

# UNDERSTANDING & INVESTIGATION OF TRAFFIC ACCIDENTS

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This manual is intentionally spiral bound to allow the user to build the manual by including their own examples in the relevant sections by including pages

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### **Forward:**

Much is found written internationally on the subject of Traffic Accidents and is largely a specific subject matter. However, is a subject matter that perhaps more than any other field of investigation, touches base with an almost limitless range of subjects from Civil, Mechanical, Mathematical, Electrical, Chemical, Medical, Psychological, Environmental and many others. Extensive research and documenting already exists and will continue to grow or change as all aspects of accident investigation progress with inherent development of transportation across the board.

To this end, I acknowledge and have intentionally attempted to remain suitably in line with the internationally recognised and accepted subject matter manuals, their categories, procedures, practices, terminology and generally accepted norms of the field.

It was never the intention to re-invent the subject, however from years of work in the field and likewise constant reference to the many international compendiums and research, few of these offered detailed and extensive colour photographic examples of the extensive and perhaps exhaustive evidential factors that can be found in traffic accidents. Similarly and although the sound principals and theories on which traffic accident investigation are based are universal, the lack of manuals that offered both extensive reference imagery, in colour and specific to South African Laws (although largely similar to United Kingdom English Law) and nuances of the land, were major influences in creating the manual.

Over and above this, the idea of creating a manual was a progression of the usual request from clients to assist in educating staff members and so it began around 2001.

Access to first-hand experience and from that perhaps an almost unbelievable database of specific imagery of evidential factors, started in 1991, where I have stored every case image and detailing ever worked. With this at hand, it was perhaps more of a daunting task to take the time to find and insert the necessary images than there being appropriate examples. From the outset, it was evident that the manual could quite easily reach double its current size with reference imagery and therefore remains in this first edition as an intentionally “to be developed” version.

Any investigator will at some stage search for their, or an example of some evidential factor to use as validation, it is hoped that this manual and possible updated iterations, assists with exactly this.

I acknowledge and appreciate the assistance of Angelique in her painstaking effort to find and appropriately insert the imagery and likewise the general setup of the manual.

As it was derived, it has always been my intention for the manual to serve as a training and reference manual for the basic level introduction to the field, not only updated as regularly as reasonable possible, but updated with detailed colour examples, most importantly with South African Specific case images.

Craig Proctor-Parker

[www.accidentspecialist.co.za](http://www.accidentspecialist.co.za)

## **1 Introduction:**

- 1.1 The attendance at any scene of an accident can be a very traumatic and often confusing situation in which to find yourself, be this as a result of you simply having happened upon the scene and stopping to assist, or that this forms part of your duties as member of one or another specialized service. Set aside the often extremely gruesome tragedy of such a scene, an accident scene very often involves many service providers, many safety issues and other factors that need to be considered over and above that of the rescue and recovery of patients and fatally injured, that will ultimately inform us of the cause of the accident.
- 1.2 Understanding these many factors (holistically) from grass roots level will allow you to better deal with all aspects of the accident. It is this holistic understanding of the many aspects that relate to an accident that this training will assist you with, and hopefully allow you to create a better understanding for yourself. Be that because you may assist others, that you yourself are ever involved in an accident that you have stopped to help someone in your private capacity or that it is part of your duties.

## **2 Your lecturer/s:**

- 2.1 Lecturers may vary dependant on availability and subject matter

Note: Lecturers presenting may vary and do so on availability and specific to subject matter.

## **3 Overview:**

- 3.1 The training set out herein, is based intentionally and as closely as possible on internationally accepted training standards, these, among others, are generally accepted as being the leaders on the subject. This manual has evolved through updates and revision over time to the latest edition and serves as the basic guideline principals in this field.
- 3.2 Likewise, this training is tailored specifically to the needs of the understanding and investigation of traffic accidents within the South African context, particularly with reference to the laws and procedures of this country.
- 3.3 The training is directly aimed at assisting you in achieving better results in conducting your daily task through the clear understanding of accidents and all the interrelated issues.

**Day 1 Content:** (08:30 – 16:30 - Lunch as arranged, usually 12:00 – 13:00 or as required)

**1 What is an Accident, Collision or a Crash?**

**2 Types of accident (Categories)**

2.1 Accident Classification:

2.1.1 Slight

2.1.2 Moderate

2.1.3 Serious

2.2 Correct procedures / Documents / Common questions and issues

**3 Legal requirements relating to accidents**

**4 National Road Traffic Act**

**5 Equipment (Scene Investigation)**

5.1 Equipment introduction

5.2 Basic equipment

5.2.1 Measuring

5.2.2 Photography

5.2.3 Video

5.2.4 Pen, Pencil and Paper

5.2.5 Marking

5.3 Extra and advanced equipment

**6 The scene of crash:**

6.1 Scene safety

6.1.1 Driving / responding to the Scene

6.1.2 Arrival at the Scene

6.1.3 Safe guarding the Scene and Yourself

6.1.4 Freeway Incident Management Plan

6.1.5 Scene etiquette

Day end

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## 1 What is a traffic accident, Collision or a Crash?

### 1.1 Accident is defined as:

1.1.1 An undesirable or unfortunate happening that occurs unintentionally and usually results in harm, injury, damage, or loss; casualty; mishap: automobile accidents.

1.1.2 Any event that happens unexpectedly, without a deliberate plan or cause.

### 1.2 Collision is defined as:

1.2.1 To come together with violent, direct impact.

### 1.3 Crash is defined as:

1.3.1 To break violently or noisily; smash.

1.3.2 To undergo sudden damage or destruction on impact.

“Their car crashed into a guardrail”

“The airplane crashed over the ocean.”

1.4 In general, the term “Accident” is commonly referred to in the National Road Traffic Act and is accepted in the South African context as being the generic term of reference to all vehicle accidents / crash or collisions. However, use of any of these terms is generally accepted.

1.4.1 One of the South African authoritative books “The law of Collisions in South Africa” sees the author HB Kloppe using the term “Collisions”.

1.4.2 Internationally it is now preferred that the term “**crash**” is used, as it is proposed that this is wiser than the others as an accident implies that the incident occurred of purely accidental nature, where this may not be (and usually is not) the case.

## 2 Types of accidents (Categories)

2.1 Accidents are generally classified into three groups, as follows:

### 2.1.1 Slight or minor (damage only)

2.1.1.1 This type of accident usually results in damages only, and that the vehicle is usually driven away from the scene. Drivers usually exchange particulars and report the accident of their own accord at a police station (SAPS or a Metropolitan Police station) within 24 hours.

2.1.1.2 This type of reporting is a form of a statement; however this is not the traditional sense of a statement. This type of reporting is the completion of a standard Accident Report (AR) document. This document is shown below.

2.1.1.2.1NB – The accident report has seen many changes and there are different versions

2.1.1.3 An accident report of this nature can also be completed by a police officer at the scene of an accident where a police officer is at the scene, or if he/she has an accident report with him, you yourself (the person involved in the accident) can complete this yourself on the scene. If there is any discrepancy over who may or may not actually fill in the accident report form, simply read section three (3) on page 1a of the report, this is clearly stated.

2.1.1.4 Completion of this Accident Report will result in the supply of what is referred to as an Accident Report (AR) number, which is referenced as a number followed by the month and year, and police station name for example AR 10/02/2012 – KwaMbanambi SAPS.

- 2.1.1.5 In general, completion of an AR means that in general, there will be no further investigation of the accident.



Example of a complete Accident Report Document

The 6 different pages of an accident report

**Accident Report (AR) Form**

SECTION 1: GENERAL INFORMATION

SECTION 2: VEHICLE INFORMATION

SECTION 3: DRIVER INFORMATION

SECTION 4: WITNESS INFORMATION

SECTION 5: DAMAGE INFORMATION

SECTION 6: OTHER INFORMATION

**Accident Report (AR) Form**

SECTION 7: OPERATIONAL PROCEDURES FOR RWMP AND SAPS OFFICERS

SECTION 8: INSTRUCTIONS FOR COMPLETION OF THE FORM

SECTION 9: SIGNATURES

SECTION 10: NOTES

**Accident Report (AR) Form**

SECTION 11: SIGNATURES

SECTION 12: NOTES

SECTION 13: SIGNATURES

SECTION 14: NOTES

**Accident Report (AR) Form**

SECTION 15: SIGNATURES

SECTION 16: NOTES

SECTION 17: SIGNATURES

SECTION 18: NOTES

**Accident Report (AR) Form**

SECTION 19: SIGNATURES

SECTION 20: NOTES

SECTION 21: SIGNATURES

SECTION 22: NOTES

**Accident Report (AR) Form**

SECTION 23: SIGNATURES

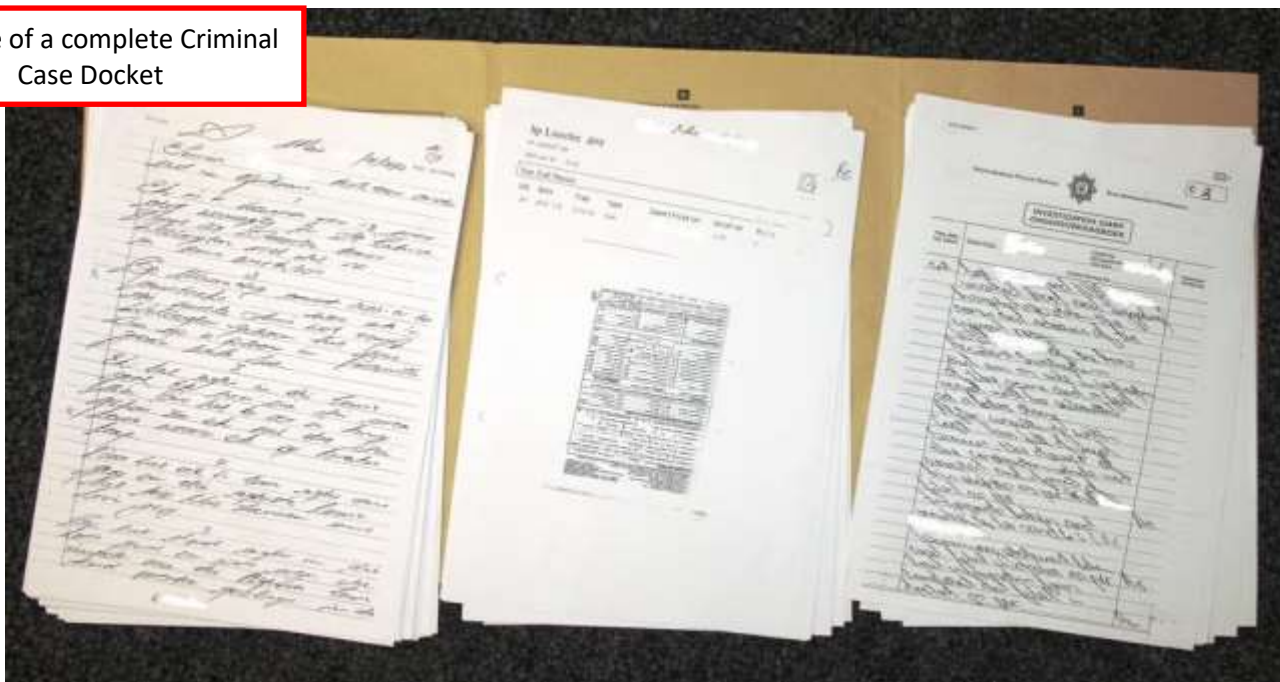
SECTION 24: NOTES

SECTION 25: SIGNATURES

SECTION 26: NOTES

- 2.1.1.6 If an accident report is completed by the officer, it is signed by him. If it is completed by the party involved; it is signed by that person.
- 2.1.1.7 Each party must report the accident independently if they are doing it themselves.
- 2.1.2 Moderate (damage and slight injury)
  - 2.1.2.1 This type of accident is usually the type of accident that results in somewhat more severe damages where a vehicle may need to be towed away and there may well be injuries involved. This type of accident can result in either a standard accident report (as above) being completed, or a criminal case docket (see below) being opened dependant on how severe the damages, injuries and number of vehicles involved. The opening of either an accident report or a criminal case docket is usually the determination of the attending officer. However, it can also be done at the request of one of the parties, or by one of the parties themselves at the police station. Regardless, and AR is always completed.
- 2.1.3 Serious (serious damages and injuries among other factors)
  - 2.1.3.1 This type of accident usually results in serious damages and injuries and should always be attended to by the police. A criminal case docket (**Criminal Administration System – CAS**) is opened for investigation purposes, this could be a criminal case docket for investigation of:
    - 2.1.3.1.1 Culpable homicide (someone fatally injured)
    - 2.1.3.1.2 Reckless and/or negligent driving (Inconsiderate driving)
    - 2.1.3.1.3 Hit and run (and seven sub counts {a – g} associated)
    - 2.1.3.1.4 Drunken driving (Driving under the influence of an intoxicating substance or drug having a narcotic effect, or excessive amount of alcohol in blood or breath)
  - 2.1.3.2 This type of accident can result in the police seizing any or all of the vehicles involved and have them placed into the police pound (SAP 13 register). Likewise, where a driver is arrested for “Drunken driving” or “Reckless and negligent driving” or “hit and run”, they can and usually are formally arrested and detained, however this is not always the case.
  - 2.1.3.3 Where a criminal case docket is opened, this still contains an Accident Report, however the Accident Report is not “on its own” as above, it forms part of the entire case docket. Where a case docket is opened, a reference number known as a CAS number is appointed. This CAS number is referenced as a number followed by the month and year and police station name, for example CAS 103/02/2012 – KwaMbanambi SAPS.

Example of a complete Criminal Case Docket





- [illegible]

[illegible][illegible][illegible][illegible]

1

Consent/assent, documents, etc., not having part of "a" or "b" to be furnished.  
 Consent/assent, documents or any other will contain "a" or "b" to be furnished. The last line please write:

**PART 9 CHECKLIST**

**1. Certificate completed by the Chief Service Officer (CISO) who directed the audit:**

Cert. number \_\_\_\_\_ Date \_\_\_\_\_ Initials only (Signature) \_\_\_\_\_

**2. The undersigned certify that the above document was checked and that the information provided on the document was correct according to the CISO's records on file:**

Name \_\_\_\_\_ Initials only (Signature) \_\_\_\_\_

**3. Certificate completed by the Company Agent who signed the document:**

**4. The undersigned certify that the above document was prepared correctly according to the information provided on the document:**

Name \_\_\_\_\_ Initials only (Signature) \_\_\_\_\_

Name \_\_\_\_\_ Signature \_\_\_\_\_

**5. Certificate completed by the CISO (Signature) who directed the audit:**

After the following information is entered into the system, the system will be updated with the following information:

**6. The following information is entered into the system:**

**7. The following information is entered into the system:**

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**39. The following information is entered into the system:**

**40. The following information is entered into the system:**

- [Training]

## 2.2 Correct procedures / documents / common questions and issues:

- 2.2.1 Frequently, we hear “I have made a statement to the police”. As has already been shown above, an Accident Report is a form of a statement as it records certain details that you may have indicated to an officer, or that you have listed on the report yourself. However it is generally accepted that this is a simple statistical and incidental reporting of the accident, and not a formal statement.
- 2.2.2 A statement, if a formal written (typed) statement that is usually taken down by an investigating officer (police officer) where a criminal case docket is under investigation; such a statement is an extra to (over and above) the normal accident report document. A statement of this sort is also commissioned in front of the person making the statement i.e. a commissioner of oath (such as a policeman) will have you read and/or acknowledge that what is contained in the statement is correct, they will have you sign it and date it, as well as indicate location, and then they too will sign it.
  - 2.2.2.1 An affidavit is similar to a statement in that it is also a complete detailing either written or typed and is also signed and may even be witnessed by someone. However, the main difference is that this document (affidavit) is not done in front of and signed by a commissioner of oaths (like a police officer etc.)
- 2.2.3 An accident report document is usually filed at the SAPS station, or the Metro station, and is at a later stage / date forwarded to a provincial central point, such as the Road Traffic Inspectorate, or Provincial D.O.T office where it is filed and stored. Accident reports can be sourced and purchased from this office.
- 2.2.4 Where an officer attends at the scene of accident, this officer is then known as the attending officer, regardless of the accident being a minor or serious accident. If the accident is a serious accident then this officer will also compile a statement (His own statement, not yours) that will become part of the criminal case docket. This statement is referred to as the attending officer’s statement, also known as the A1 statement as it goes into the “A” clip section of the case docket and is the first statement in the case docket.
- 2.2.5 The case docket is then registered at the police station under which jurisdiction the accident occurred, the CAS number issued (....ref. no. .... / month / year). The case docket is then handed to an investigating officer, called the case docket investigating officer, or the detective. This member will then “carry” this case docket through the full process of investigation to finality, usually where the court makes a decision.
  - 2.2.5.1 **Some** of the many requirements of the case docket investigating officer in the process of investigating the case are highlighted below:



<b><u>Duties of a Investigating Officer</u></b>		
*	2.3.1	Enquiries about details of a certain case eg. Charge and name complainant
*	3.3.5	List of property involved.
*	3.6.2	Enquiry and details of the deceased.
*	4.2.1	Sign for dockets the charge office.
*	4.8	Sign of dockets that are assign to you.
*	4.13.5	Acknowledgment of receipt on a enquiry docket.
*	4.13.7	Reopening of and enquiry docket.
*	4.13.8	Enquiry about and enquiry docket.
*	4.15.1.1.1	Enquiry about a specific case number.
*	4.15.1.5.1	List of cases on hand per I/O.
*	4.15.1.1.6	Status of the cases eg. who's the I/O and court date.
*	5.3	Charging of suspect on CAS system.
*	5.13.8	List of cases (own cases) where SAP 76 is outstanding.
*	5.13.9	List of cases (own cases) where SAP 69 is outstanding.
*	5.13.10	List of cases where (own cases) SAP 69 is not sent.
*	5.13.11	Control list ( case where accuse is charged before the case is closed).
*	5.13.6	Checking whether suspect has other cases against him pending.

