reversed.

1. Criminal Law

The trial court, in prosecution for operating a motor vehicle at a speed of 94 miles per hour in a 55-mile per hour zone, could, without the People's request, properly take judicial notice of the Official Compilation of Codes, Rules and Regulations of the state and the absence therein of any Department of Transportation regulation establishing a higher speed limit than 55 miles per hour for route on which defendant was traveling. Vehicle and Traffic Law '' 1180(b), 1620(a); CPLR 4511(a).

2. Criminal Law

Where the police officer, in prosecution for operating a motor vehicle at a speed of 94 miles per hour in a 55-mile per hour zone, failed to specifically indicate or particularize his experience or accuracy in judging speed of motor vehicles, his opinion as to defendant's speed was inadmissible, even though had he properly established his qualifications his testimony alone would have been sufficient to sustain conviction. Vehicle and Traffic Law ' 1180(b).

3. Criminal Law

In prosecution for operating a motor vehicle at a speed of 94 miles per hour in a 55-mile per hour zone, the People had the burden of proving the accuracy of speed measuring device used as evidence of defendant's speed. Vehicle and Traffic Law ' 1180(b).

4. Automobiles

In absence of evidence that the speed measuring device used to measure defendant's speed was accurate, the reading from the device was not sufficient to sustain defendant's conviction of operating a motor vehicle at a speed of 94 miles per hour in a 55-mile per hour zone. Vehicle and Traffic Law ' 1180(b).

Michael F. Dillon, Dist. Atty. of Erie County by William H. Dillon, Asst. Dist. Atty. for the People.

Weiss & Mullins, by William J. Weiss, Jr., Buffalo, for defendant-appellant.

PEOPLE v. LEATHERBARROW

FRANK R. BAYGER, Judge.

The defendant has appealed his conviction after trial in the Town of Brant Justice Court (Gugino, J.) upon a charge of operating a vehicle at a speed of 94 miles per hour in a 55 mile per hour zone in violation of Section 1180, subdivision (b), of the Vehicle and Traffic Law.

The People's proof consisted of testimony by two New York State Police Officers, unfortunately offered without the aid of a prosecuting attorney. Both officers testified that on November 15, 1971, at approximately 1:15 a.m., they observed a vehicle approaching their parked patrol car "at a very high rate of speed" in a westerly direction along Route No. 5, a public highway. Their car was equipped with a "Vascar" speed-measuring device with which they were monitoring traffic passing through a previously measured "speed trap." Trooper Winkowski testified over objection that he obtained a reading of 94.3 miles per hour as the defendant's vehicle passed through the trap and that he had independently estimated the car's speed to be in excess of 90 miles per hour. Trooper Balon was unable to offer any independent estimates beyond a statement that the defendant passed the patrol car "at a great rate of speed." Trooper Winkowski further testified that he had checked the Vascar unit accuracy some three hours prior to the defendant's arrest. A "calibration sheet" prepared by Winkowski and certifying the unit's accuracy at that time was accepted in evidence over the defendant's objection.

The defendant has argued several points as grounds for a reversal of this conviction. His initial argument concerns the complainant's failure to testify or otherwise prove that a speed limit greater than 55 miles per hour had not been established for this area of Route 5.

Section 1180, subdivision (b), of the Vehicle and Traffic Law provides, in substance, that except where different maximum speed limits have been lawfully established, no person shall operate a vehicle in this State at a speed in excess of 55 miles per hour. Section 1620, subdivision (a), authorizes the Department of Transportation to establish higher or lower speed limits for state highways and further provides that the absence of signs allowing a higher speed shall be presumptive evidence that a speed greater than 55 miles per hour has not been authorized. It is the defendant's contention that this presumption may not be relied upon by the people unless there has been some testimony as to the absence of signs indicating a higher limit. See People v. Aubin, Co.Ct., 231 N.Y.S.2d 466(1962)

(1) But there is another method of establishing the applicability of the 55 mile per hour speed limit. A trial court may properly take judicial notice of the Official Compilation of Codes, Rules and Regulations of the State of New York and the absence therein of any Department of Transportation regulation establishing a higher speed limit for Route 5 in the Town of Brant. People v. Foster, 27 N.Y.2d 47, 313 N.Y.S.2d 384, 261 N.E.2d 389(1970). And

a Court may do so, as in this case, without the People's request. (C.P.L.R. Section 4511, subdivision (a)).

A reversal is further urged on the basis of the trial court acceptance of Trooper Winkowski's independent estimate of the defendant's speed. The defendant contends, quite properly I believe, that the record failed to establish the officer's qualifications in that regard. A careful reading of the testimony shows that he had been a licensed operator for twenty-one years and a trooper for nine and a half years; that he drives approximately twenty-five thousand miles per year and in the course of daily patrols, "Had opportunities to check dozens of vehicles"; and that he had been a radar operator for approximately one year and a Vascar operator for a similar period.

(2) While the officer undoubtedly meant to so indicate, he in fact did not state that he had ever estimated the speed of any moving vehicle or compared his estimates with any speed measuring device of known accuracy. Nor did his testimony that "I have been able to independently estimate the speed of vehicles anywhere from two to five miles an hour," suffice to cure this defect in proof. In short, the witness failed to specifically indicate or particularize his experience and accuracy in judging the speed of moving vehicles. His skill in that regard, although undoubtedly possessed to a high degree, may not be assumed by a trial court. It must be proven and demonstrated on the record. Under established law, the trooper's opinion as to the defendant's speed was inadmissible. People v. Tanner, 6 Misc.2d 1007, 165 N.Y.S.2d 308(1957); People v. Page, 32 Misc.2d 179, 222 N.Y.S.2d 450(1961). The defendant's speed was estimated as being in excess of 90 miles per hour. Had the trooper properly established his qualifications with regard to estimating speed, that testimony alone would have been sufficient to sustain this conviction. Cf. People v. Olsen, 22 N.Y.2d 230, 292 N.Y.S.2d 420, 239 N.E.2d 354(1968). Upon this record, however, it was inadmissible and may not be considered.

(3) There remains for consideration the proof concerning the "Vascar" reading of 94.3 miles per hour. The ultimate fact to be proved upon this trial was the defendant's speed. It was incumbent upon the People to prove the alleged violation by competent evidence, either by way of qualified witness' estimate of defendant's speed, or by means of its accurate measurement by some speed-measuring device. In the latter event, the people have the burden of proving the accuracy of that device. This they failed to do upon the record herein.

This Court is very much aware of the dangers posed by such reckless and wanton disregard of our speed laws as was alleged herein. Such drivers must be banished from our highways. But that punishment must be imposed only in accordance with our law. Here, the record is completely devoid of any testimony concerning the theory and mechanics of Vascar's operation or the scientific facts and principles upon which its operation is founded. Neither officer offered any opinion at all as to Vascar's accuracy nor did they demonstrate sufficient knowledge of its operation to allow such an opinion. Therefore there was no evidence upon

which the trial court could properly find that this device accurately measured the defendant's speed. The accuracy of that measurement was left entirely to the Court's conjecture.