Typical SAPS case docket investigation procedures & requirements

- 2.2.5.2 Once a case docket is completed, such as where the suspect (the driver) is not prosecuted, perhaps due to a lack of evidence. Or if the case docket has been completed and the driver is found either guilty or perhaps not guilty, the case docket is filed in a “filing room” at that particular police station.
- 2.2.5.3 Where a driver feels the need to, a driver can go to a police station and open a criminal case docket of their own accord. Such as for reckless and/or negligent driving, hit and run etc. The same basic process as set out already will be followed.
- 2.2.5.4 Usually, a driver will not have anything to do with any other documents than the Accident Report, and or the Statement that may be required. In some circumstances, a driver may be requested to attend the scene and point out certain factors if clarity is required, however this is usually only where a serious accident has occurred and when a criminal case docket is under investigation.

### 3 Legal requirements relating to accidents:

3.1 As has been indicated in the different types of accident (Minor / Moderate / Serious) all accident must be reported by law, within a 24 hour period.

3.1.1 The accident may well have been reported by the police officer that attended the accident scene, if there was an officer at the scene. This should be clarified with the officer at the scene when he attends i.e. ask him/her if they will be reporting the accident, if not (they will usually request you to do so if it is a minor accident), then you will need to do so.

3.1.2 If you are injured or are unable to report the accident (perhaps you were injured and are in hospital or bedridden), then you are to do so at the earliest point / time that you can. It could be required that a medical certificate for your delay be required. If you do not have a valid reason for not reporting, you can be charged.

3.2 If an officer at the scene of the accident arrests someone, they should do so by firstly:

3.2.1 Warning that person that they are being arrested and inform them as to what they are being arrested for (culpable homicide / drunken driving / reckless and or negligent driving, etc.).

3.2.2 The arresting officer must inform the arrested person of their rights as per the bill of rights, as follows:

- a) I am \_\_\_\_\_ of the Durban Metropolitan police service / SAPS etc.
- b) I am arresting you for \_\_\_\_\_ (REASON).
- c) You have the right to remain silent.
- d) You have the right to consult with an attorney and your attorney may be present during questioning, should you not be able to afford an attorney, you may apply for legal aid.
- e) You are not compelled to say anything, but should you care to give up this right, anything you say will be taken down in writing and can be used against you in a Court of Law.
- f) You have the right to be handed over to a Police Official as soon as possible, after the Arrest.
- g) You have the right to have these rights and processes explained to you in the official language of your choice.
- h) Do you understand your rights as explained to you?

3.3 Typical traffic offences such as speeding, parking violation etc. have a simple system of “ticket issue” or “spot fine” and the option of “Admission of Guilt” (A.G.) to be paid by and at a specific date and time. If you contest this, you are entitled to appear in court and to defend yourself. This is usually clearly stipulated on the fine.

3.4 Typically such “regular offenses” such as speeding do not result in arrest and are simply “fineable offenses”. However speeds above the “cut off” results in a serious offense type situation, where you are automatically arrested; you may not pay an “admission of guilt”, as in the situation where you would be issued with a spot speeding fine and can go and pay it later. You will be detained.

Typical KZN limits:

60kph	-	97kph
80kph	-	111kph
120kph	-	145kph

NB: Provinces differ.

3.5 Dealing with insurance companies and their requirements:

3.5.1 Requirements of your insurance have absolutely nothing to do with the policing functions other than the fact that you need to report your accident to the authorities. It is not the responsibility of the police officer to comply with your insurance policy requirements.

3.5.2 Insurance companies have particular requirements specific to each one. These requirements will most definitely be set out in some sort of document that has been supplied to the person that is insured, usually in the insurance policy document itself.

3.5.3 The person that is insured, or someone acting on their appointed behalf are required to fulfil whatever the insurance requirements are, these requirements are always set out in your insurance policy document and or have been explained to you during your application and acceptance of your insurance. Some examples of insurance policy requirements are:

3.5.3.1 Making sure that the accident is reported to the authorities.

3.5.3.2 Making sure that the accident is reported to your insurers within their (your insurance) stipulated time.

3.5.3.3 Making sure that whatever documents and information they (your insurers) require, are supplied to them.

3.5.3.4 That you may not lie or deceive the insurance company.

3.5.3.5 That the insurance company has the right to investigate the matter if they suspect some untoward situation.

3.6 Accident Investigation is accepted as being divided into four basic sections as follows:

- a) Accident Investigation
- b) Technical follow-up
- c) Reconstruction
- d) Cause analysis

3.6.1 Typically, the on-scene investigation is undertaken by the police service. Likewise and where necessary, the technical follow-up, reconstruction and cause analysis may be undertaken by their “in house specialists” such as their Local Criminal Record Centre (LCRC) or their forensic departments (Or appointed contractors), where the investigations is primarily guided by, among others:

3.6.1.1 Criminal Procedure Act (CPA, 1977 (Act No. 51 of 1977)

3.6.1.2 National Road Traffic Act (NRTA, 1996 (93 of 1996)

3.6.2 Specifically during criminal investigations, however during all investigations, investigators should have a clear understanding of the issues of “chain of evidence”, and likewise legal requirements of “warning of rights” and related hereto, the appropriate “taking of statement”.

3.7 Although not an absolute requirement, general understanding of the method of research and keeping abreast of judgements and decided cases from courts through such resources as Juta Law and others is ideal, and will assist in understanding.

3.7.1 It is wise to get advice and guidance from the legal profession if you are not sure of any legal aspects. Advice can be obtained from your in house legal advisor, a lawyer specialising in the particular field and even advice from the state prosecutors directly.

#### 4 National Road Traffic Act:

- 4.1 The national road traffic act is largely broken into two main sections, that of the Act 1996 itself, comprising Chapters I through XV and the regulations, listed as chapters I through XIV
- 4.2 As has already been referred to, accidents and likewise vehicles fall under the National Road Traffic Act. All practitioners should have a copy of the act, be this a hard copy or an electronic copy (at hand).
  - 4.2.1 The full act is freely available at [www.acts.co.za](http://www.acts.co.za).
- 4.3 Certain key issues typically arise when dealing with issues of vehicle accidents, the following specific National Road Traffic Act listings are a quick reference to some of the key issues:

National Road Traffic Act, 1996

Chapter X: Accidents and accident reports

##### **61. Duty of driver in event of accident**

- a) Immediately [stop](#) the vehicle;
- b) Ascertain the nature and extent of any injury sustained by any person;
- c) If a person is injured, render such assistance to the injured person as he or she may be capable of rendering;
- d) Ascertain the nature and extent of any damage sustained;
- e) If required to do so by any person having reasonable grounds for so requiring, give his or her name and address, the name and address of the [owner](#) of the vehicle driven by him or her and, in the case of a motor vehicle, the registration or similar mark thereof;
- f) If he or she has not already furnished the information referred to in paragraph (e) to a [traffic officer](#) at the scene of the accident, and unless he or she is incapable of doing so by reason of injuries sustained by him or her in the accident, as soon as is reasonably practicable, and in any case within 24 hours after the occurrence of such accident, report the accident to any police officer at a police station or at any office set aside by a competent authority for use by a traffic officer, and there produce his or her [driving licence](#) and furnish his or her identity number and such information as is referred to in that paragraph; and
- g) Not, except on the instructions of or when administered by a [medical practitioner](#) in the case of injury or shock, take any intoxicating liquor or drug having a narcotic effect unless he or she has complied with the provisions of paragraph (f), where it is his or her duty to do so, and has been examined by a medical practitioner if such examination is required by a traffic officer.
- h) No person shall remove any vehicle involved in an accident in which another person is killed or injured from the position in which it came to rest, until such removal has been authorized by a traffic officer, except when such accident causes complete obstruction of the [roadway](#) of a public road, in which event the vehicle involved may, without such authority and after its position has been clearly marked on the surface of the roadway by the person moving it, be moved sufficiently to allow the passage of traffic.
- i) Subject to subsection (2), no person shall remove a vehicle involved in an accident from the scene of such accident, except for the purpose of sufficiently allowing the passage of traffic, without the permission of the owner, driver or operator of such vehicle or a person who may lawfully take possession of such vehicle.
- j) In any prosecution for a contravention of any provision of this section it shall be presumed, in the absence of evidence to the contrary, that the accused was aware of the fact that the accident had occurred, and that he or she did not report the accident or furnish the information as required by subsection (1)(f).
- k) In this section the word “animal” means any bovine animal, horse, ass, mule, sheep, goat, pig, ostrich or dog.

National Road Traffic Act, 1996  
National Road Traffic Regulations, 1999  
Chapter VI: Fitness of Vehicles  
Part II: Equipment on or in respect of vehicles

**154. Specifications for brakes**

National Road Traffic Act, 1996  
National Road Traffic Regulations, 1999  
Chapter VI: Fitness of Vehicles  
Part II: Equipment on or in respect of vehicles

**155. Braking performance of service, emergency and parking brakes**

National Road Traffic Act, 1996  
National Road Traffic Regulations, 1999  
Chapter X: Rules of the road and matters relating thereto  
Part I: Rules of the road

**308. General duties of driver or passenger of vehicle on public road**

National Road Traffic Act, 1996  
National Road Traffic Regulations, 1999  
Chapter VI: Fitness of Vehicles  
Part II: Equipment on or in respect of vehicles

**216. Motor vehicles operated on public road to comply with compulsory vehicle specifications**

National Road Traffic Act, 1996  
National Road Traffic Regulations, 1999  
Chapter VI: Fitness of Vehicles  
Part II: Equipment on or in respect of vehicles

**213. Seatbelts**

- 4) For the purpose of this regulation –
  - a) An adult is a person over the age of 14 years or taller than one comma five metres; and
  - b) A child is a person between the age of three years and 14 years, except where such person is taller than one comma five metres.
- 2) Any reference to a safety belt in these regulations shall be construed as a reference to a seat belt
- 3)
  - a) Motor vehicles which are required to be fitted with seatbelts in terms of the relevant requirements as contemplated in [regulation 216](#), shall be fitted with seatbelts in accordance therewith.
  - b) In addition to the requirements of paragraph (a), no person shall operate a minibus the gross vehicle mass of which exceeds 2 500 kg, unless seatbelts are fitted to the space on the front seat occupied by the driver, and if such front seat has seating accommodation for passengers, unless seatbelts are fitted for the driver and at least one passenger.
  - c) No person shall operate a motor vehicle on a public road unless the seatbelts fitted to such motor vehicle are in good working order.
  - d) Seatbelts fitted to a motor vehicle may only be removed for repair or replacement purposes and such motor vehicle may not be used on a public road while such seatbelts are being repaired or replaced.
- 4) No adult shall occupy a seat in a motor vehicle operated on a public road which is fitted with a seatbelt unless such person wears such seatbelt: Provided that the provisions of this regulation do not apply while reversing or moving in or out of a parking bay or area.
- 5) No adult shall occupy a seat on a row of seats in a motor vehicle operated on a public road which is not fitted with a seatbelt, unless all other seats on such row which are fitted with seatbelts are already occupied.
- 6) The driver of a motor vehicle operated on a public road shall ensure that a child seated on a seat of the motor vehicle –
  - a) Where it is available in the motor vehicle, uses an appropriate child restraint; or

- b) If no child restraint is available, wears the seatbelt if an unoccupied seat which is fitted with a seatbelt is available.
- 6) The driver of a motor vehicle operated on a public road shall ensure that a child seated on a seat of the motor
- 7) If no seat, equipped with a seatbelt is available in a motor vehicle the driver of the motor vehicle operated on a public road shall ensure that a child shall, if such motor vehicle is equipped with a rear seat, be seated on such rear seat.
- 8) a) A seatbelt shall comply with the standard specification SABS 1080 “Restraining devices for occupants of adult build in motor vehicles (Revised requirements)” and bear a [certification mark](#) or [approval mark](#).  
b) A child restraint shall comply with the standard specification SABS 1340 “Child restraining devices in motor vehicles” and bear a certification mark or approval mark.
- 9) The MEC may exempt a person from the provisions of this regulation on such medical grounds and under such conditions he or she may deem expedient
- 10) An exemption from wearing a seatbelt in a prescribed territory shall be deemed to be an exemption in terms of subregulation (9) for the period of validity thereof.

National Road Traffic Act, 1996

National Road Traffic Regulations, 1999

Chapter V: Fitness of Drivers

Part IV: Professional Driving Permit

**115. Certain drivers of certain vehicles to hold professional driving permit**

National Road Traffic Act, 1996

National Road Traffic Regulations, 1999

Chapter VI: Fitness of Vehicles

Part II: Equipment on or in respect of vehicles

**212. Tyres**

- 4) No person shall operate on a public road –
  - a) A motor vehicle, other than a tractor or trailer, which is equipped with a metal tyre;
  - b) A tractor or trailer, other than an animal-drawn vehicle, which is equipped with a metal tyre of less than 130 millimetres in width;
  - c) An animal-drawn vehicle which is equipped with a metal tyre less than 40 millimetres in width;
  - d) A vehicle which is equipped with a metal tyre unless the whole width of the tread of the tyre is at all times in direct contact with the surface of the road;
  - e) A vehicle which is equipped with a tyre which is in such a state of disrepair or in such a condition that it may cause or is likely to cause damage to the road surface or may be or is likely to be a danger;
  - f) A motor vehicle which is equipped with a pneumatic tyre of which the rubber covering is so worn or damaged that the fabric or cord used in the construction of such tyre is exposed;
  - g) A motor vehicle of which a tyre is so constructed and fitted that the metal part of the wheel to which such tyre is fitted may come into contact with the road surface;
  - h) A motor cycle which is equipped with a retreaded tyre;
  - i) A motor vehicle which is equipped with a regrooved tyre having a bead diameter of 430 millimetres or less;
  - j) A motor vehicle –
    - i) Which is fitted with a pneumatic tyre unless such tyre displays throughout, across its breadth and around its entire circumference, a pattern which is clearly visible, and has a tread of at least one millimetre in depth; or
    - ii) Which is fitted with a pneumatic tyre which contains a tyre tread depth indicator, if the tread is level with the tyre tread depth indicator:

Provided that this paragraph shall not apply in respect of a motor cycle with an engine which has a cylinder capacity not exceeding 125 cubic centimetres, or a trailer drawn by a tractor at a speed not exceeding 35 km/h;

- k) A motor cycle with an engine having a cylinder capacity not exceeding 50 cubic centimetres, which is fitted with a pneumatic tyre which does not at any position on the tread thereof have a visible tread pattern over at least 80 per cent of the full width of the tread;
- l) A motor vehicle which is equipped with a pneumatic tyre which has a break in its fabric or which has a cut, measured in any direction on the outside of the tyre and of such depth that it reaches the cords used in the construction of such tyre, in excess of 25 millimetres or 10 per cent of the maximum width of the tyre, whichever is the greater; or
- m) A motor vehicle which is equipped with a pneumatic tyre which has a lump or bulge caused by the separation of or a partial break in its structure.

National Road Traffic Act, 1996

National Road Traffic Regulations, 1999

Chapter VI: Fitness of Vehicles

Part II: Equipment on or in respect of vehicles

**157. Vehicles to be equipped with certain lamps and times when certain lamps to be lighted**

- 1) No person shall operate on a public road a motor vehicle unless –
  - a) All lamps fitted to a motor vehicle as contemplated in [regulations 159](#) to [184](#) inclusive, are undamaged, properly secured, and capable of being lighted at all times; and
  - b) The head lamps, rear lamps and number plate lamps are kept lighted during the period between sunset and sunrise and at any other time when, due to insufficient light or unfavourable weather conditions, persons and vehicles upon the public road are not clearly discernible at a distance of 150 metres: Provided that the provisions of this paragraph shall not apply to a motor vehicle parked off the roadway of a public road or in a parking place demarcated by appropriate road traffic signs or within a distance of 12 metres from a lighted street lamp illuminating the public road on which such vehicle is parked.
- 2) No person shall operate on a public road a motorcycle, a motorcycle with a side car, a motor tricycle or [motor quadrucycle](#), unless the headlamp of such vehicle is lighted at all times: Provided that the provisions of this subregulation shall not apply to a motorcycle, motorcycle with side car, motor tricycle or motor quadrucycle manufactured before 31 December 1960 which is used only during the period from sunrise to sunset.
- 3) A person operating a motor vehicle on a public road shall extinguish the main-beam of the light emitted by the head lamp of such vehicle if such main-beam could cause a dangerous glare to oncoming traffic.

National Road Traffic Act, 1996

National Road Traffic Regulations, 1999

Chapter VI: Fitness of Vehicles

Part II: Equipment on or in respect of vehicles

**158. Visibility distance of lights**

**(150m)**

National Road Traffic Act, 1996

National Road Traffic Regulations, 1999

Chapter VI: Fitness of Vehicles

Part II: Equipment on or in respect of vehicles

**161. Dipped-beam**

**(45m)**

National Road Traffic Act, 1996

National Road Traffic Regulations, 1999

Chapter VI: Fitness of Vehicles

Part II: Equipment on or in respect of vehicles

**160. Main-beam**

**(100m)**



National Road Traffic Act, 1996  
National Road Traffic Regulations, 1999  
Chapter VI: Fitness of Vehicles  
Part II : Equipment on or in respect of vehicles  
**186. White retro-reflectors to be fitted on front of certain vehicles**

National Road Traffic Act, 1996  
National Road Traffic Regulations, 1999  
Chapter VI: Fitness of Vehicles  
Part II : Equipment on or in respect of vehicles  
**187. Red retro-reflectors to be fitted on rear of certain vehicles**

National Road Traffic Act, 1996  
National Road Traffic Regulations, 1999  
Chapter VI: Fitness of Vehicles  
Part II: Equipment on or in respect of vehicles  
**188. Yellow retro-reflectors to be fitted on sides of certain motor vehicles**

- 1) No person shall operate on a public road a motor vehicle or a combination of motor vehicles, if the [overall length](#) of such vehicle or combination of vehicles exceeds seven metres, unless they are fitted with, on each side of such vehicle, or on each side of every motor vehicle in such combination of vehicles, as the case may be –
  - a) One yellow [retro-reflector](#)—
    - i) Within three metres of the front of such vehicle or combination of vehicles;
    - ii) Within one metre of the back of such vehicle or combination of vehicles; and
    - iii) In the case of a combination of motor vehicles, of which a trailer, other than a semi-trailer, forms a part, within three metres of the front of the trailer; and
  - b) So many additional yellow retro-reflectors as may be necessary to ensure that no two successive yellow retro-reflectors on any side are more than three comma six metres apart, complying with the provisions of [regulations 189](#) and [192](#): Provided that –
    - i) Yellow retro-reflectors need not be fitted to a bus or minibus which is not a [school bus](#), including such a bus or minibus which forms part of a combination of motor vehicles;
    - ii) In the case of a combination of motor vehicles where the drawing vehicle is a [motor car](#), yellow retro-reflector need not be fitted to such drawing vehicle; and
    - iii) In the case of a combination of motor vehicles where the drawing vehicle is a motor car, bus or [mini-bus](#) which is not a school bus, the front of such combination shall, subject to the provisions of paragraph (i), be deemed to be the front of the vehicle immediately following such drawing vehicle.

National Road Traffic Act, 1996  
National Road Traffic Regulations, 1999  
Chapter VI: Fitness of Vehicles  
Part II: Equipment on or in respect of vehicles  
**192A. Side and rear retro-reflective material to be fitted to vehicles**

- 1) The sides and rear of a [goods vehicle](#) the gross vehicle mass of which exceeds 10 000 kg and which is licenced for the first time on or after 1 July 1999, shall be fitted, and all vehicles may be fitted, with side and rear retro-reflective material in accordance with standard specification SABS ECE R104 “Uniform provisions concerning the approval of retro-reflective markings for heavy and long vehicles and their trailers”, but –
  - a) Any [rear underrun protection device](#) shall be fitted along its length with a rear retro-reflective marking strip;
  - b) Application for (paragraph 3 of SABS ECE R104), and approval of (paragraph 5 of SABS ECE R104), any retro-reflective marking material is not required under these regulations, but the letter “C” indicating contour or strip marking as referred to in paragraph 5.4.3.1 of SABS ECE R104, shall be brought onto the retro-reflective marking material;
  - c) Advertising, consisting of retro-reflective logos, distinctive markings or letters or characters may be used if –
    - i) It complies with the requirements of the said standard specification; and
    - ii) It is used in conjunction with contour marking, excluding marking strips, which denotes the manufacturer concerned;



- d) the side and rear retro-reflective material shall be yellow.
- 2) The sides and rear of a goods vehicle which was licenced for the first time before 1 July 1999 the gross vehicle mass of which exceeds 10 000 kg, shall be fitted with side and rear retro-reflective material in accordance with subregulation (1), on and after 1 January 2001.

National Road Traffic Act, 1996

National Road Traffic Regulations, 1999

Chapter VI: Fitness of Vehicles

Part II: Equipment on or in respect of vehicles

**214. Emergency warning signs (Triangle)**

- 1) For the purposes of this regulation –
  - a) The expression “motor vehicle” excludes an ambulance, motor-car, motor cycle, motor tricycle or [motor quadrucycle](#); and
  - b) “Reflective material” means reflective material which under all circumstances is capable of reflecting light.
- 2) No person shall operate on a public road –
  - a) A motor vehicle unless there is carried on such vehicle at least one emergency warning sign, which –
    - i) Is a double-sided sign having the shape, design, minimum dimensions and colours as illustrated hereunder, and of which the red portion on each side –
      - (aa) shall consist of red reflective material; or
      - (bb) shall be painted red and have [retro-reflectors](#) at each corner; or
    - ii) Is an emergency warning sign contemplated in paragraph (b);
  - b) A motor vehicle with a gross vehicle mass exceeding 3 500 kilograms, unless there is carried on such vehicle at least one emergency warning sign, which –
    - i) Is a warning sign complying with the requirements of standard specifications SABS 1329 “Retro-Reflective and Fluorescent Warning Signs For Road Vehicles”, Part 1: “Triangles”; and
    - ii) Bears a [certification mark](#);  
Provided that in the case of a combination of motor vehicles, the emergency warning sign for every motor vehicle of such combination may be carried on the drawing vehicle: Provided further that in the case of a combination of three motor vehicles, at least two emergency warning signs shall be carried on the vehicle.
- 3) Where a motor vehicle is for any reason stationary on the roadway of a public road, the driver of such vehicle shall display or cause to be displayed at least one emergency warning sign in the manner contemplated in subregulation (5).
- 4) No person shall, without lawful cause, remove or tamper with any emergency warning sign, which is being displayed in accordance with the provisions of this regulation.
- 5) At least one emergency warning sign shall be displayed in the following manner:
  - a) The sign shall be placed not less than 45 metres from the motor vehicle along the roadway of the public road concerned in the direction from which traffic will approach such vehicle when travelling on the side of the roadway closest to such motor vehicle;
  - b) The sign shall be placed approximately as far from the edge of the roadway as the transverse centre of the motor vehicle is from the edge of the roadway; and
  - c) The reflective side of the sign shall face in the direction from which any traffic will approach.
- 6) The provisions of subregulation (3) shall not apply where a motor vehicle is stationary –
  - a) In a place where a road traffic sign authorises the loading or unloading of a vehicle;
  - b) In compliance with any direction conveyed by a road traffic sign or given by a traffic officer;
  - c) On account of other traffic on the public road concerned and while the driver occupies the driving seat of such motor vehicle; or
  - d) In the course of events accompanying the carrying out of a State or municipal function.

National Road Traffic Act, 1996  
National Road Traffic Regulations, 1999  
Chapter X: Rules of the road and matters relating thereto  
Part I: Rules of the road  
**304. Stopping of vehicles**

- 1) Except in order to avoid an accident, or in compliance with a road traffic sign or with a direction given by a traffic officer, or for any cause beyond the control of the driver, no person shall stop a vehicle on the roadway of a public road –
  - a) Alongside or opposite an excavation or obstruction on the public road if other traffic would be obstructed or endangered by such stopping;
  - b) Within any tunnel or subway or on any bridge or within six metres of any tunnel, subway or bridge;
  - c) On, or within six metres from the beginning or end of, any part of such roadway where the normal width thereof has for any reason been constricted;
  - d) In contravention of any road traffic sign;
  - e) On the right-hand side of such roadway facing oncoming traffic;
  - f) Alongside or opposite any other vehicle on such roadway where such roadway is less than nine metres wide;
  - g) Within the railway reserve at a level crossing;
  - h) Within nine metres of his or her approaching side of a [pedestrian crossing](#) demarcated by appropriate road traffic signs; or
  - i) In any other place where the stopping of a vehicle would or would be likely to constitute a danger or an obstruction to other traffic.

National Road Traffic Act, 1996  
National Road Traffic Regulations, 1999  
Chapter X: Rules of the road and matters relating thereto  
Part I: Rules of the road  
**319. Hindering or obstructing traffic on public road**

- 1) No person shall hinder or unnecessarily prevent, hinder or interrupt the free and proper passage of traffic on a public road.
- 2) Subject to the provisions of the Act or any other law, no person shall place or abandon or cause to be placed or abandoned on a public road any object that may endanger or cause damage to traffic on such road.

National Road Traffic Act, 1996  
National Road Traffic Regulations, 1999  
Chapter X: Rules of the road and matters relating thereto  
Part I: Rules of the road  
**320. Vehicle left or abandoned on public road**

National Road Traffic Act, 1996  
National Road Traffic Regulations, 1999  
Chapter X: Rules of the road and matters relating thereto  
Part I: Rules of the road  
**296. Vehicle to be driven on left side of roadway**

National Road Traffic Act, 1996  
National Road Traffic Regulations, 1999  
Chapter X: Rules of the road and matters relating thereto  
Part I: Rules of the road  
**298. Passing of vehicle**

- 1) Subject to the provisions of subregulation (2) and (4) and [regulation 296](#), the driver of a vehicle intending to pass any other vehicle proceeding in the same direction on a public road shall pass to the right thereof at a safe distance and shall not again drive on the left side of the roadway until safely clear of the vehicle so passed: Provided that, in the circumstances as aforesaid, passing on the left of such vehicle shall be permissible if the person driving the passing vehicle can do so with safety to himself or herself and other traffic or property which is or may be on such road and –
  - a) The vehicle being passed is turning to its right or the driver thereof has signalled his or her intention of turning to his or her right;
  - b) Such road is a public road in an urban area and –
    - i) Is restricted to vehicles moving in one direction; and
    - ii) The roadway is of sufficient width for two or more lines of moving vehicles;
  - c) Such road is a public road in an urban area and the roadway is of sufficient width for two or more lines of moving vehicles moving in each direction;
  - d) The roadway of such road is restricted to vehicles moving in one direction and is divided into [traffic lanes](#) by appropriate road traffic signs; or
  - e) He or she is driving in compliance with the directions of a traffic officer or is driving in traffic which is under the general direction of such officer, and in accordance with such direction:  
Provided further that in no event shall any passing referred to in paragraph (a), (b), (c) or (d) be done by driving on the shoulders of the roadway or on the verge of the public road concerned.
- 2) The driver of a vehicle shall not pass other traffic proceeding in the same direction on a public road when approaching –
  - a) The summit of a rise;
  - b) A curve; or
  - c) Any other place where his or her view is so restricted that any such passing could create a hazard in relation to other traffic which might approach from the opposite direction, unless—
    - i) He or she can do so without encroaching on the right-hand side of the roadway; or
    - ii) The roadway of such road is restricted to vehicles moving in one direction.
- 3) The driver of a vehicle on a public road shall, except in the circumstances referred to in the first proviso to subregulation (1), upon becoming aware of other traffic proceeding in the same direction and wishing to pass his or her vehicle, cause his or her vehicle to travel as near to the left edge of the roadway as is possible, without endangering himself or herself or other traffic or property on the roadway, and shall not accelerate the speed of his or her vehicle until the other vehicle has passed.
- 4) When about to pass oncoming traffic, the driver of a vehicle on a public road shall ensure that the vehicle driven by him or her does not encroach on the roadway to his or her right in such manner as may obstruct or endanger such oncoming traffic.
- 5) The driver of a vehicle intending to pass a stationary bus on a public road shall do so with due care for the safety of persons who are approaching or leaving or may approach or leave such bus.

National Road Traffic Act, 1996  
National Road Traffic Regulations, 1999  
Chapter X: Rules of the road and matters relating thereto  
Part I: Rules of the road  
**303. Towing of vehicles**

National Road Traffic Act, 1996  
National Road Traffic Regulations, 1999  
Chapter VI: Fitness of Vehicles  
Part II: Equipment on or in respect of vehicles  
**200. Steering gear**

National Road Traffic Act, 1996

National Road Traffic Regulations, 1999

Chapter VIII: Transportation of dangerous goods and substances by road

**275. Transportation of dangerous goods prohibited**

- 1) Dangerous goods may not be transported unless in accordance with this Chapter: Provided that –
  - a) Dangerous goods which is required under this Chapter to be transported in a vehicle in respect of which standard specifications SABS 1398 “Road tank vehicles for petroleum-based flammable liquids” or SABS 1518 “Transportation of dangerous goods – design requirements for road tankers”, apply –
    - i) May be transported in such a vehicle from the date of commencement of these regulations;
    - ii) Shall be so transported in accordance with the said appropriate code of practice if the vehicle in which the said dangerous goods is being transported was registered on or after 1 January 2000;
    - iii) Shall be transported in accordance with the said appropriate standard specifications after a date to be determined by the Minister by notice in the Gazette;
  - b) Vehicles carrying dangerous goods in respect of which a placard is required to be fitted to such vehicle, may be fitted with, but shall after 1 January 2001 be fitted, with the appropriate placards prescribed in code of practice SABS 0232-1 “Transportation of dangerous goods –Emergency information systems”, Part 1: Emergency information system for road transportation”.

National Road Traffic Act, 1996

National Road Traffic Regulations, 1999

Chapter VIII: Transportation of dangerous goods and substances by road

**278. Dangerous goods to be compatible**

The consignor shall ensure that a multiload of dangerous goods transported on a vehicle is compatible as prescribed in Annex D to code of practice SABS 0232-1 “Transportation of dangerous goods –Emergency information systems”, Part 1: “Emergency information system for road transportation”.