(4) This Court's independent research has shown Vascar to be a relatively simple and undoubtedly accurate mechanism for determining vehicular speed. It is widely used by law enforcement agencies in this State and elsewhere. But its operation and accuracy are still not a matter of such general knowledge as to eliminate the need for any proof of those facts. Neither our legislature nor any higher court has as yet granted these devices per se acceptance in this State. Until their reliability is thus established, I believe the otherwise applicable rules of evidence must be followed and A proper foundation for the use of Vascar readings must be demonstrated. Cf. People v. Magri, 3 N.Y.2d 562, 170 N.Y.S.2d 335, 147 N.E.2d 728(1958); People v. Donaldson, 36 A.D.2d 37, 319 N.Y.S.2d 172(1971); People v. Offermann, 204 Misc. 769, 125 N.Y.S.2d 179(1953). The defendant's objection to the receipt of the Vascar reading should have been sustained.

In view of the foregoing, there is no need to consider the sufficiency of the proof as to the testing or operation of the VASCAR device on this occasion or the admissibility of Trooper Winkowski's calibration sheet. There was no competent evidence offered as to the defendant's guilt. The judgment appealed from is reversed, the fine remitted and the simplified traffic information dismissed.

J. Site Selection Considerations

1. There are several considerations that should be kept in mind when selecting an appropriate place for conducting speed measurement operations.

2. Any location chosen for speed measurement operation should be a place where there is a demonstrated need for speed enforcement.

3. Locations should not be chosen simply because they are convenient. There should be a valid need for speed enforcement.

Note: Show Slide, "Typical Valid Needs for Time-Distance Speed Measurement"

4. Examples of sites might include locations where:

   a) There have been a significant number of motor vehicle accidents in which excessive speed was a contributing factor.

   b) There have been high incidences of speed violations in the past.

   c) There have been significant numbers of complaints of speed violations by citizens.

   d) There are special speed regulations or other characteristics that necessitate selective or special speed enforcement (e.g., school zones, construction sites, work zones, etc.)

   e) There are requirements for conducting speed surveys for planning and allocation of enforcement resources.

Note: Show Slide, "Safety Considerations for Time-Distance Site Selection"

5. Safety is another major consideration in site selection. The purpose for using time-distance instruments is to improve traffic safety. We should not choose to conduct speed-measuring operations at a place where our presence will make the safety situation worse than it already is. For stationary operations, this implies that the chosen site must permit us to set up far enough off the road so that we do not impede the flow of traffic; the site also should provide sufficient visibility so that we can safely enter the traffic stream to conduct pursuits. When operating in moving mode, we

also have to be very conscious of the safety aspects of initiating pursuit, especially since it may require us to perform a "U turn" against on-coming traffic. In either the stationary or moving modes, we also have to think about the safety aspects of stopping a speed violator; the road shoulders or other potential stopping places must be broad enough to ensure that the traffic flow is not obstructed by the violator's vehicle or the patrol car. Of course, we must always observe all basic safety procedures when approaching and apprehending speed violators, just as we would in approaching any other person as part of general police duties.

Note: Show Slide, "Desirable Traffic and Road Characteristics for Time-Distance Site Selection"

6. Traffic and Roadway Conditions also should influence our selection of Time-Distance sites. In all cases, there should be sufficient visibility to allow us to detect suspected speed violators and perform visual speed estimation.

7. The more frequently speed-measuring units are utilized at a particular location at a particular time, the less frequently they will encounter speed violators.

8. When drivers become aware of enforcement activity in a certain area, they begin to drive more cautiously while in that area. For this reason, it is recommended that officers vary the location and times of speed measuring enforcement.

K. Reference Points

Note: Show Slide, "Reference Points"

Note: Show Slide, "Examples"

Note: Show Slide, "Depth Perception"

What is a reference point? A reference point may be any stationary object along the roadway that is clearly visible to the Time-Distance computer operator such as shadows cast from trees, power or telephone poles, signs or overhead bridges and beginning and ending of guard rails or yellow lines. The operator is looking for an occurrence to happen (the shadow "striking" or darkening the target or patrol vehicle). This is why depth perception is not used. Depth perception - "The

ability to judge the distance of objects and the spatial relationships of objects at different distances." (Webster's New Collegiate Dictionary). Cloudy and overcast days should be no problem to the operator. When there is a lack of direct sun, the shadow created by the target vehicle is just not as dark or as large. Instead of one, we now have three shadows. It can be noted that the vehicle casts a soft shadow on each side and one directly under it. The only restriction created by inclement weather is that the REFERENCE POINTS must now be closer to the target vehicle and the operator MUST use REFERENCE POINTS which are readily defined. Here again, the expansion joints, repair sections or tar strips are best suited for this type of clocking. Points by the edge of the road, because of the irregularities caused by weather and use, can also be used. The target car passing under an overpass is still one of the best and most used methods. Even on overcast days there is still the definite change of light density as the vehicle passes through the shadow. Consistency in determining when a target vehicle and patrol vehicle reaches any given location point is imperative. It must be remembered that when the front of a vehicle is used to start a clock, the front must also be used when finishing the clock.

There are two primary switches involved in the operation of Time-Distance computers. One switch allows the operator to accumulate "Time" and the other to accumulate "Distance" in the computer. Once the time and distance inputs are fed into the computer, the instrument automatically computes the speed of the vehicle and indicates it through the display module.

Distance information may be stored in the computer and used over and over as in pre-measured or stationary patrol. This feature is accomplished in some Time-Distance computers by activating a distance "Lock" switch, while other types have "reset" push button switches, system reset and time/computer reset switches. The system reset switch is usually black and resets the Time-Distance information and the computed speed. The time/computer reset switch is usually red and resets the time information and the computed speeds only; the distance information is retained in the storage register. Any interruption in, or loss of primary power, will erase the stored distance. Also, activating the distance switch once or the time switch twice without pressing the time/computer reset switch will automatically generate an "Error" signal and erase the stored distance.

Time-Distance computers equipped with a thumbwheel dial to "pre-program" distance information into the computer resets time/computed speeds automatically on activation of the time switch.

The following are examples illustrating the use of Time-Distance computers on

stationary and moving patrols:

1. Stationary Patrol

   The officer selects two reference points one-tenth of a mile apart. (Since increased distance between two reference points ensures more accurate clock, it is recommended that at least a one-tenth of a mile distance be used for all clocks.) He drives his patrol car to the first reference point and turns "on" the distance switch. When the patrol car reaches the second reference point, the distance switch is turned "off." The distance is now entered in the computer. The officer is now free to position his vehicle where he has a clear and unobstructed view of the two reference points. When a target vehicle approaches and "touches" the first reference point, the time switch is tuned "on." As the target vehicle reaches the second reference point, the time switch is turned "off." The elapsed time it took the target vehicle to traverse the distance between the two reference points is thus fed into the computer. The computer then computes the target vehicle speed using both the elapsed time and the measured distance and automatically displays the vehicle speed. The officer is now ready to measure the speed of the next vehicle.

2. Moving Patrol

   An officer in a cruising patrol car observes ahead of him a suspected violator. He watches the violator's vehicle until it "touches" a selected reference point. At that instance the officer turns "on" the time switch. The officer now waits until his patrol vehicle "touches" the same reference point and then turns "on" the distance switch. The officer continues to observe the target vehicle until it "touches" a second selected reference point. At that instant the officer turns "off" the time switch. The officer now has given the computer the amount of time it took the target vehicle to travel the distance between the two reference points. When the patrol vehicle "touches" the same second reference point, the distance switch is turned "off." The officer has now given the computer the distance between the two reference points and the computer automatically computes the target vehicle's speed using the measured distance over the elapsed time. Note that the speed of the patrol car is irrelevant as to the speed of the violator. He simply has to determine accurately the distance between the two reference points and the elapsed time it took the target vehicle to travel that distance.

When properly calibrated the accuracy of the computer's computational capabilities are not subject to question; however, they are directly dependent upon the anticipation time of the officer. The officer must be able to quickly activate the time and distance switches to the on and off positions. Any delay or missing of reference points on the officer's part will affect the information given to the computer and, therefore, affect the accuracy of the speed calculations. The officer's anticipation time, selection of reference points, and the many ways of measuring vehicle speeds while using the Time-Distance computer will be greatly enhanced by proper training, practice and experience. Reaction time, which is time lapse between perception and action, is NOT a factor because of anticipation. Anticipation is looking forward to or planning ahead.

3. Calibration

Note: Show Slide, "Calibration"

Note: Show Slide, "Calibration Concerns"

Calibration of the Time-Distance computer shall be performed daily before the start of the operator's tour of duty. The Time-Distance computer shall not be used for enforcement purposes before a calibration check is performed. A calibration check must be performed after any of the following occurs: (1) repair or replacement of the computer; (2) repair or replacement of the control module containing the calibration adjustment control; (3) repair or replacement of the patrol vehicle's transmission or differential; (4) changing of the patrol vehicle's rear wheels or tire sizes. This applies to rear wheel drive, front wheel drive, or all-wheel drive patrol platforms. The operator shall be aware that changing from radial to bias ply or bias ply to radial ply tires, and sometimes even changing brands of tires, will affect the calibration of the Time-Distance computer.

Note: Show Slide, "Calibration Concerns Con't"

To further test the Time-Distance computer for accuracy, the operator needs a certified stopwatch. The stopwatch must have the capability of accumulating at least five (5) minutes time. The accuracy of the stopwatch shall be maintained within plus or minus one (1) second in five (5) minutes of accumulated time.

The stopwatch must be certified by one of two methods: (1) comparing the

sweep second marks and accumulated time against the time signals generated by the National Bureau of Standards radio station WWV, Fort Collins, Colorado, at 5, 10, 15 or 20 Mhz. (megahertz) on a shortwave receiver; (2) use of a "ticker tape" method. (Note: some stopwatches do not lend themselves to this method due to the construction of the stopwatch.) This certification shall be performed each twelve (12) months.

Note: Show Slide, "Calibration Course"

The operator must personally measure a distance of one-quarter mile (1320 feet) or one-half mile (2640 feet) segment on a convenient and straight roadway. The beginning and ending points of this measured distance should be clearly marked with painted lines on both edges and the center of the pavement (so to enter calibration distance with patrol vehicle traveling either direction). Highway mile markers or "rolatapes" are not adequate for this measurement because of their inconsistent accuracy. A steel tape, fiberglass tape, or trained surveying personnel utilizing a surveying laser system are acceptable methods for measuring a calibration course. Regardless, the operator utilizing the course for calibration shall be able to personally ensure the distance is correct.

Apply power to the Time-Distance Instrument and drive the patrol car through the measured distance. As the car "touches" the first mark, line up the rear view mirror, the windshield post, or a vertical mark such as a piece of tape of the driver side window with the calibration mark. When the two are aligned, turn the DISTANCE switch "on" and continue driving to the second mark. When the same mark is aligned with the second calibration mark, the DISTANCE switch is turned "off." The measured distance information has now been entered into the time-distance computer. The operator may now check the measured distance illustrated on the time distance instrument, and ensure it meets the ¼ of 1 percent tolerance as required in North Carolina. If the measured distance is outside of this tolerance, reset the device and start the calibration routine over again from the beginning. If the device fails to measure the distance within tolerance after calibration has occurred, take the instrument out of service for repair and inspection by a qualified technician.

If the check of the measured distance is within tolerance, the operator shall now simultaneously start the stopwatch and ~~turns~~ the TIME switch to "on." When the appropriate time in seconds has elapsed, the operator shall

simultaneously stop the stopwatch and turn the TIME switch "off." It is imperative that both the stopwatch and the TIME switch be turned "on and off" at exactly the same time. This test of time accuracy will be repeated a second time. For a more detailed description of the calibration and test for accuracy, refer to Appendix C for the corresponding Time-Distance instrument installed on your vehicle.

Note: Show Slide, "Your SMI Instructor…"

Refer to the "Supplement for Speed Measuring Instrument Training Courses" which lists individual Time-Distance Computer Calibration Procedures.

4. Night Clocking

Note: Show Slide, "Night Clocking"

Night clocking is accomplished much the same as daylight clocking except shadows are no longer available, but we now have headlights which were not available during the daylight hours. Because of the well-defined line of light extending at right angles from the front of the target vehicle across both sides of the road, we know exactly when the vehicle passes an object on the side of the road. An excellent example would be a typical rural mailbox. As the target car approaches the mailbox, the headlights will illuminate it so that it is visible for great distances. The instant the target vehicle passes the mailbox, the light no longer strikes the mailbox and it instantly goes dark and is no longer visible to the eye. This method can be used for opposite directions or pacing clocks. By watching the target vehicle in the rear-view mirror (opposite-direction clock), the mailbox will instantly go black as the target vehicle passes the mailbox. This method provides pinpoint accuracy.

Guard railings are another REFERENCE POINT that can be used for night clocks as well as signs and foreign objects on the road.

Some operators will prefer night clocks to day clocks because of the availability of REFERENCE POINTS along the highway. It is not necessary to restrict night opposite-direction clocks to measuring distance first. As the officer becomes more experienced, he will, as with day clocks, learn to recognize the REFERENCE POINTS available on the particular stretch of road he is traveling, whether it is a two-lane divided or

single-lane country road.

5. Methods of Operation
Note: Show Slide, "Methods of Operation "
Note: Show Slide, "Clocking Considerations"

This section will address the five basic operating configurations. Each type of configuration will be discussed. The configurations will appear in the following order: (a) Following, (b) Approach From the Rear, (c) T-Intersection, (d) Parked Pre-Measured and (e) Meeting.