National Road Traffic Act, 1996

National Road Traffic Regulations, 1999

Chapter VIII: Transportation of dangerous goods and substances by road

**280. Driver to undergo training**

- 1) An operator shall ensure that, after a date to be determined by the Minister by notice in the Gazette, the drivers of the vehicles of which he or she is the operator that has to obtain a profession driving permit as referred to in regulation 115(1)(f), undergo training at an approved training body to comply with regulation 117(e).
- 2) Each approved training body shall submit a syllabus for the training of the drivers referred to in subregulation (1) to the Shareholders Committee for approval, and a resubmit such syllabus for approval, within 90 days after relevant legislation for SABS specifications, influencing the training material, have been amended.
- 3) The syllabus for the training of drivers shall contain at least –
  - a) The interpretation and implementation of the instructions on a Tremcard;
  - b) General duties of the driver before proceeding on a route concerning, specifically, but not limited to, the condition of the vehicle, the documents to be kept in the vehicle, instructions regarding the route to be taken, warning signs and warning devices to be displayed or stored in the vehicle, the correct type and number of fire extinguishers to be fitted to the vehicle and protective clothing to be used;
  - c) General 24behaviour expected of the driver on the route, amongst other things, planning of stops for deliveries or checking of the tyres and vehicle, and procedure to be followed in the event of stops, periods of driving allowed, action to be taken in the event of an incident occurring;

- d) General procedure to be followed by the driver on reaching his or her destination; and
  - e) General procedure to be followed when loading or offloading dangerous goods.
- 4) A training body referred to in subregulation (2) shall issue drivers with a certificate for successful completion of training for purposes of regulation 117(e).
- 5) An operator shall ensure that a driver undergo theoretical and practical training at an approved training body for the specific class of dangerous goods that he or she shall be responsible for transporting.

National Road Traffic Act, 1996

National Road Traffic Regulations, 1999

Chapter VIII: Transportation of dangerous goods and substances by road

**281. Documents to be held by driver**

- 1) The driver of a vehicle referred to in [regulation 274](#)(1) shall ensure that such Tremcards and manifests as are required in terms of this Chapter, and which pertain to the dangerous goods carried on such vehicle are held in the designated space in the cab of that vehicle at such time as dangerous goods are being transported in such vehicle.
- 2) The driver of a vehicle referred to in regulation 274(1) shall produce on demand –
- a) A professional driving permit, if applicable; and
  - b) The documents referred to in subregulation (1), whenever he or she is operating a vehicle referred to in regulation 274(1).

National Road Traffic Act, 1996

National Road Traffic Regulations, 1999

Chapter VI: Fitness of Vehicles

Part IV: Loads on vehicles

**233. Number of persons that may be carried on motor vehicle in relation to seating capacity**

No more to be carried than seated positions are allocated for

National Road Traffic Act, 1996

National Road Traffic Regulations, 1999

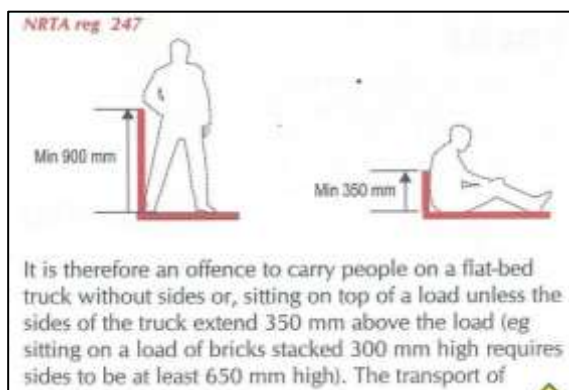
Chapter VI: Fitness of Vehicles

Part IV: Loads on vehicles

**247. Circumstances under which persons may be carried on goods vehicle**

- 1) No person shall operate on a public road a goods vehicle conveying persons unless that portion of the vehicle in which such persons are being conveyed is enclosed to a height of –
- a) at least 350 millimetres above the surface upon which such person is seated; or
  - b) at least 900 millimetres above the surface on which such person is standing, Z in a manner and with a material of sufficient strength to prevent such person from falling from such vehicle when it is in motion: Provided that this regulation shall not apply in the case of employees being carried in the course of their employment.

Provided that no person shall be conveyed in the goods compartment together with any tools or goods, except their personal effects, unless that portion in which such persons are being conveyed is separated by means of a partition, from the portion in which such goods are being conveyed.



### **231. Manner in which children to be counted for purposes of regulations**

For the purposes of establishing the number of persons that may in terms of these regulations, other than regulation 263, be carried on any vehicle, other than a motor cycle, motor tricycle, motor quadrucycle or pedal Cycle –

- (a) **any child under the age of three years shall not be counted;**
- (b) two children of three years or over but under the age of six years shall be counted as one person; and
- (c) three children of six years or over but under the age of 13 years shall be counted as two persons:

Provided that in applying the provisions of this regulation, fractions shall be dis-regarded.

### **232. Mass of person and luggage for determining maximum load for homologation and testing purposes**

For the purpose of establishing the maximum mass of a person and his or her hand luggage which may be conveyed on a motor vehicle for the purpose of determining the seating capacity of such vehicle to homologate a vehicle –

- (a) the mass of a person together with his or her hand luggage shall, be taken as 68 kilograms;
- (b) in the case of a motor vehicle which is fitted with
  - (i) a luggage compartment, the mass of luggage shall be calculated at the rate of 100 kilograms per cubic metre; or
  - (ii) a roof rack, the mass of luggage shall be calculated at the rate of 75 kilograms per square metre of area of the roof rack.

### **218. Rear underrun protection device**

Subject to such exemptions as may be provided for under any specification as referred to in regulation 216, a rear underrun protection device which complies with the standard specification **SABS 1055** “Rear underrun protection devices”, shall be fitted to –

- (a) a trailer the gross vehicle mass of which exceeds 3 500 kilograms, first registered on or after 1 January 1988;
- (b) any other goods vehicle the gross vehicle mass of which exceeds 12 000 kilograms, first registered on or after 1 January 1988, but after 1 January 2000, such rear underrun protection device shall be fitted to any trailer the gross vehicle mass of which exceeds 3 500 kilograms and any goods vehicle the gross vehicle mass of which exceeds 12 000 kilograms.

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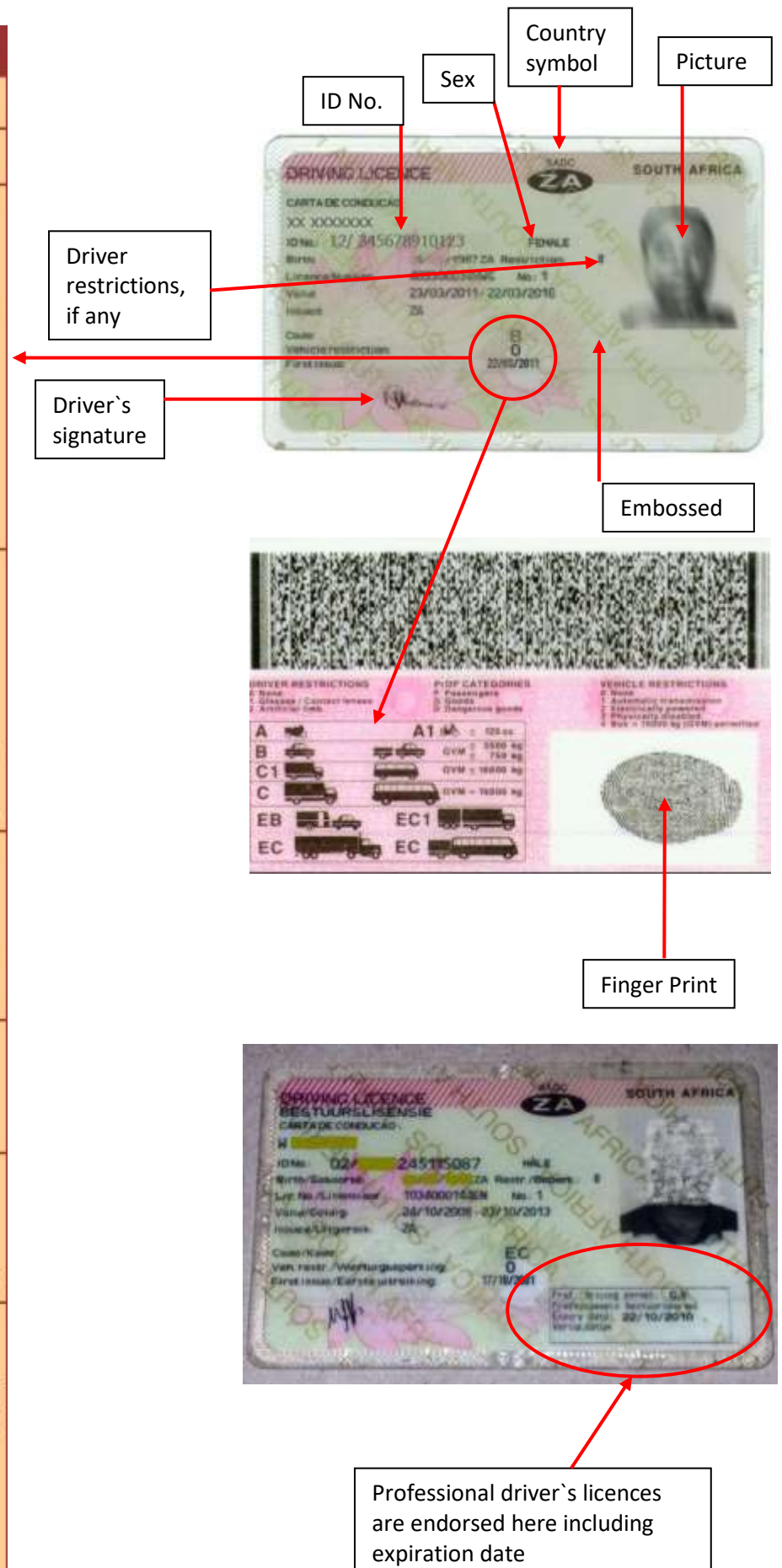
**Just how many Acts are there to consider when doing an investigation - 360**

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4.4 National road traffic act specification regarding drivers licenses identified and categorised as follows:

Illustrated guide to driving licence codes Extracted from the Professional Driver's Digest	
<b>A1</b>	Motor cycle up to 125 cc with or without sidecar (Moped, scooter etc), or Electrically powered vehicle
<b>A</b> Also sub-categories A1	Motor cycle, tricycle or quadricycle above 125 cc with or without sidecar
<b>B</b> Also sub-categories tractor & mobile machinery	Light motor vehicle (not articulated) which may pull a light trailer up to 3 500 kg GVM (a) goods vehicle or bus up to 3 500 kg GVM; or (b) a motor car or special vehicle (eg ambulance, fire-fighting vehicle) up to 3 500 kg tare  There is no mass limit when driving a tractor or mobile machinery with or without a trailer  <b>B5</b> A "5" endorsement restricts authorisation to a tractor  <b>B7</b> A "7" endorsement restricts authorisation to mobile machinery
<b>C1</b> Also sub-categories B	Heavy motor vehicle (not articulated) which may pull a light trailer up to 750 kg GVM (a) goods vehicle or bus above 3 500 kg up to 18 000 kg GVM; or (b) a special vehicle (eg ambulance, fire-fighting vehicle) above 3 500 kg up to 18 000 kg tare  <b>C14</b> A "4" endorsement authorises the driving of buses above 18 000 kg GVM
<b>C</b> Also sub-categories B & C1	Extra heavy vehicle (not articulated) which may pull a light trailer up to 750 kg GVM (a) goods vehicle or bus above 18 000 kg GVM; or (b) special vehicle above 18 000 kg tare
<b>EB</b> Also sub-categories B	Combination (a) articulated vehicle up to 3 500 kg GCM; or (b) rigid vehicle up to 3 500 kg GVM pulling a trailer above 750 kg GVM
<b>EC1</b> Also sub-categories B, C1 & EB	Combination (a) articulated vehicle up to 16 000 kg GCM; or * This is a total limit, split to be corrected and should read 25 000 kg (b) rigid vehicle above 3 500 kg up to 16 000 kg GVM pulling a trailer above 750 kg GVM
<b>EC</b> Also sub-categories B, C1, C, EB & EC1	Combination (a) articulated vehicle above 16 000 kg GCM; or (b) rigid vehicle above 16 000 kg GVM pulling a trailer above 750 kg GVM



#### 4.5 Verification of South African Driver's License

4.5.1 The Road Traffic Management Corporation (RTMC) and or your Provincial Department Of Transport Office, will upon request, issue a printout of the licence required and supply a Letter of Confirmation of the licence. This letter reflects the date the licence was first issued.

4.5.2 Currently, there is no formal, simple way to check on foreign drivers licence validity. There are current efforts being undertaken by the National Department of Transport, where a recent workshop<sup>1</sup> on this, and related issues, saw the following items listed that are being addressed:

- a) *A passenger list should be kept on all foreign public transport.*
- b) *There are basic systems in other countries like Namibia and Tanzania, Mozambique, Botswana and Lesotho where they are moving towards electronic system.*
- c) *Zimbabwe does have a basic system although not electronic at this stage.*
- d) *Should you need any info on drivers licenses or vehicles please do the following:*
  - i *Send the copy of the license electronically to the Department where we will assist you with the information.*
  - ii *The owner of the vehicle can also be traced so just send the registration number and ownership as well as road worthiness of vehicle can be verify.*

#### 4.6 Professional Driving Permit Applications:

4.6.1 To drive certain types of vehicles, you are required to have a professional driving permit in addition to your regular drivers licence for that specific vehicle, a professional driving permit is required if you drive:

- 4.6.1.1 a goods vehicle, weighing over 3 500 kg
- 4.6.1.2 a breakdown vehicle
- 4.6.1.3 a bus
- 4.6.1.4 a minibus weighing more than 3 500 kg designed to carry 12 or more people, including the driver
- 4.6.1.5 a vehicle used to transport people for payment
- 4.6.1.6 a goods vehicle carrying dangerous goods, which weighs more than 3 500 kg
- 4.6.1.7 a road tank vehicle for petroleum-based flammable liquids
- 4.6.1.8 a motor vehicle conveying 12 or more people including the driver.

4.6.2 A professional driving permit is not required to drive a hearse or a tractor. You can only get a professional driving permit if you:

- 4.6.2.1 have a valid driving licence for the type of vehicle in question
- 4.6.2.2 are over the required age limit (this depends on the type of vehicle is question)
- 4.6.2.3 certified medically fit by a doctor
- 4.6.2.4 certified by an approved training body (only required for certain types of vehicles)
- 4.6.2.5 have not been convicted of driving under the influence, of reckless or negligent driving or of a violent offence
- 4.6.2.6 have never had your driving licence suspended

---

<sup>1</sup> Mrs Cecilia Karrow – NDOT – Road Transport Regulation – Road Accident Investigation – 01/08/2014





- 4.6.3 Your professional driving permit may be suspended or cancelled if you become medically unfit or if you are convicted of driving under the influence, of reckless or negligent driving, or of a violent offence.
- 4.6.4 The operator or owner of a motor vehicle for which a professional driving permit is required may not let another person drive that vehicle on a public road, unless that other person is the holder of a professional driving permit of the appropriate category.

4.7 Other legal factors of interest:

- 4.7.1 There are many legal issues that will arise that need to be researched during the investigation of traffic accidents, generally more so the more serious an accident is. Efforts should be made to research and reference appropriately to the required standards and requirements; where necessary, consult with a specialist. As an example, you may need to consult with a trailer designer if trailer size or load specifics are in question, a maintenance mechanic if the condition of the mechanics of the vehicle are in question or a civil engineer where the road parameters may be in question.