FOLLOWING

Note: Show Slide, "Following"

Figure 1 (below)

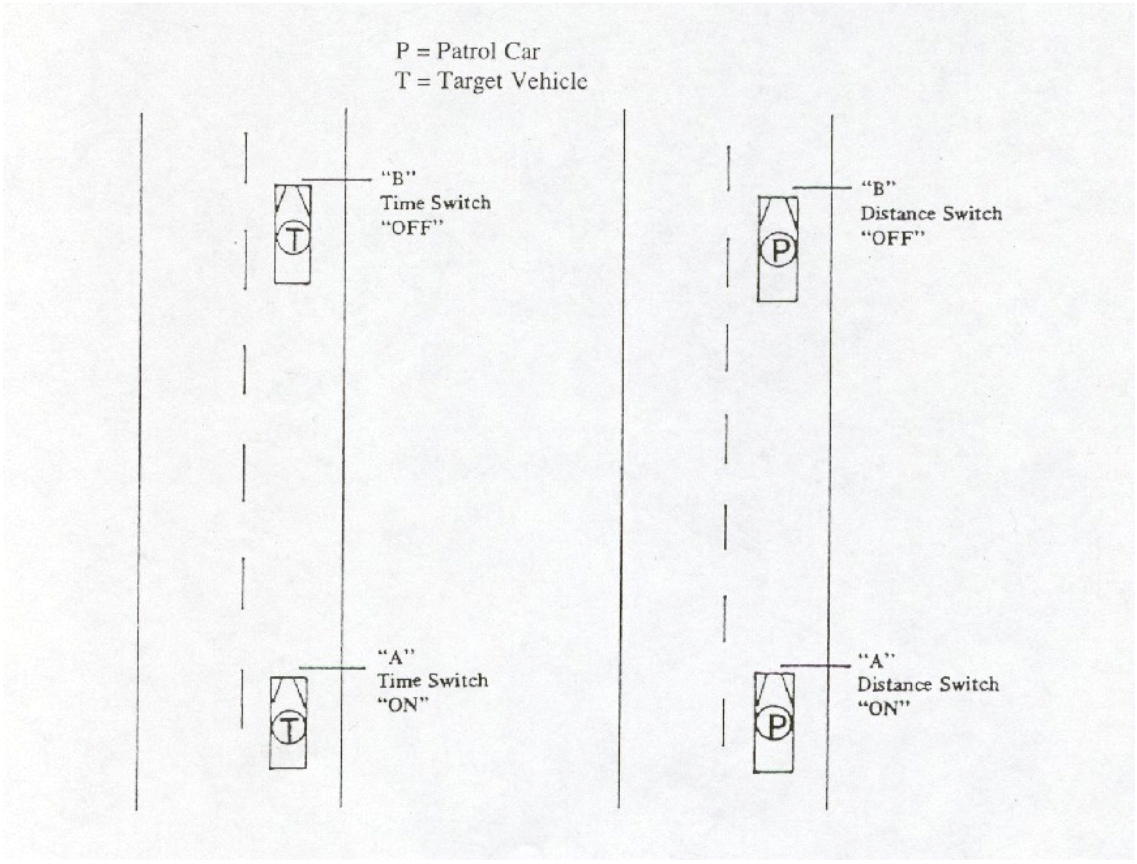
(1) Turn time switch "on" when target vehicle passes reference point "A."

(2) Turn time switch "off" when target vehicle passes reference point "B."

(3) Turn distance switch "on" when patrol vehicle passes reference point "A."

(4) Turn distance switch "off" when patrol vehicle passes reference point "B."

(5) The calculated average speed of target vehicle is immediately displayed on the readout screen.



APPROACH FROM THE REAR

Note: Show Slide, "Approach from the Rear"

Figure 2 (next page)

*Remember, in this clock the distance switch is used first.

(1) The operator of the patrol vehicle (P) observes a violating vehicle approaching from the rear.

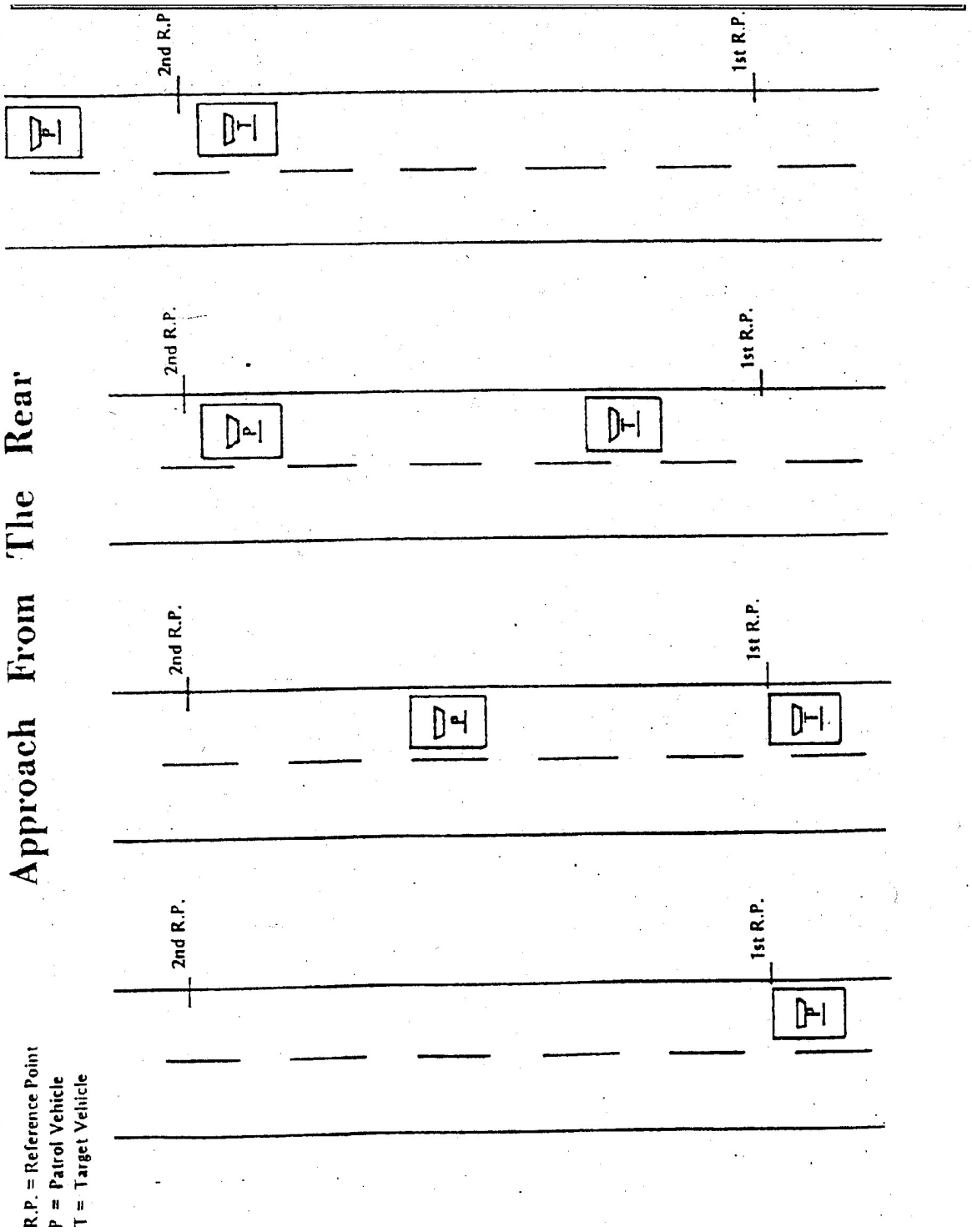
(2) The distance switch is turned on when the patrol vehicle reaches the first reference point.

(3) The time switch is turned on when the target vehicle (T) reaches the first reference point.

(4) The distance switch is turned off when the patrol vehicle reaches the second reference point.

(5) The time switch is turned off when the target vehicle reaches the second reference point.

(6) Result - mph


Approach From The Rear
2nd R.P
1st R.P.
2nd R.P.
1st R.P.
2nd R.P.
1st R.P.
2nd R.P.
1st R.P.
R.P. = Reference Point
P = Patrol Vehicle
T = Target Vehicle

T-INTERSECTION
Note: Show Slide, "T-Intersection"

There are several variations of clocking a target vehicle where the patrol vehicle is parked off the traveled roadway. Figure 3 (below) illustrates a target vehicle passing a patrol vehicle at a T-intersection.

(1) When the target vehicle "touches" a reference point in front of the patrol vehicle, the time switch is turned "on."

(2) The patrol vehicle proceeds to the reference point and the distance switch is turned "on."

(3) The patrol vehicle will pursue until a second reference point is located, i.e., shadow, tar strip, bridge, or other marking. At this point, the time switch is turned "off."

(4) When the patrol vehicle "touches" this same reference point, the distance switch is turned "off."

(5) With the time and distance recorded, the computer will display the speed of the target vehicle.

(6) Result mph

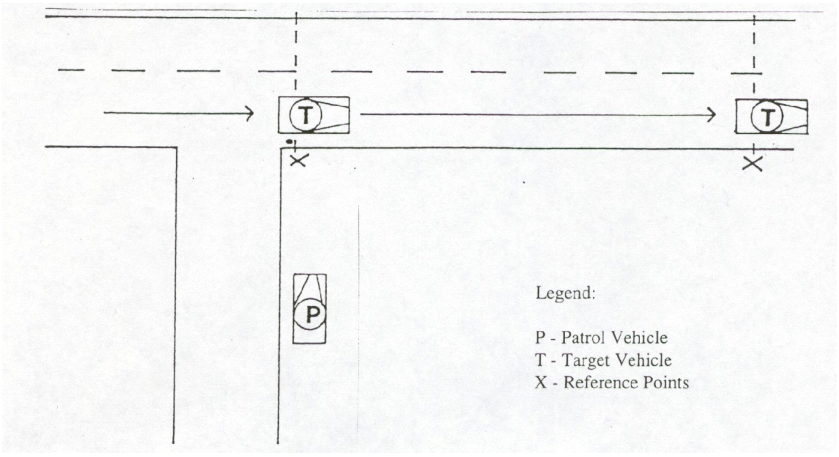


Figure 4 (below) illustrates a target vehicle passing a parked vehicle in a like situation as before. When the target vehicle passes a predetermined reference point, the time switch is turned "on" and when the target vehicle reaches a second well-defined reference point, the time switch is turned "off." The patrol vehicle proceeds to the first reference point and turns the distance switch "on" and upon reaching the second reference point, the distance switch is turned "off" or the distance can be entered into the computer prior to positioning the patrol vehicle. With this variation, the time and distance have been computed into speed before the patrol vehicle overtakes the target vehicle. When using either of the above variations, it is recommended that a minimum distance between reference points should never be less than one-tenth mile (528 feet).

Triangulation

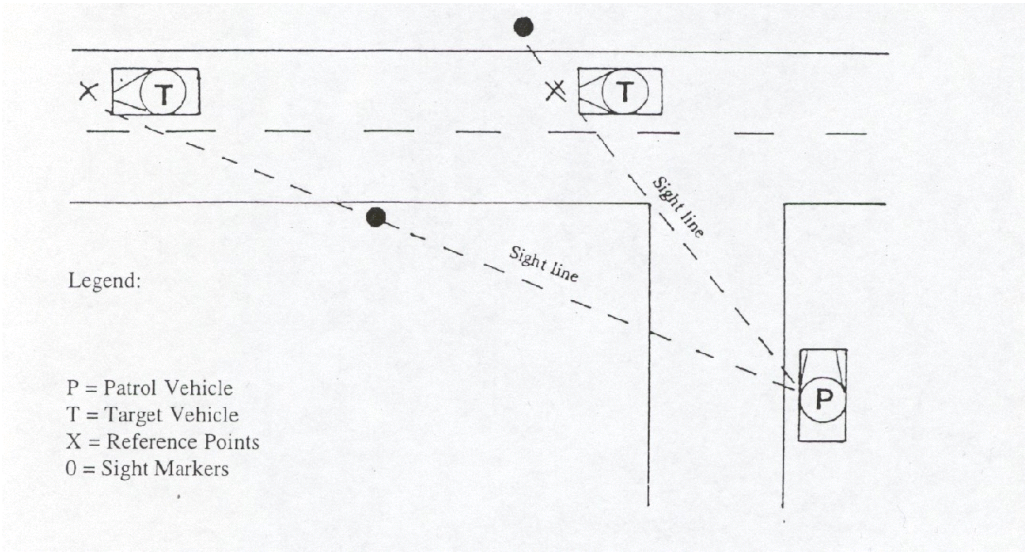


Figure 4

Target vehicle speed can be computed between reference points on two or four lane roadways and at angular roadway connections by establishing lines of sight between the reference points. These variations will be discussed during classroom and field training sessions.

PARKED PRE-MEASURED CLOCKS
Note: Show Slide, "Parked Premeasured"

Two reference points are selected where the operator can sit and see both clearly. The patrol vehicle is then driven between the two points.

(1) When the patrol vehicle reaches the first point, the DISTANCE SWITCH is turned on.

(2) When the patrol vehicle reaches the second point, the distance switch is turned off. Thus, the distance between the two points has been measured and put into the computer.

(3) The patrol vehicle is parked off the highway where the operator can see the two reference points. When the target vehicle shadow reaches the first reference point, the time switch is turned on.

(4) When the target vehicle shadow reaches the second point, the time switch is turned off.

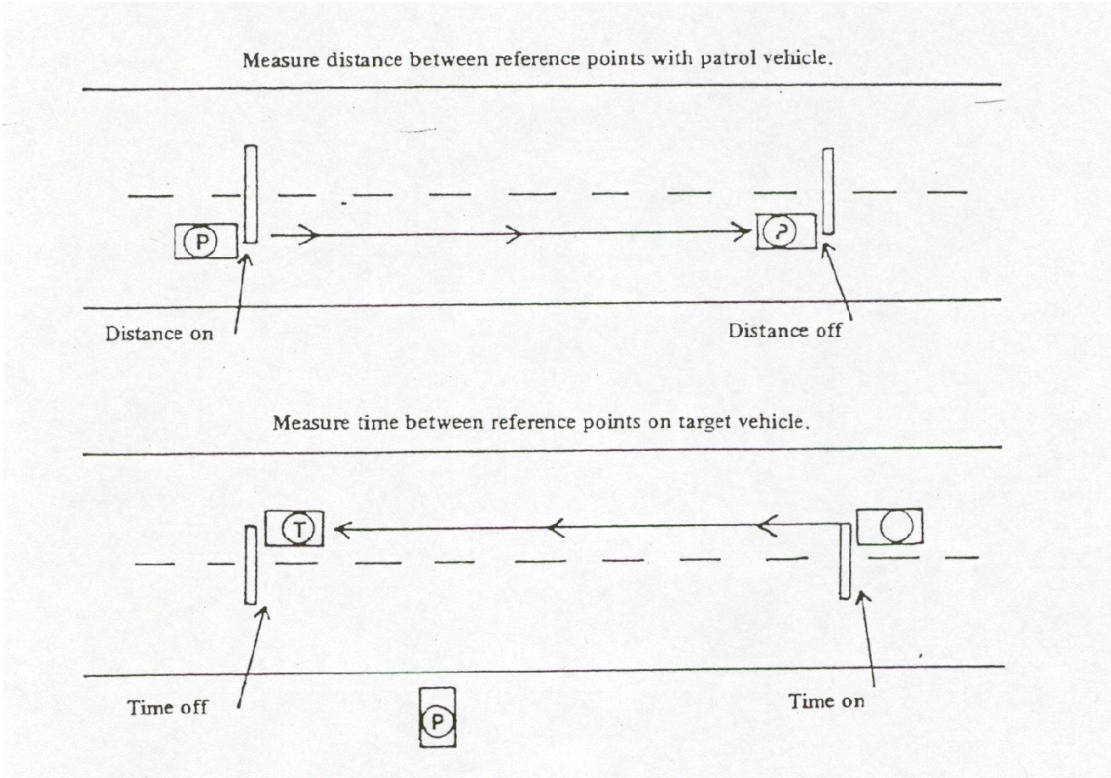
(5) The distance being pre-measured and the time measured secondly, a speed measurement is obtained.