4.7.1a General speed limits:

Maximum vehicle speed limits			
Type of vehicle	Built-up areas	Rural areas	Freeways
Cars and private minibuses seating less than 12	60	100	120
Goods vehicles up to 9 000 kg	60	100	120
Minibuses seating more than 12 and all minibus taxis	60	100	100
Buses and coaches	60	100	100
Goods vehicles exceeding 9 000 kg GVM (or GCM)	60	80	80
Breakdown vehicles towing another vehicle	60	80	80
Any vehicles towing without a tow bar	30	30	30
Tractors	35	35	Prohibited

 = General speed limit    
  = Vehicle type speed limit    
  = Total ban

4.7.1b Chevron specifications:

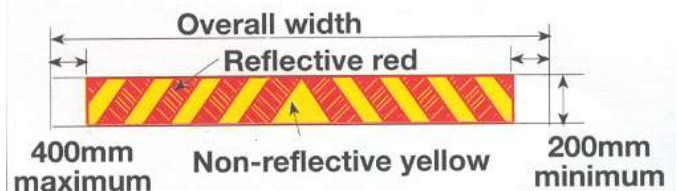


Diagram A

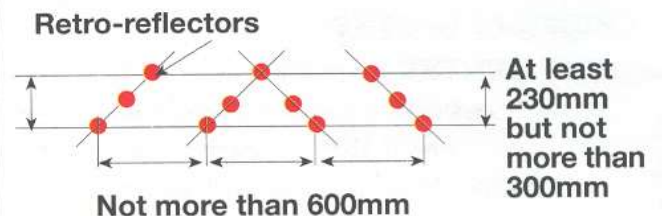
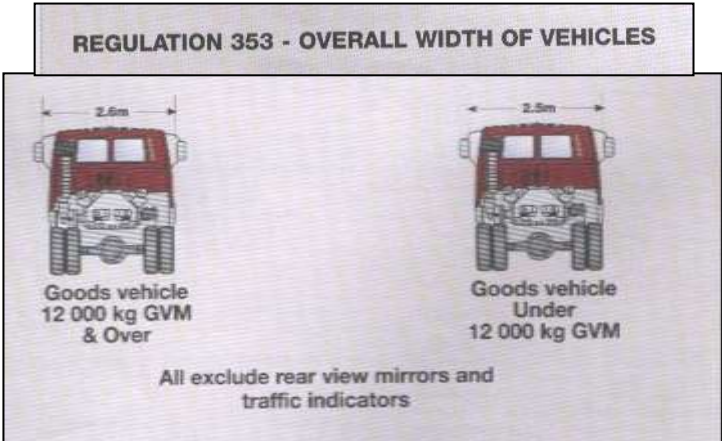


Diagram B

4.7.1c Maximum permissible widths:



- The maximum overall width of:
- (a) a bus - the front wheel track of which exceeds 1,9 m – 2,6 m
  - (b) a goods vehicle – the gross vehicle mass of which is more than 12 000 kg - 2,6 m
  - (c) any other vehicle – 2,5 m

**NB: Manufacturer specifications should always be used, the NRTA is a fall-back**

## 5 Equipment (Scene investigation)

5.1 Attending to the scene of an accident, where it is either your duty (perhaps as a police officer, a company SHEQ officer, or fleet manager etc.) or that you simply are assisting someone to document the scene, you will require certain basic equipment to ensure that the scene and the evidence is documented to an appropriate level, that it may be useful in determining various factors.

5.2 Although there are many different pieces of equipment and tricks that can be used and employed when investigating and attending a scene, the following basic pieces of equipment will be your basic requirement:

### 5.2.1 Measuring:

5.2.1.1 Attending to the scene of accident appropriately will require the appropriate measuring (the basics hereof to be covered in a later module) in order to allow certain key evidential factors on the scene, such as the final resting position of the vehicles, tyre marks and/or a deceased to be repositioned, and/or that the distances among various objects is measured so as to allow certain calculations to be made.

5.2.1.2 Although there are many different types of measuring devices (some of which will be dealt with at a later stage), the very basic equipment that is required is first and foremost a measuring tape. As can be seen below there are various different types, however a 50 metre tape (minimum of 10 metre) is ideal. A hand held tape measure usually 3 or metre is ideal when measuring minor distances and such other things such as damage heights, seat positions and other smaller measurements. A measuring wheel is also convenient and, if utilised correctly is an indispensable tool.



### 5.2.2 Photography:

5.2.2.1 There is an extremely wide range of cameras that are available for use, ideally where regular attendance at such scenes is required, a relatively decent camera with manual settings is most appropriate, however even the use of a “point and shoot” camera will suffice.

5.2.2.1.1 The basic requirements of photography covered in a later module.

5.2.2.2 With cameras now being digital, the relatively limitless memory allows an extreme amount of photographs to be taken, which is ideal as there is virtually no cost involved in taking many photographs.

5.2.2.3 Although any camera can be utilised, a camera with no less than 5 megapixels should be used so as to allow the necessary detail and blowing up of photographs when necessary.



### 5.2.3 Video:

5.2.3.1 Although not necessarily required, a video camera can be an extremely useful tool. A “stand alone” video camera or even a video camera integrated on your cell phone can serve as an extremely useful tool for recording all of the evidential factors on the vehicle, the road surface, and the general surroundings at the scene of an accident.





5.2.4 Pen, pencil and paper:

5.2.4.1 Perhaps the most important piece of equipment is that of a pen or pencil and paper. The attendance at and/or detailing of various evidential factors at the scene will inevitably require notes to be made, even if the notes are as simple as someone's name and contact details or as specific as a detailed diagram and/or observation notes on a tyre or evidential marks on a road surface. Any person attending at and/or to the scene of an accident should always be in possession of a pen and pencil and paper.

5.2.5 Marking:

5.2.5.1 Position marking is crucial, always try and use long term markings (i.e. paint) so that the marks will remain in-case you need to return. Some typical marking equipment is spray-paint, lumber marking crayon and or chalk. If you have nothing at hand, use a stone and scratch well, then remark as soon as you can. See Day 2, section 2.7 – Marking off the scene evidence.



5.3 Advanced equipment (Yaw jigs / Drag sleds / G-meters / Total stations / Photogrammetry / scanning):

5.3.1 Although advanced equipment is not necessarily required to attend the scene of an accident appropriately, where the above equipment has already been indicated as being the basic requirements. The use of specialised equipment and modern and/or advanced equipment can hugely increase the accuracy of the recording of the evidential factors of the scene and can reduce time spent at the scene.

5.3.2 A piece of equipment that may make the attendance of scenes of accidents far easier, quicker and most definitely more accurate, is that of a link-stick, where this is simply a form of an extension pole, allowing a camera to be elevated above either a vehicle or the scene in general and allow a "top down view" to be taken.



Link Stick

- 5.3.3 Although a drag sled is not specifically required for the attendance at an investigation of a general accident, where more advanced accident investigation is undertaken, an understanding of the coefficient of friction of a road surface where the accident took place (the amount of grip that particular section of road surface has) becomes a relevant issue to various calculations that may need to be undertaken. Building one's own simple drag sled device, as is set out in the two photographs below, or making use of advanced equipment such as a Vericom test device, as is also indicated below, can be extremely useful in the advanced investigation of scenes.



SAE / ISO - British pendulum tester



- 5.3.4 Although not necessary for the basic investigation of some scenes, where advanced investigation is required, the building and use of a yaw jig, a device that depicts the positioning of the various tyres on a vehicle on evidential marks with specific reference to the track width and wheel base of a vehicle can prove extremely useful, especially in the photography of the mark in order to indicate the orientation and/or position of a vehicle, this is depicted in the photographs below.



- 5.3.5 Other pieces of equipment that can be useful during an on-scene investigation, although these pieces of equipment are not strictly necessary can prove of great assistance, is that of a light metre, a Jost kingpin and plate gauges and a gradient gauge, these pieces of equipment are evident below:

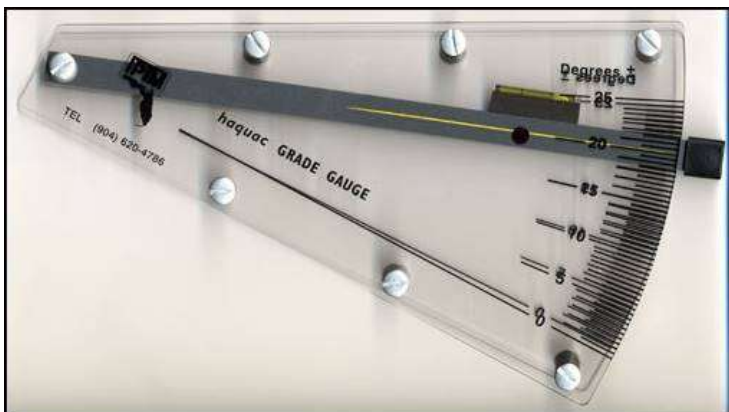
Light Meter:



Kingpin Gauge:



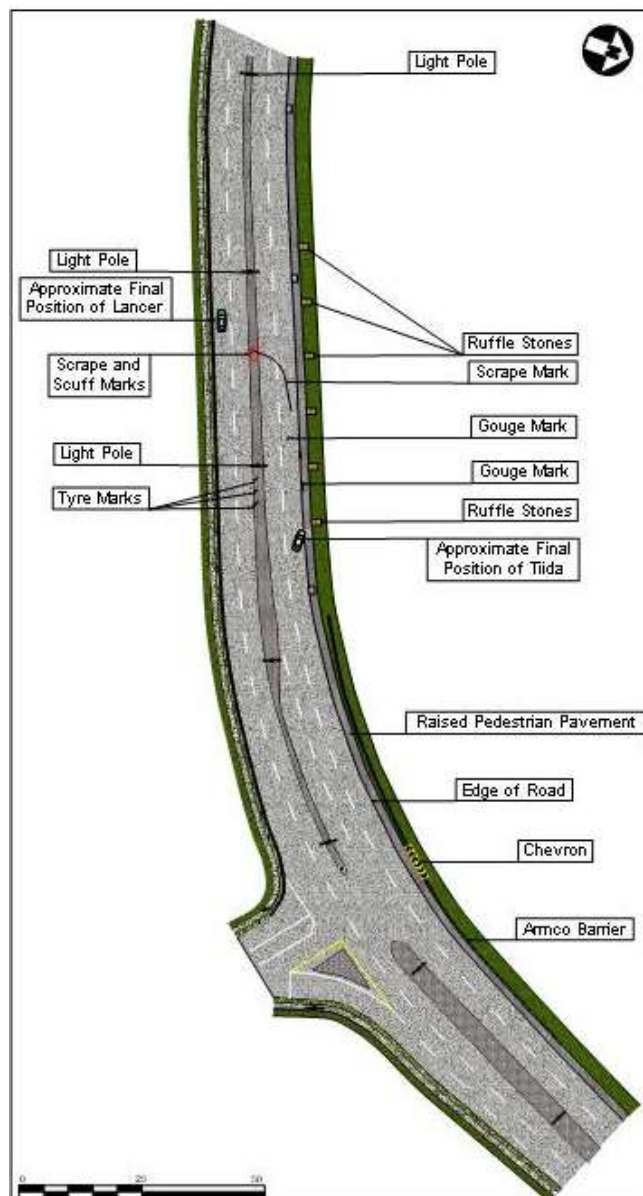
Gradient gauge:



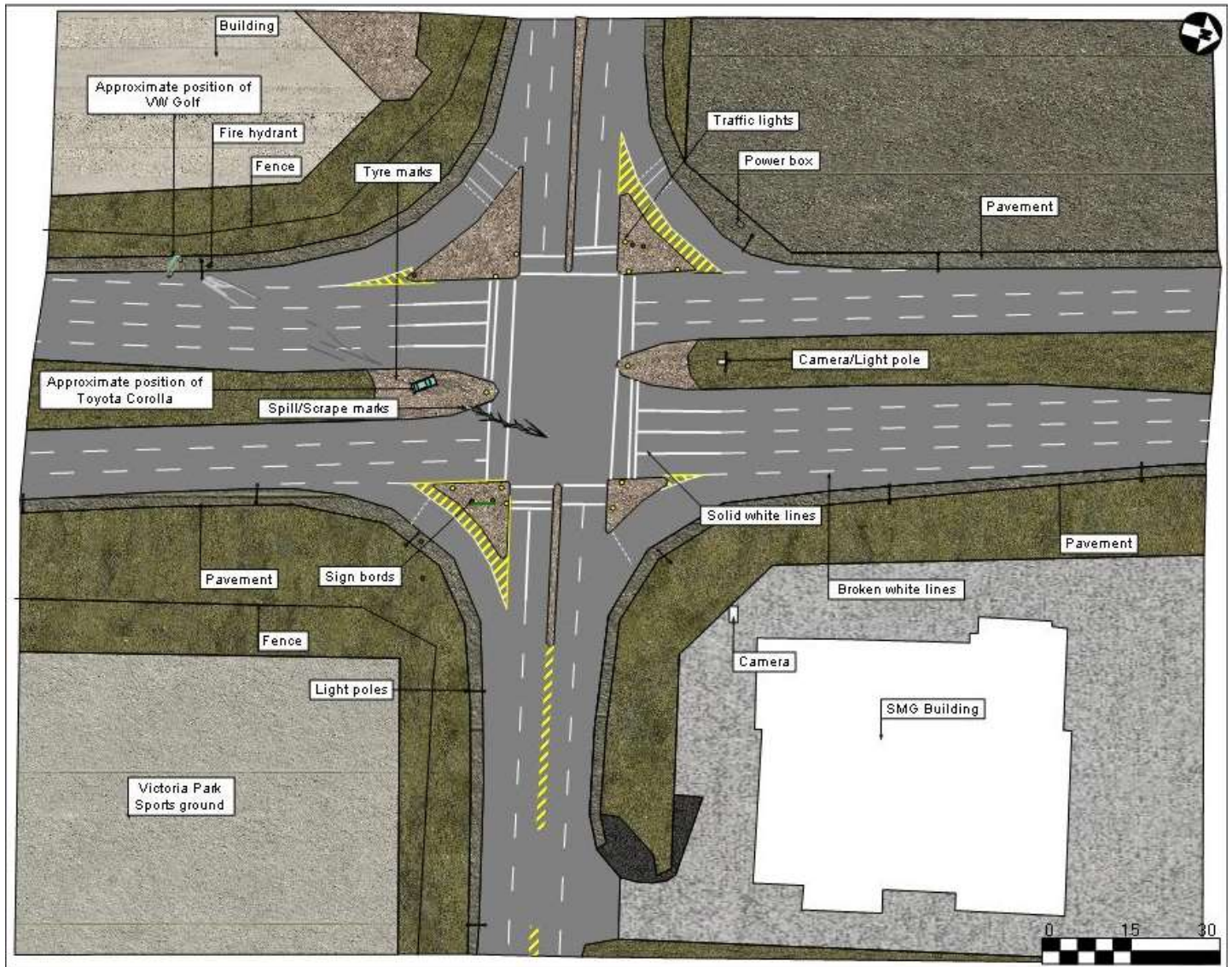
5.3.6 Although there are various advanced pieces of equipment, perhaps the most common piece of “advanced equipment” that is currently used on the scenes of accident by some investigators is that of a piece of surveying equipment referred to as a Total Station. A Total Station allows the full three dimensional plotting of the entire scene and various evidential marks on the scene, an example of the Nikon Total Station (There are many brands available) utilised by Accident Specialist is set out in the following photographs.