(6) Results - mph

We clear the time only if additional clocks are to be made using the same reference points. It is recommended that the minimum distance between reference points should never be less than one-tenth mile (528 feet).

PARKED PRE-MEASURED CLOCKS

Figure 5 (below)



P = Patrol Vehicle T = Target vehicle

Figure 5

Target vehicle can be timed between reference points when traveling in either direction. Other Parked Pre-Measured configurations will be discussed during classroom and field training sessions.

MEETING

Figure 6 (below)

Note: Show Slide, "Meeting"

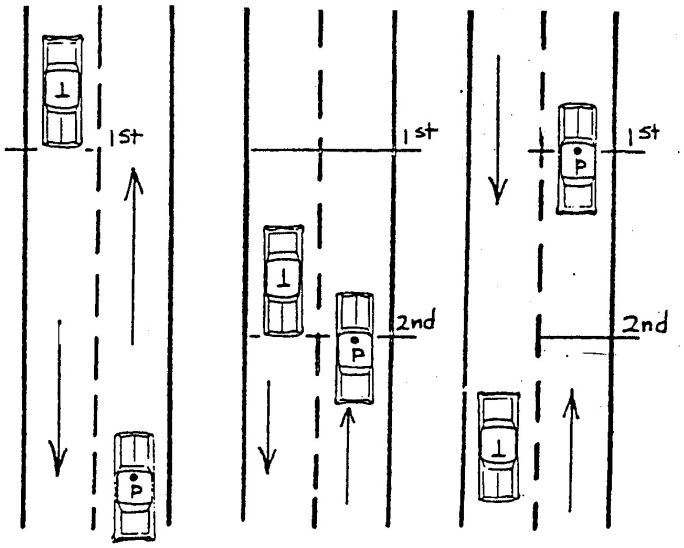
(1) In this method, the operator sees an approaching vehicle and the TIME is started when the target vehicle "touches" a reference point.

(2) The target vehicle and the clocking vehicle continue toward each other, and as they are abreast of each other, the TIME SWITCH is turned "off" and the DISTANCE SWITCH is turned "on" simultaneously.

(3) The clocking vehicle continues to the first reference point of the target vehicle where the TIME was started and then the DISTANCE is turned "off."

(4) The TIME has been measured from the location point to the meeting place with the clocking vehicle. The DISTANCE has been measured from the meeting place, back to the first roadway location point.

(5) Result - Average speed in mph or the operator may desire to begin measuring distance with the patrol vehicle because a reference point is not available to start timing the target vehicle first.



L. Time-Distance Speed Enforcement by use of Aircraft

Note: Show Slide, "Time-Distance by Aircraft"

1. Stopwatch as the clocking device

The following procedure shall be followed when using a "stopwatch as the clocking device" in time-distance speed enforcement by use of aircraft:

a) The Parked Pre-measured configuration shall apply when utilizing aircraft for time-distance speed enforcement.

b) The operator of the stopwatch shall be currently certified as a time-distance operator by the North Carolina Criminal Justice Education and Training Standards Commission.

c) The operator of the stopwatch shall not be the pilot of the aircraft.

d) Two reference lines shall be located on the surface of the street or highway being monitored by the aircraft engaged in the speed enforcement. These lines will represent two reference points. The two lines shall be one-half mile apart. The two lines shall be plainly visible to the operator of the timing device.

e) The operator shall visually estimate the speed of vehicles as they travel in his/her line of vision.

f) A stopwatch shall be used to time the target vehicle as it travels between the two reference points. The stopwatch shall be a digital stopwatch and meet the criteria specified in "Appendix B, Section (C)(2)" located in the Supplement for Speed Measuring Instrument Training Courses.

g) When the target vehicle touches or reaches the first reference point, start the stop watch.

h) Continue to estimate the speed of the target vehicle as it travels toward your second reference point.

i) When the target vehicle touches or reaches the second reference point stop the stop watch.

j) The operator of the stopwatch shall use the time displayed on the stopwatch and the "Time-Distance Speed Enforcement Sheet" (provided at the end of this section) to determine the speed of the target vehicle. Corroborate the "determined target speed" with your visual speed estimate.

k) The description, speed, and direction of the target vehicle will be radioed to a ground unit who will stop the target vehicle and determine the enforcement action. The instrument operator should ensure he/she maintains proper notes to establish the tracking history and compliance with the rules and regulations regarding the accuracy of this speed measuring activity.

2. Time-Distance Instrument as the clocking device in an aircraft.

The following procedure shall be followed when using a "time-distance instrument as the clocking device" in time-distance speed enforcement by use of aircraft:

a) The Parked Pre-measured configuration shall apply when utilizing aircraft for time-distance speed enforcement.

b) The operator of the time-distance instrument shall be currently certified as a time-distance operator by the North Carolina Criminal Justice Education and Training Standards Commission.

c) The operator of the time-distance instrument shall not be the pilot of the aircraft

d) Two reference lines shall be located on the surface of the street or highway being monitored by the aircraft engaged in the speed enforcement. These lines will represent two reference points. The two lines shall be a pre-measured distance from each other. The two lines shall be plainly visible to the operator of the time distance instrument.

e) Input the pre-measured distance into the time-distance instrument.

f) The operator shall visually estimate the speed of vehicles as they travel in his/her line of vision.

g) A time-distance instrument, approved for use in North Carolina, shall be used to clock the target vehicle as it travels between the two reference points. The time-distance instrument shall meet the criteria specified in "Appendices A, B and C" located in the Supplement for Speed Measuring Instrument Training Courses.

h) When the target vehicle touches or reaches the first reference point, turn on the time switch.

i) Continue to estimate the speed of the target vehicle as it travels toward your second reference point.

j) When the target vehicle touches or reaches the second reference point turn off the time switch.

k) Corroborate your visual estimate of speed with the speed displayed by the time-distance instrument.

l) The target vehicle speed will remain displayed in the time-distance instrument display window. The description and speed of the target vehicle will be radioed to a ground unit who will stop the target vehicle and determine the enforcement action. The instrument operator should ensure he/she maintains proper notes to establish the tracking history and compliance with the rules and regulations regarding the accuracy of this speed measuring activity.