5.3.6.1 Example of a to scale scene created with a Total Station:





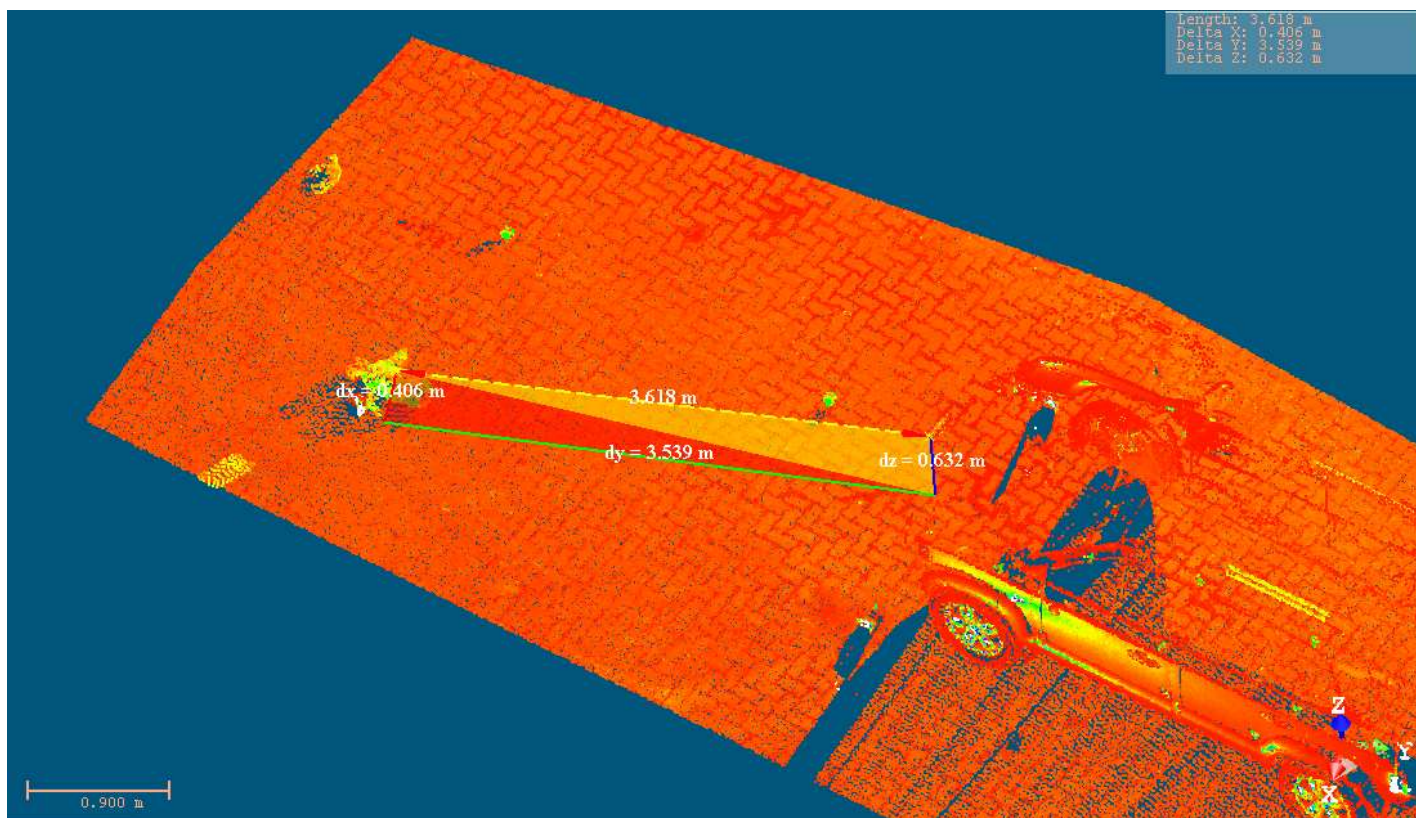


- 5.3.7 Although extremely expensive, various 3D scanners are available that can scan an entire scene in minutes, and record these scenes in prosperity to extremely accurate tolerances. These devices are excellent, however are not commonly found in use due to their exorbitant prices and relatively technical nature.



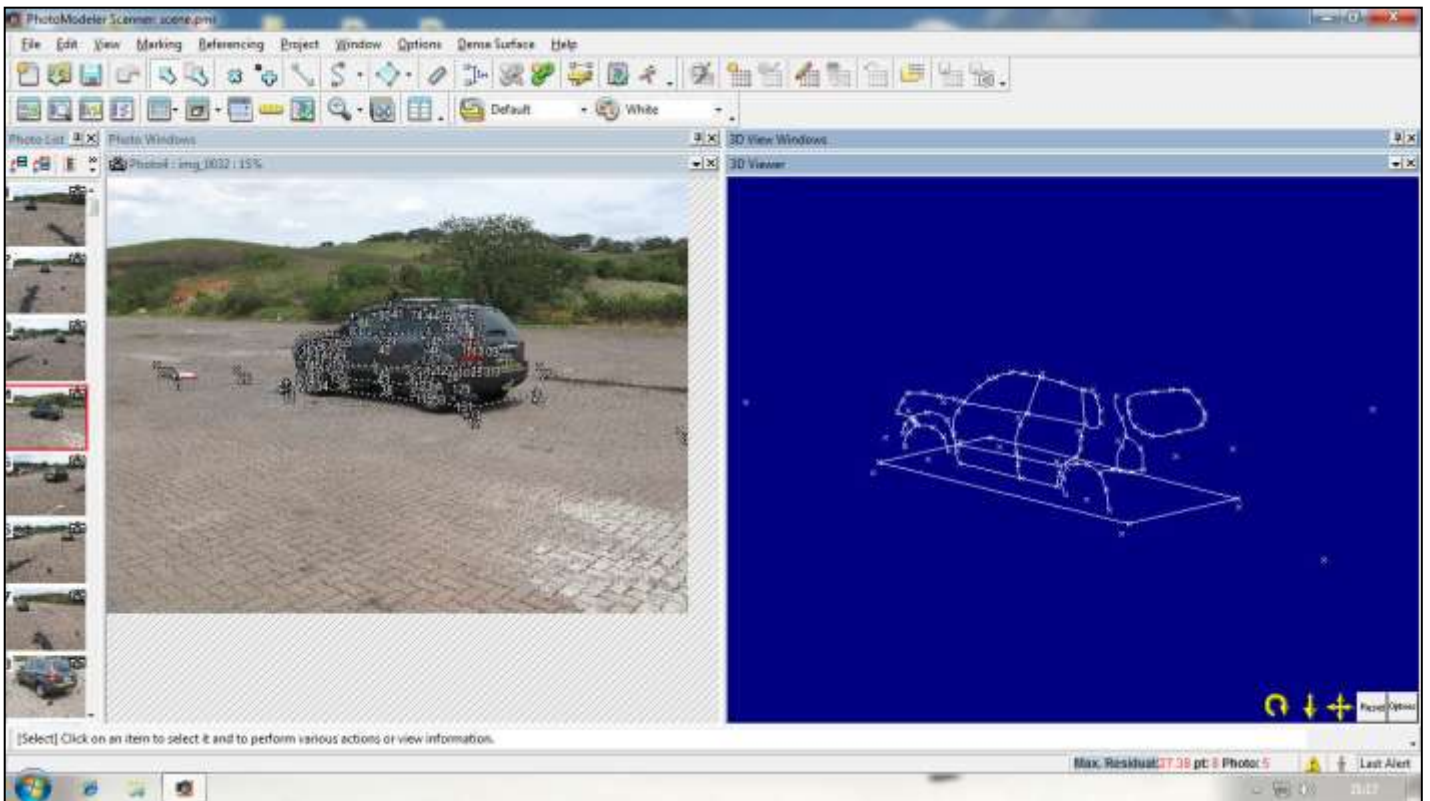


## 5.3.7.1 Examples of a scene created with a scanner:



- 5.3.8 Photogrammetry, is software that allows you to make use of your camera (one specifically calibrated / setup to the software specifications) and with the assistance of “targets” (specific objects placed or identified) and certain parameters on a scene, allowing you to record the scene with images (Photography), and to later import these into software that allows the scene to be built and measurements taken there from.

5.3.8.1 Example of a scene created with photogrammetry:

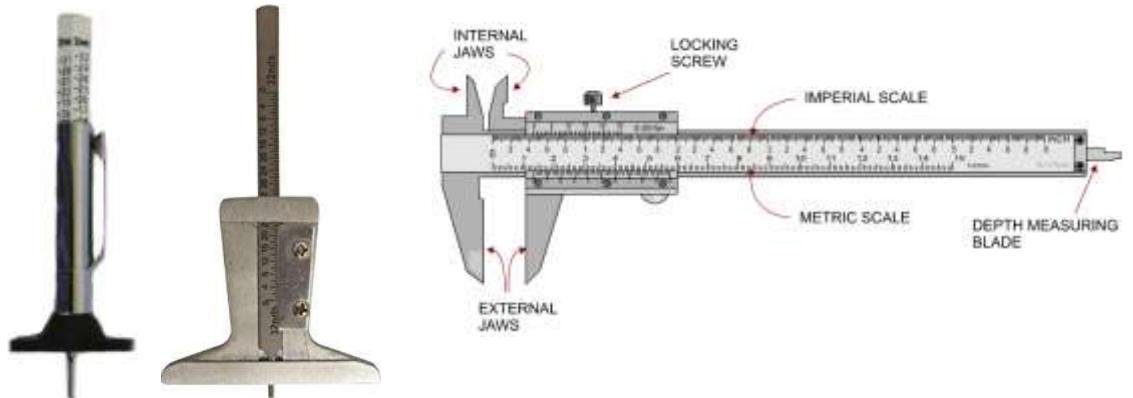


5.3.9 Other equipment that can be useful may be:

5.3.9.1 a tyre pressure gauge (Possibly combined with a tread depth gauge)



5.3.9.2 a tread depth gauge (or normal Vernier)





- 5.3.9.3 A tool set (removing wheels & parts for examination etc.)



- 5.3.9.4 A torch (looking under and in vehicles)



- 5.3.9.5 A stopwatch (taking timings of robots, or over distances etc.)



- 5.3.9.6 A basic medical assistance kit.



- 5.3.9.7 A spirit level (measuring grades and slopes)



- 5.3.9.8 Marking crayons / Paint (marking on the road as well as on the vehicles as required)



## 6 The scene of crash:

### 6.1 Scene safety

#### 6.1.1 Driving / responding to the scene



6.1.1.1 When there is a need to respond to, or simply go to an accident, it should be borne in mind that the accident has already happened. While it is essential that there be no unnecessary delay in reaching the scene, driving at high speed and in manner that causes risk to other road users must be avoided. An accident that has already occurred is not grounds to cause yet another accident. The investigator / responder must not endanger his own life nor the lives and safety of other road users. He/she must use reasonable care and comply with all road rules and policies respecting the use of emergency vehicles and other road users at all times. When proceeding to the scene:



i. Proceed quickly, but SAFELY. As you increase your speed of the vehicle the efficiency of peripheral vision decreases, making you less aware of hazards approaching from the sides. This reduced awareness is compounded by less time to react and consequently increase in the probability that evasive action may be taken, too late.

ii. One of the greatest contributing factors to being involved in a crash as a responding vehicle is your error of assumption made by you as the driver, which may involve the following:

**ASSUMING** that the other driver will or has seen your flashing lights and/or your urgency.

**ASSUMING** that the other driver will or has heard your siren or hooter.

**ASSUMING** that the other driver understands the intended path of your vehicle.

**ASSUMING** that the other driver knows what to do if he/she is aware of the first three.

**ASSUMING** that the other driver will do what is required, even if he/she knows what to do.

iii. You as the driver of the responding vehicle must also realise that not all drivers on the road are incompetent and that most drivers will give the responding vehicle the right-of-way if:-

i They are aware of the response vehicle's presence.

ii They are aware of the responding vehicle's intended path.

iii They are given sufficient time to appreciate the situation or approach of the responding vehicle and react.

iv. Do not depend on emergency equipment, such as siren and flashing red/blue light, to get to the scene safely, drive with proper care.

v. Consider the urgency of the trip from the standpoint of:

i Seriousness of the accident

ii Aid required to the injured persons



- iii Need to protect the scene from further damage and from alteration to or loss of evidence and to prevent the scene from posing a danger to passing traffic
  - iv Consequences of delays allowing drivers and witnesses to leave the scene before your arrival
  - v Danger from hazardous materials, if applicable
- vi. Consider the traffic problems that may be encountered on-route and possible solutions:
  - i Congestion
  - ii Detours that will enable quicker response time
- vii. Select the route that will allow the quickest and safest arrival at the scene
- viii. The accident may have been a hit-and-run accident, or there may be witnesses who will leave the scene prior to the investigator's arrival:
  - i Look for damaged vehicle leaving the scene area.
  - ii Look for suspicious vehicles and those which might be carrying witnesses
- ix. When possible, place warning devices, e.g. signs and/or flares, on the approach to the accident scene as you approach.
- x. There are a number of obstructions to the average driver to hearing the siren and/or seeing? The blue light and flashing lights of the response vehicle, including the following: -
  - Radio's and tape decks, CD players
  - Heaters or air conditioners
  - Windows rolled up
  - Noisy children
  - Distracting pets
  - Pre-occupation
  - Hearing deficiencies
  - Environmental noises

#### 6.1.2 Arrival at the Scene

##### 6.1.2.1 Upon arrival at the accident scene, one should:

- a) Park his/her vehicle in a highly visible location and in such a way as to protect the scene (see image **examples at below**).
- b) Avoid parking the vehicle in such a way that it will obstruct the safe movement of other vehicles and/or pedestrians that are free to proceed past the scene. Consider an approaching driver's ability to see the accident scene.
- c) Consider the convenience of the parking location. The vehicle may have to be used and safety or emergency equipment carried by the vehicle must be readily available.
- d) Avoid parking the vehicle in such a way that it may be blocked in or obstructed by other traffic.
- e) Ensure that your vehicle will be safe from theft, other loss, or damage.

- f) Use emergency lights (red, blue. Orange or green, as you are permitted and not otherwise), as required, to protect the scene. This is very important during hours of darkness.

- g) During darkness, park the vehicle in such a way that the headlamps will illuminate the accident scene. This will assist an oncoming driver to recognise the situation, and will also assist the investigator in seeing details.

**NB: DO NOT park your vehicle with headlights, especially “brights” facing oncoming traffic, including “giz-wag” functions, WHITE LIGHT IS BLINDING.**

- h) Place sufficient and adequate warning devices, e.g. signs, reflectors, flares and/or traffic cones on approached to the scene as well as appropriate directional signs within the scene area, to give proper warning to drivers and other highway users.
- i) Examine the scene for downed or damaged electrical wires and hazardous goods spills or cargo damage.
- j) Check the general area for possible witnesses.

6.1.2.2 Whenever passage by vehicles or pedestrians past the scene is dangerous or impossible, it may be necessary to block the road. When this step is necessary:

- a) Consider entrance and exit requirements of emergency vehicles.
- b) Provide detours past the scene, if possible.

6.1.2.3 When and if you are directing traffic, always be clear and concise in giving directions to motorists and pedestrians. There should be no doubt in their minds as to what they are required to do or how they are to proceed.

#### 6.1.3 Safe guarding the scene and yourself

6.1.3.1 Scene safety starts with, and includes that of your personal safety in terms of making use of the appropriate attire whilst on the scene, this clothing is generally referred to as Personal Protection Equipment (PPE). Typically a reflective vest, jacket or shirt is made use of both during day time hours and during evening hours for obvious reasons. Over and above this , it is important that at least closed shoes are made use of on any scene, preferably a non-slip and non-corrosive sole as such items such as petrol, acids and various other chemicals can create a “slip and fall” situation or severe burning. Another protective item that should always be carried is that of medical gloves for situations where patients need to be dealt with and-or any items that may have blood on them need to be dealt with, similarly hard wearing gloves such as leather gloves or aggressive rubber gloves and the like should also be at hand where components and equipment need to be touched that could cause injury and/or cross transfer.

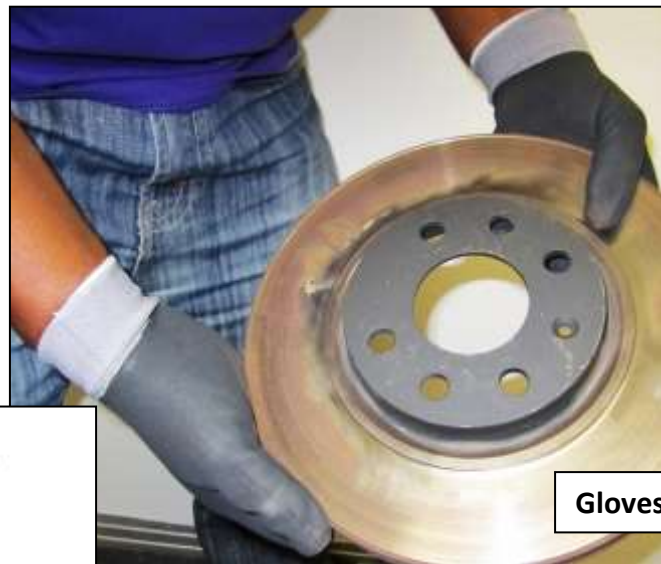
High visibility PPE







Medical kit



Gloves



Fire Extinguisher

6.1.3.2 Once you have arrived at the scene, all scenes should be considered on the following layout or zone basis when any work whatsoever is required at a scene:

a) Warning Zone

The warning zone is that zone where other road users are warned in advance about the motor vehicle accident or possible danger ahead. This will include such items as a flags-man, warning signs, flares etc.

b) Direction Change Zone

The direction zone is that section or roadway where motorists must change lanes, as indicated by cones or instructions from the officer, to move past the emergency vehicles and obstructions, or that the entire road is closed and that they are being directed. This area is setup with the least danger or unnecessary delay in mind.

c) Buffer Zone

The buffer zone is a zone approximately 15 metres, behind the first emergency vehicle encountered at the motor vehicle accident scene. This zone also extends to 15 metres in front of the vehicle involved in the motor vehicle accident, which must be kept clear, of all non-emergency, medical traffic.

d) Work Zone

The work zone is the zone where emergency personnel carry out life – saving operations. This zone of approximately 15 metres must be kept clear of any obstructions or persons who at that stage are not involved in any of the rescue activities.