M. Pacing as Speed Measurement

NOTE: Show slide, "PACE METHOD"

Pacing is another method of speed enforcement which requires an officer to get his patrol vehicle close enough to the speeder to pace the speeding vehicle while maintaining a proper following distance and accurately gauging the violator's true speed. Some considerations when using this method of speed measuring include;

a) The officer must first form an opinion independent of any superficial conditions, or mechanical assistance, as to the speed of the vehicle he/she is observing.

b) It is of paramount importance that an officer keeps alert and drive carefully while pacing a violator vehicle.

c) The officer should also obtain the pacing position without being observed by the violator, if possible.

d) An officer may have to catch up to the violator and then slow down to the same speed as the violator. It is important that the officer not confuse the speed used to catch up to the vehicle with that which he will need to clock or pace the vehicle.

e) The officer should pace the violator, at a constant speed, for a sufficient distance so as to ensure the officer is certain that his/her patrol vehicle is mirroring the same speed as the violator vehicle. This can be visually confirmed in the fact that his/her patrol vehicle will not be gaining or losing ground on the moving target vehicle over a sufficient distance to ensure correct measurement of speed.

f) The officer should be in constant visual contact with the violator's vehicle at all times once the measurement is being made. Therefore, curves and hills may prevent an accurate pace.

g) If the violator's speed is abnormally excessive, the officer may want to stop the violator as soon as possible in order to prevent an accident.

h) Once the officer has determined the speed of the violator, the correct procedures for stopping the violator should then be followed.

i) The officer will need to ensure that his/her patrol vehicle has a reasonably accurate speedometer to use this method of speed detection where a speed measuring instrument is not utilized. However, this does not require that the speedometer be a "certified" speedometer. The officer should only be able to testify in court to the known accuracy of the patrol vehicle speedometer at the time of pacing. The test/check of the speedometer should be completed as soon as feasible following initial purchase of the patrol car, maintenance to the patrol vehicle's transmission, differential, or tires, and once any enforcement action resulting from the use of the speedometer during pacing occurs. Acceptable methods to demonstrate an officer has an accurate patrol vehicle speedometer includes;

   (1) Have a certified RADAR or LIDAR operator perform a series of speed measurement tests/checks of the patrol vehicle speedometer using a properly operated and certified RADAR or LIDAR device (Time-Distance

is not suggested for this test because it is an average speed computer, which may result in a lower than actual speed measurement at the time unless the patrol car being tested remains perfectly at the same speed during the test). The speeds of the patrol vehicle tested should vary and include several of the various speed limits inside the officer's jurisdiction. An internal department form may be created and then completed by the certified RADAR or LIDAR operator indicating the registered speed on the speedometer and the measurement made by the speed measuring instrument validating the accuracy of the speedometer. (If the two have appreciable differences, there should not be any enforcement action taken utilizing the pacing speedometer.) However, completion of a departmental form is at the discretion of the agency and officer. The officer only needs to be able to testify to the known accuracy of the speedometer to establish reliability. Or,

(2) The speedometer may be checked by a local automotive repair shop that is capable of reliable speedometer accuracy testing. Steps should be taken by the officer/agency to ensure the speedometer test/check is reliable and trustworthy.

(3) To assist with the prosecution, we can apply the same standard of reliability to pacing using a speedometer as we did with the declaration of judicial notice for RADAR. The officer should consider being able to establish that the speedometer is accurate "before and after" the enforcement measurement was made. This can be accomplished by repeating the speedometer test/check after an enforcement action occurs through one of the aforementioned processes, and by documenting the checks on a departmental form if used by the agency.

(4) You should take note that the verification of the speedometer accuracy is only required when the officer only has the speedometer as a method to detect and measure speeds of other vehicles. The need to test/check the accuracy of the speedometer does not apply when a speed measuring instrument/device is used to measure the vehicles speed. This is based off the fact that the Time-Distance instrument is tested daily for accuracy, and that the Time-Distance instrument is not affected in ways that require the operator to verify the speedometer of the patrol car with the instrument. Therefore, the requirement to also "certify" the speedometer for Time-Distance operation would be an unnecessary requirement.

NOTE: It is recommended that the Time-Distance Instructor physically demonstrate to class groups the process of correctly pacing another vehicle following items a through h above during the familiarization portion of Time-Distance training.

III. Conclusion

A. Summary

Successful prosecutions are impossible without a properly qualified operator. Evidence of adherence to all certification requirements and protocols will be required in court. The need for coordination of air and ground units is very important to the successful prosecution of speeding cases where aircraft are utilized. The officer in the aircraft utilizing the speed measuring device and the officer on the ground making the vehicle stop will need to coordinate with each other for enforcement and court purposes. In some cases, both officers may be called to testify in court.

B. Questions

Note: Show Slide, "Questions"

C. Closing statement

Proof of a speeding violation follows a common scenario. First the officer must form a visual estimate of the violator's speed-based upon experience and training in speed estimation. A violation must be either of the basic or absolute speed law. The officer's visual observation can be corroborated by a wide variety of speed-measuring instruments to include Speedometer, RADAR, LIDAR, and Time-Distance Instruments. Officer presentation of sufficient documentation of conditions, equipment reliability, violator statements, and proof of operator qualifications will often be sufficient for a conviction.

TIME-DISTANCE SPEED ENFORCEMENT SHEET

The following speeds are calculated based on a distance of one-half mile (2640 feet)

T	S	T	S	T	S	T	S	T	S	T	S	T	S
51.0	35	48.2	37	45.4	39	42.7	42	39.9	45	37.1	48	34.3	52
50.9	35	48.1	37	45.3	39	42.6	42	39.8	45	37.0	48	34.2	52
50.8	35	48.0	37	45.2	39	42.5	42	39.7	45	36.9	48	34.1	52
50.7	35	47.9	37	45.2	39	42.4	42	39.6	45	36.8	48	34.0	52
50.6	35	47.8	37	45.1	39	42.3	42	39.5	45	36.7	49	33.9	53
50.5	35	47.7	37	45.0	40	42.2	42	39.4	45	36.6	49	33.8	53
50.4	35	47.6	37	44.9	40	42.1	42	39.3	45	36.5	49	33.7	53
50.3	35	47.5	37	44.8	40	42.0	42	39.2	45	36.4	49	33.6	53
50.2	35	47.4	37	44.7	40	41.9	42	39.1	46	36.3	49	33.5	53
50.1	35	47.3	38	44.6	40	41.8	43	39.0	46	36.2	49	33.4	53
50.0	36	47.2	38	44.5	40	41.7	43	38.9	46	36.1	49	33.3	54
49.9	36	47.1	38	44.4	40	41.6	43	38.8	46	36.0	50	33.2	54
49.8	36	47.0	38	44.3	40	41.5	43	38.7	46	35.9	50	33.1	54
49.7	36	46.9	38	44.2	40	41.4	43	38.6	46	35.8	50	33.0	54
49.6	36	46.8	38	44.1	40	41.3	43	38.5	46	35.7	50	32.9	54
49.5	36	46.7	38	44.0	40	41.2	43	38.4	46	35.6	50	32.8	54
49.4	36	46.6	38	43.9	41	41.1	43	38.3	47	35.5	50	32.7	55
49.3	36	46.5	38	43.8	41	41.0	43	38.2	47	35.4	50	32.6	55
49.2	36	46.4	38	43.7	41	40.9	44	38.1	47	35.3	51	32.5	55
49.1	36	46.3	38	43.6	41	40.8	44	38.0	47	35.2	51	32.4	55
49.0	36	46.2	38	43.5	41	40.7	44	37.9	47	35.1	51	32.3	55
48.9	36	46.1	39	43.4	41	40.6	44	37.8	47	35.0	51	32.2	55
48.8	36	46.0	39	43.3	41	40.5	44	37.7	47	34.9	51	32.1	56
48.7	36	45.9	39	43.2	41	40.4	44	37.6	47	34.8	51	32.0	56
48.6	37	45.8	39	43.1	41	40.3	44	37.5	48	34.7	51	31.9	56
48.5	37	45.7	39	43.0	41	40.2	44	37.4	48	34.6	52	31.8	56
48.4	37	45.6	39	42.9	41	40.1	44	37.3	48	34.5	52	31.7	56
48.3	37	45.5	39	42.8	42	40.0	45	37.2	48	34.4	52	31.6	56

TIME-DISTANCE SPEED ENFORCEMENT SHEET

The following speeds are calculated based on a distance of one-half mile (2640 feet)

T	S	T	S	T	S	T	S	T	S	T	S	T	S
31.5	57	28.7	62	25.9	69	23.1	77	20.3	88	17.5	102	14.7	122
31.4	57	28.6	62	25.8	69	23.0	78	20.2	89	17.4	103	14.6	123
31.3	57	28.5	63	25.7	70	22.9	78	20.1	89	17.3	104	14.5	124
31.2	57	28.4	63	25.6	70	22.8	78	20.0	90	17.2	104	14.4	125
31.1	57	28.3	63	25.5	70	22.7	79	19.9	90	17.1	105	14.3	125
31.0	58	28.2	63	25.4	70	22.6	79	19.8	90	17.0	105	14.2	126
30.9	58	28.1	64	25.3	71	22.5	80	19.7	91	16.9	106	14.1	127
30.8	58	28.0	64	25.2	71	22.4	80	19.6	91	16.8	107	14.0	128
30.7	58	27.9	64	25.1	71	22.3	80	19.5	92	16.7	107	13.9	129
30.6	58	27.8	64	25.0	72	22.2	81	19.4	92	16.6	108	13.8	130
30.5	59	27.7	65	24.9	72	22.1	81	19.3	93	16.5	109	13.7	131
30.4	59	27.6	65	24.8	72	22.0	81	19.2	93	16.4	109	13.6	132
30.3	59	27.5	65	24.7	72	21.9	82	19.1	94	16.3	110	13.5	133
30.2	59	27.4	65	24.6	73	21.8	82	19.0	94	16.2	111	13.4	134
30.1	59	27.3	65	24.5	73	21.7	82	18.9	95	16.1	111	13.3	135
30.0	60	27.2	66	24.4	73	21.6	83	18.8	95	16.0	112	13.2	136
29.9	60	27.1	66	24.3	74	21.5	83	18.7	96	15.9	113	13.1	137
29.8	60	27.0	66	24.2	74	21.4	84	18.6	96	15.8	113	13.0	138
29.7	60	26.9	66	24.1	74	21.3	84	18.5	97	15.7	114	12.9	139
29.6	60	26.8	67	24.0	75	21.2	84	18.4	97	15.6	115	12.8	140
29.5	61	26.7	67	23.9	75	21.1	85	18.3	98	15.5	116	12.7	141
29.4	61	26.6	67	23.8	75	21.0	85	18.2	98	15.4	116	12.6	142
29.3	61	26.5	67	23.7	75	20.9	86	18.1	99	15.3	117	12.5	144
29.2	61	26.4	68	23.6	76	20.8	86	18.0	100	15.2	118	12.4	145
29.1	61	26.3	68	23.5	76	20.7	86	17.9	100	15.1	119	12.3	146
29.0	62	26.2	68	23.4	76	20.6	87	17.8	101	15.0	120	12.2	147
28.9	62	26.1	68	23.3	77	20.5	87	17.7	101	14.9	120	12.1	148
28.8	62	26.0	69	23.2	77	20.4	88	17.6	102	14.8	121	12.0	150

HANDOUT: G.S. 8-50.2 Results of speed-measuring instruments; admissibility.[2]

(a) The results of the use of radio microwave, laser, or other speed-measuring instruments shall be admissible as evidence of the speed of an object in any criminal or civil proceeding for the purpose of corroborating the opinion of a person as to the speed of an object based upon the visual observation of the object by such person.

(b) Notwithstanding the provisions of subsection (a) of this section, the results of a radio microwave, laser, or other electronic speed-measuring instrument are not admissible in any proceeding unless it is found that:

(1) The operator of the instrument held, at the time the results of the speed-measuring instrument were obtained, a certificate from the North Carolina Criminal Justice Education and Training Standards Commission (hereinafter referred to as the Commission) authorizing him to operate the speed-measuring instrument from which the results were obtained.

(2) The operator of the instrument operated the speed-measuring instrument in accordance with the procedures established by the Commission for the operation of such instrument.

(3) The instrument employed was approved for use by the Commission and the Secretary of Public Safety pursuant to G.S. 17C-6.

(4) The speed-measuring instrument had been calibrated and tested for accuracy in accordance with the standards established by the Commission for that particular instrument.

(c) All radio microwave, laser, and other electronic speed-measuring instruments shall be tested for accuracy within a 12-month period prior to the alleged violation by a technician possessing at least a General Radiotelephone Operator License from the Federal Communications Commissions or possessing a Certified Electronics Technician certificate issued by a Federal Communications Commission Commercial Operators License Examination Manager or by a laboratory established by the International Association of Chiefs of Police. A written certificate by the technician or laboratory showing that the test was made within the required period and that the instrument was accurate shall be competent and prima facie evidence of those facts in any proceeding referred to in subsection (a) of this section.

All radio microwave, laser, and other speed enforcement instruments shall be tested in accordance with standards established by the North Carolina Criminal Justice Education and Training Standards Commission. The Commission shall provide for certification of all radio microwave, laser, and other speed enforcement instruments.

(d) In every proceeding where the results of a radio microwave, laser, or other speed-measuring instrument is sought to be admitted, judicial notice shall be taken of the rules approving the use of the models and types of radio microwave, laser, and other speed-measuring instruments and the procedures for operation and calibration or measuring accuracy of such instruments. (1979, 2nd Sess., c. 1184, s. 3; 1983, c. 34; 1987, c. 318; c. 827, s. 60; 1994, Ex. Sess., c. 18, s. 1; 2005-137, s. 1; 2011-145, s. 19.1(g).)