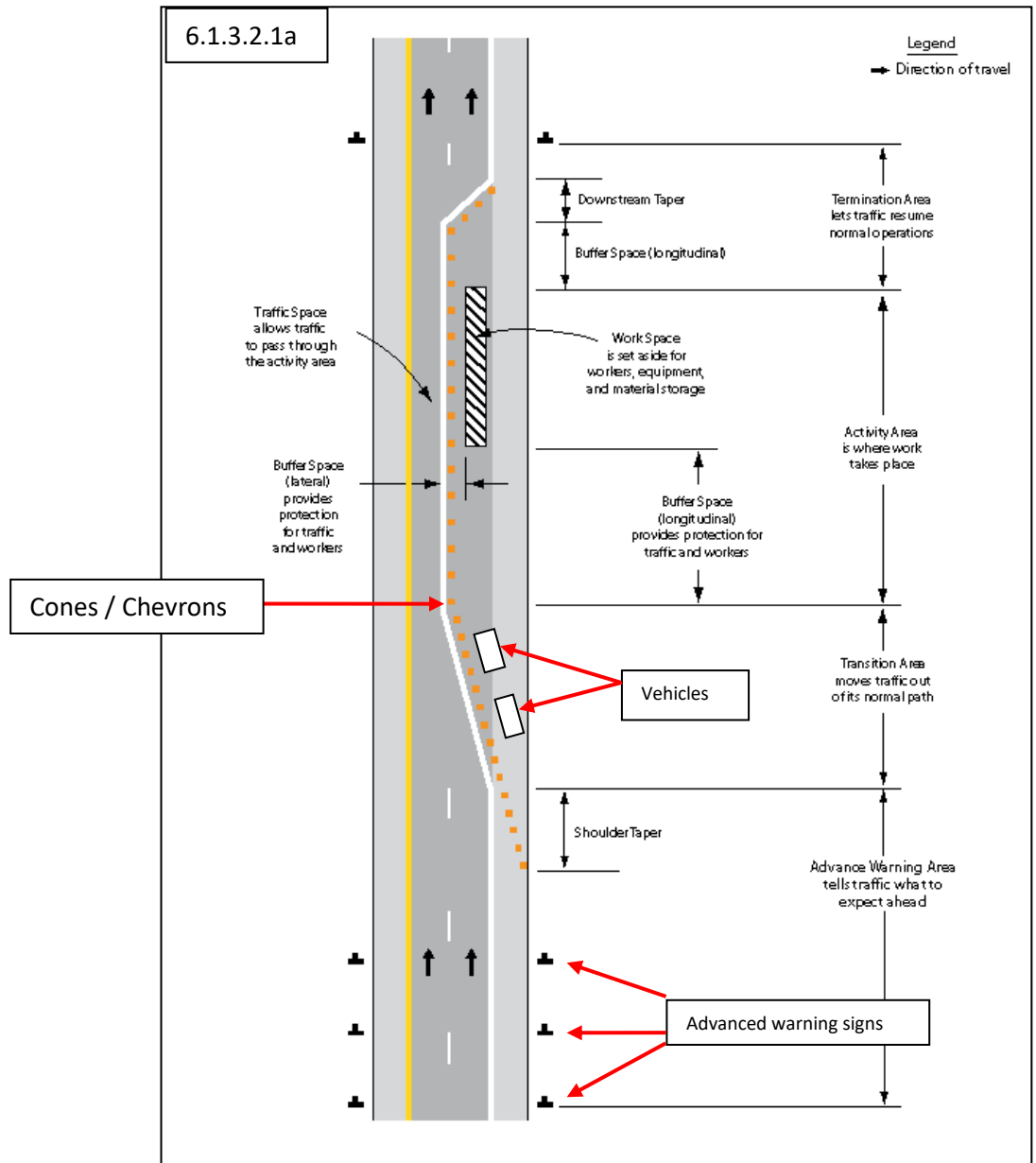
e) Parking Zone

The parking zone is a zone where emergency vehicles as well as other response vehicle which are not immediately necessary at the accident scene, park, and from which the various personnel perform their duties.



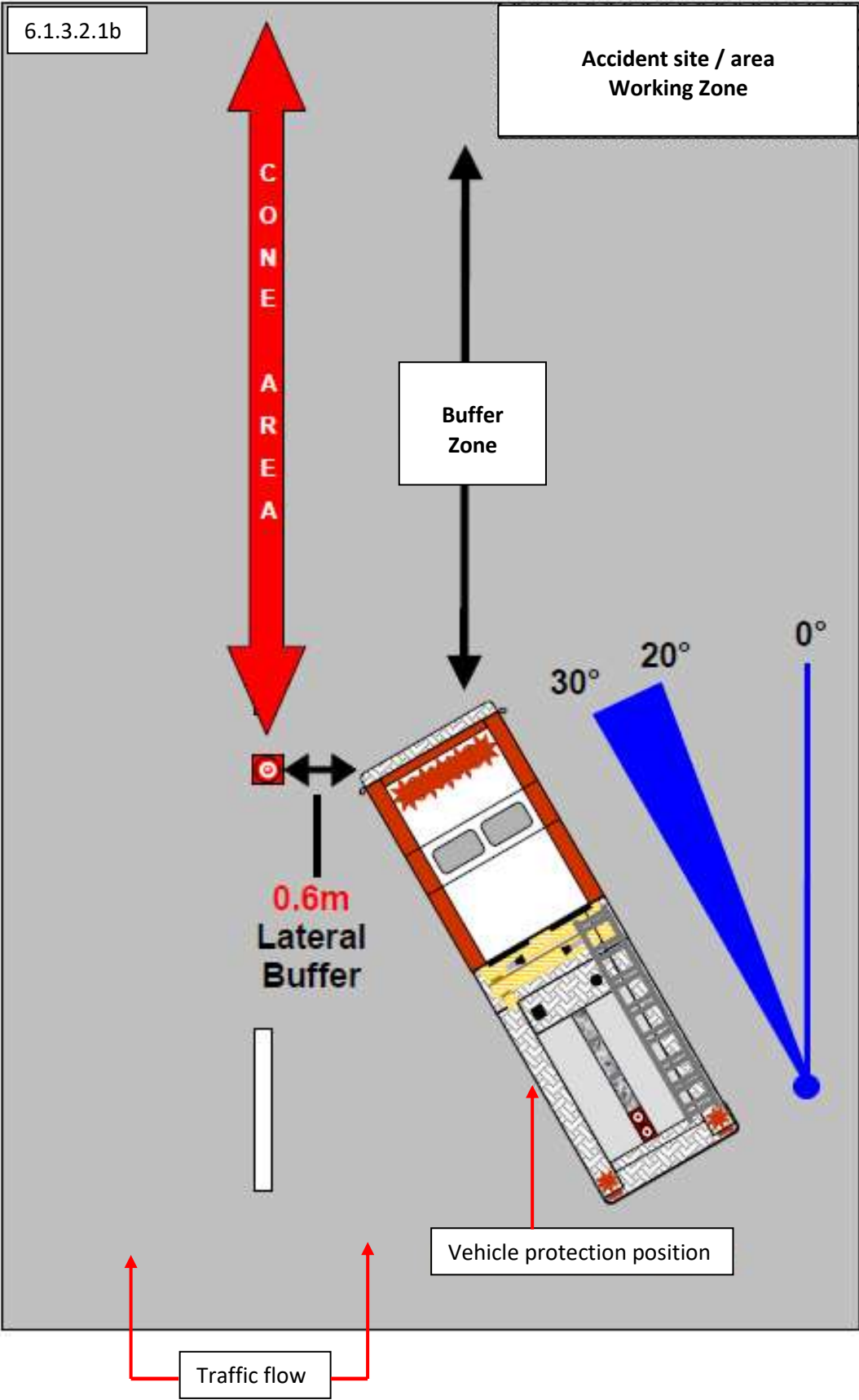
The distance of the Working Zone and the Direction Change Zone is calculated as twice (x2) the speed limit on the road. Thus, on a Freeway, where the speed limit is 120km / hour, it is calculated as 2 x 120 metres. Therefore it is 240 metres.

6.1.3.2.1 The following images serve as a basic indicator of the location of the different zones on a typical scene.



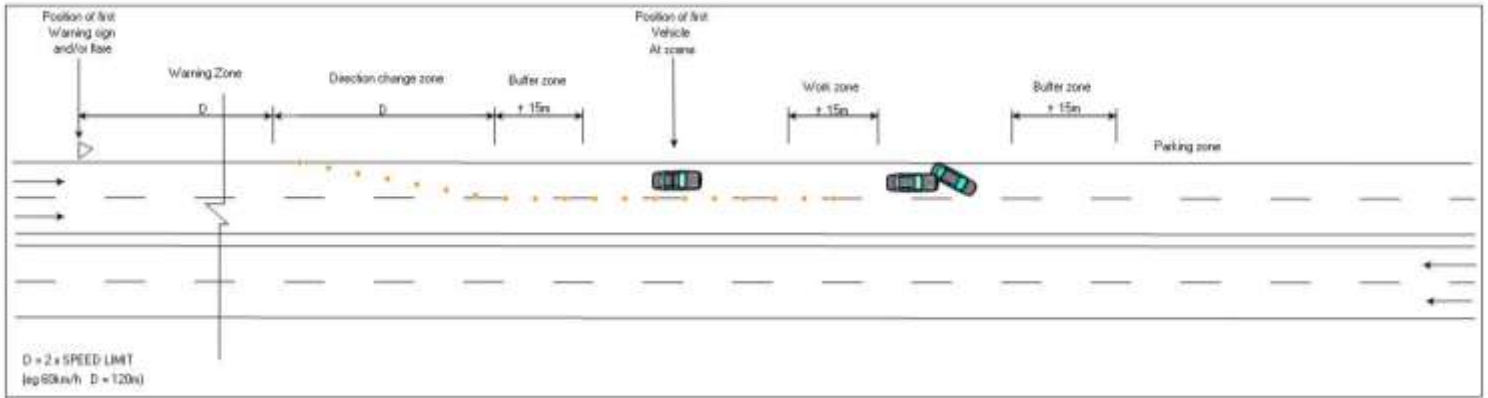
Zone length guide:

Speed limit (km/h)	Warning Zone (A)	Direction change zone (B)	Buffer Zone (C + E)	Work Zone (D)
120	190 – 200 m	100 m	10-30 m	10-30 m
100	120 – 130 m	80 m	10-20 m	10-20 m
80	70 – 80 m	60 m	5-20 m	5-20 m
60	40 – 50 m	40 m	5-10 m	5-10 m

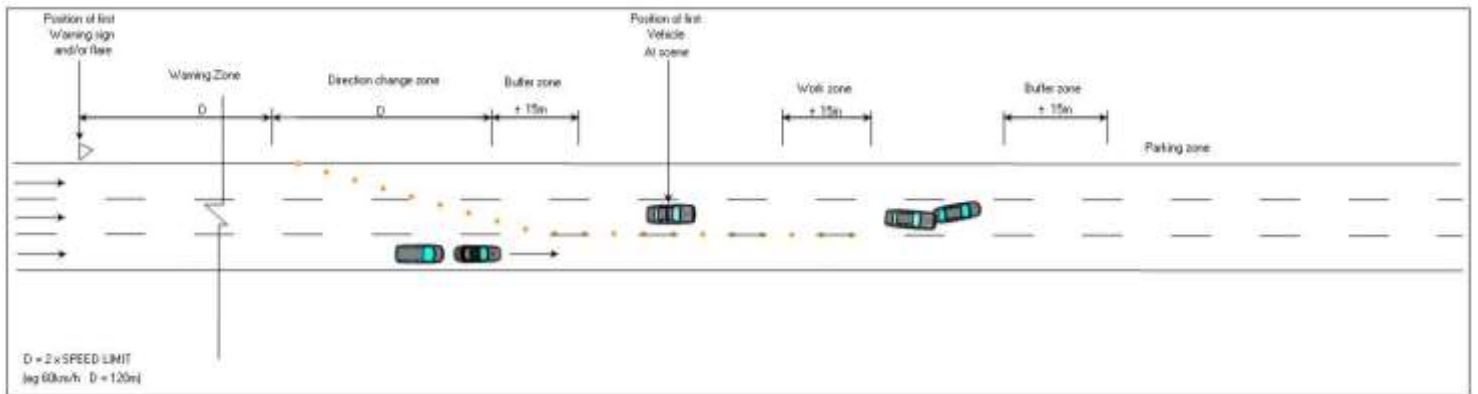


6.1.3.2.2 Some examples of the method of cordoning off different scenes are set out below:

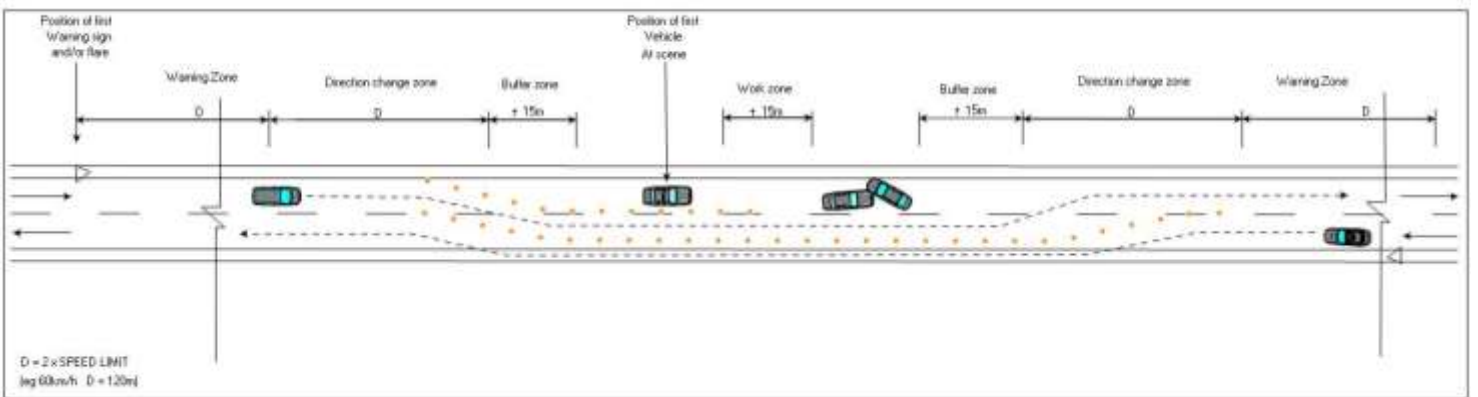
6.1.3.2.2a Two directional road, dual lanes, one lane obstructed, flat road:



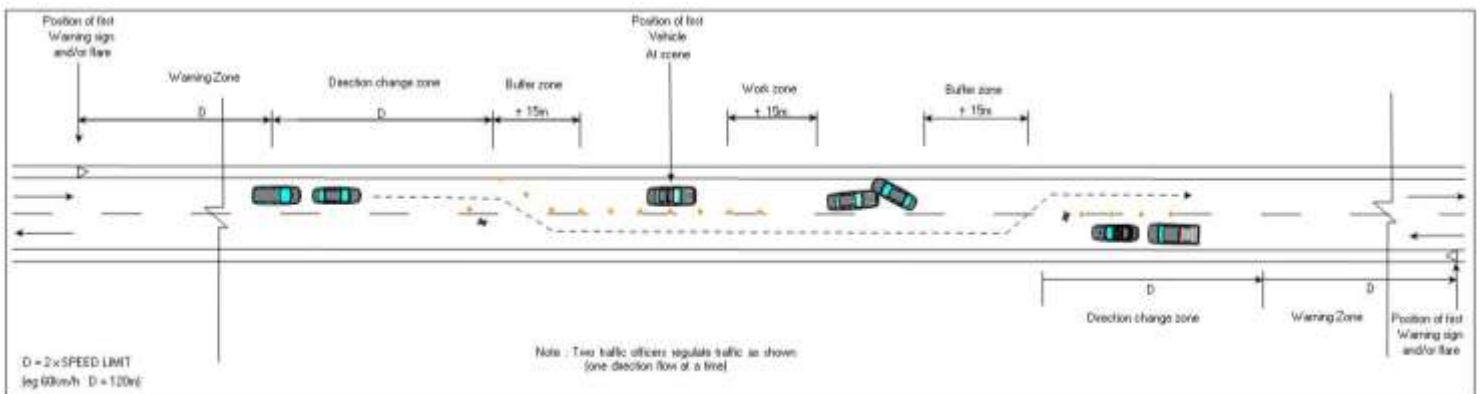
6.1.3.2.2b Single directional road, centre lane obstruction, flat road:



6.1.3.2.2c Two directional road, single lane each direction, one direction obstructed, flat road:

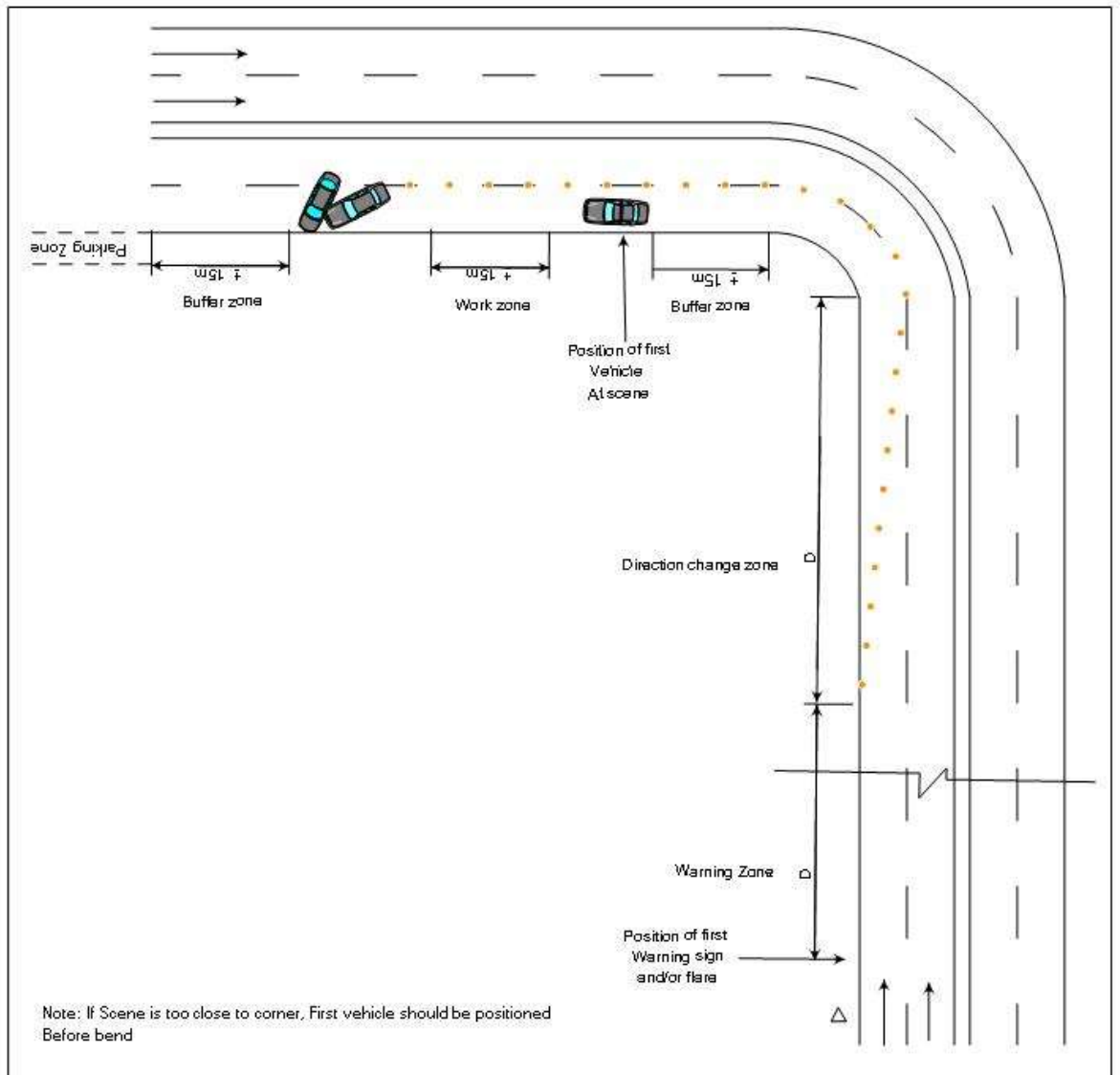


6.1.3.2.2d Two directional road, single lane each direction, one direction obstructed, flat road:



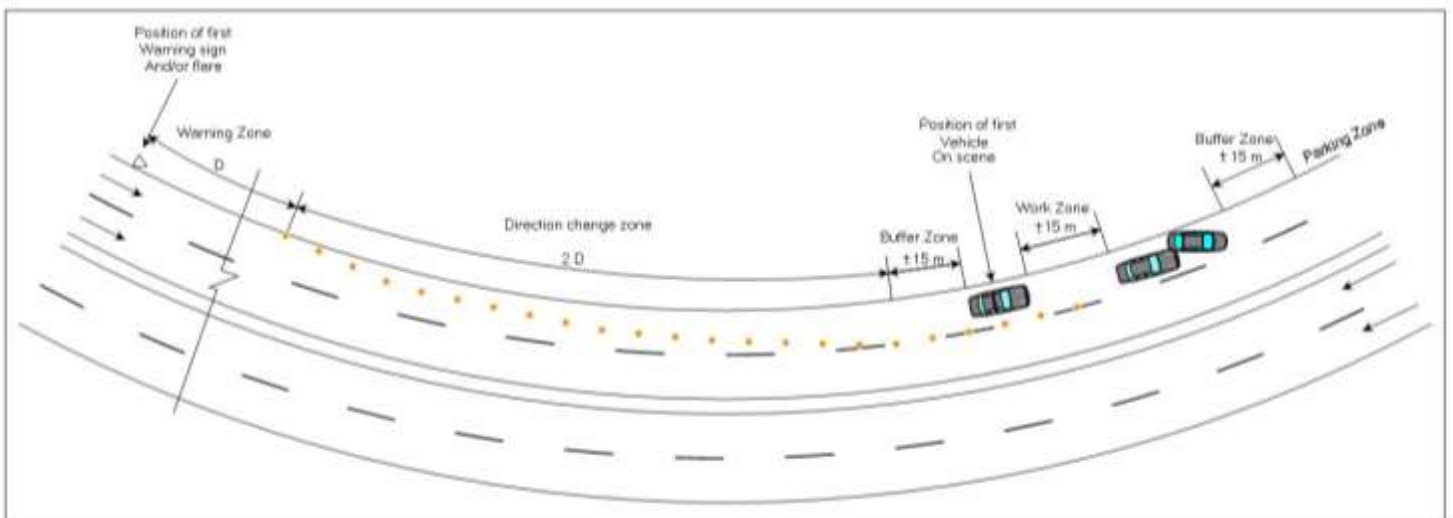
6.1.3.2.2e

**Two directional road, dual lanes each direction, one direction obstructed around a corner:**

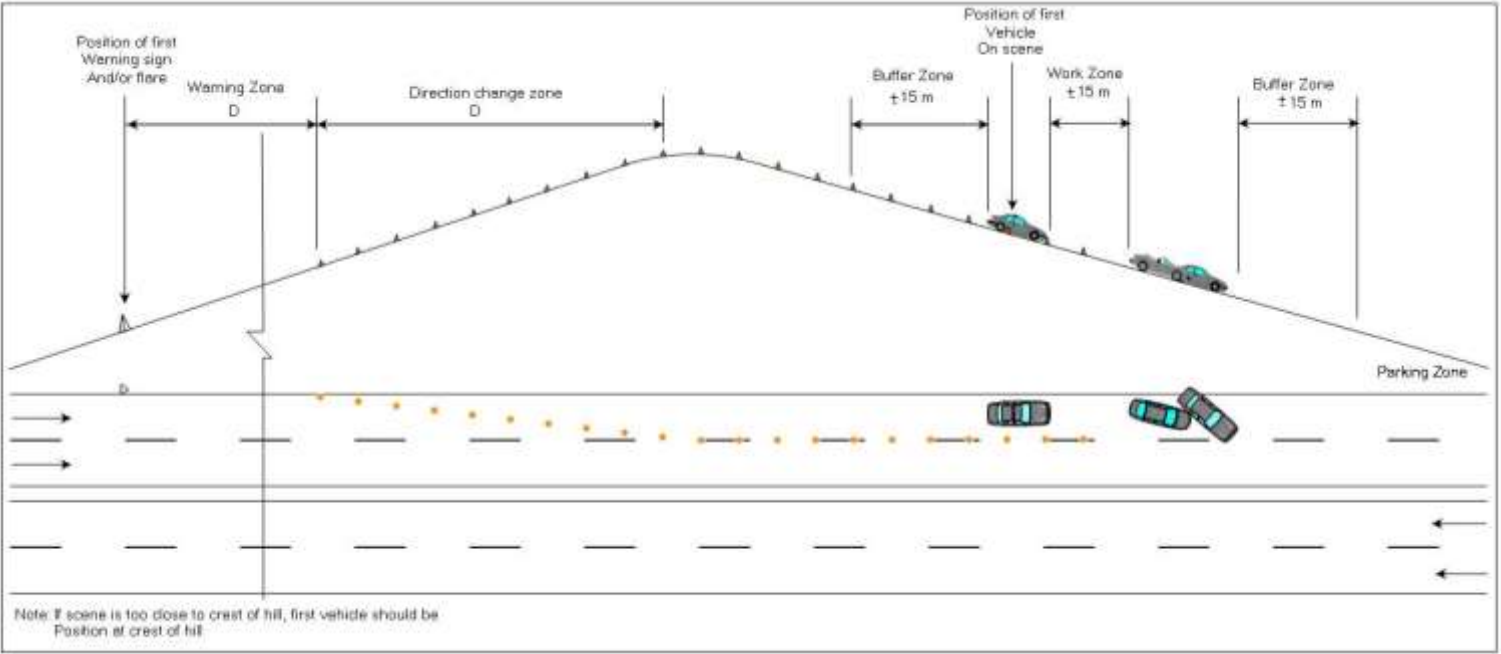


6.1.3.2.2f

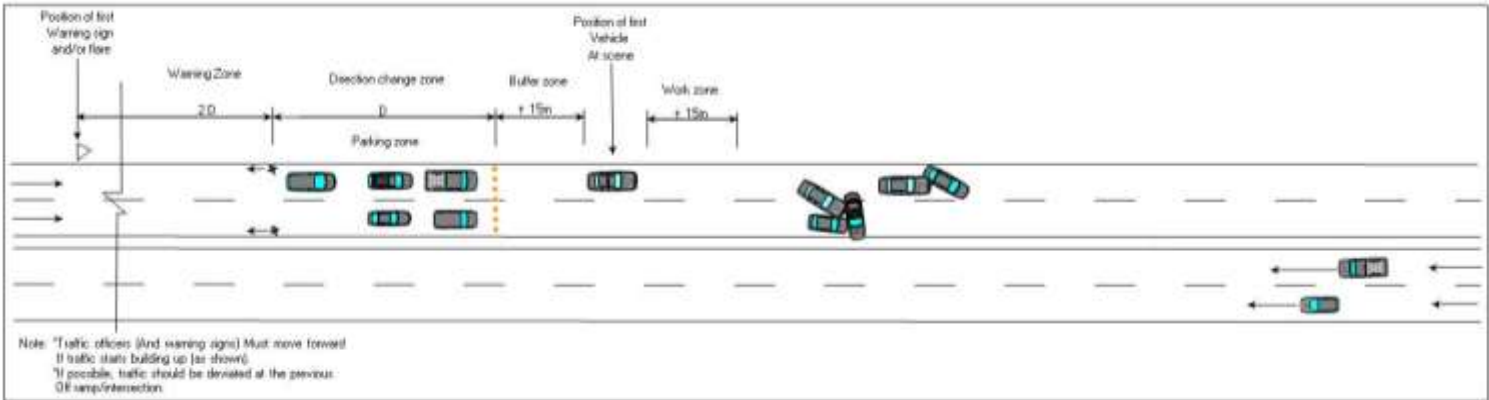
**Two directional road, dual lanes each direction, one lane obstructed around a bend / curve:**



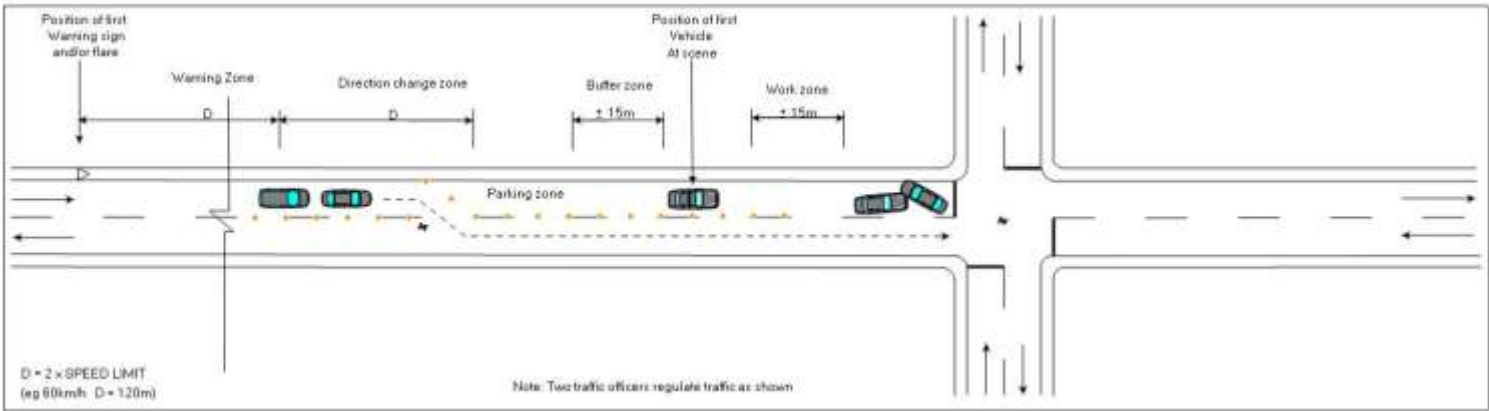
6.1.3.2.2g Two directional road, dual lanes, one lane obstructed, over a blind rise:



6.1.3.2.2h Two directional road, dual lanes, both lanes in one direction obstructed:



6.1.3.2.2i Two directional road, single lane in each direction at a junction:





### 6.1.3.3 View Obstructions

6.1.3.3.1 Obstacles can keep a driver from seeing cones, control devices or hazards.

- a) Horizontal View Obstructions – embankments, hedges, trees, crops, weeds, buildings, billboards, vehicles.
- b) Vertical View Obstructions – crests of hills, bridges, overpasses or general lay of the land affects sight distance or the driver's line of sight

### 6.1.3.4 Reduced Visibility

6.1.3.4.1 Weather and darkness do not obscure a view the way solid objects do but they do reduce visibility.

- a) Darkness – Lack of lighting or over-driving headlights.
- b) Weather – Fog, smoke, rain, snow, or a combination of these plus darkness.

6.1.3.4.2 The motorist is usually driving too fast for the conditions present.

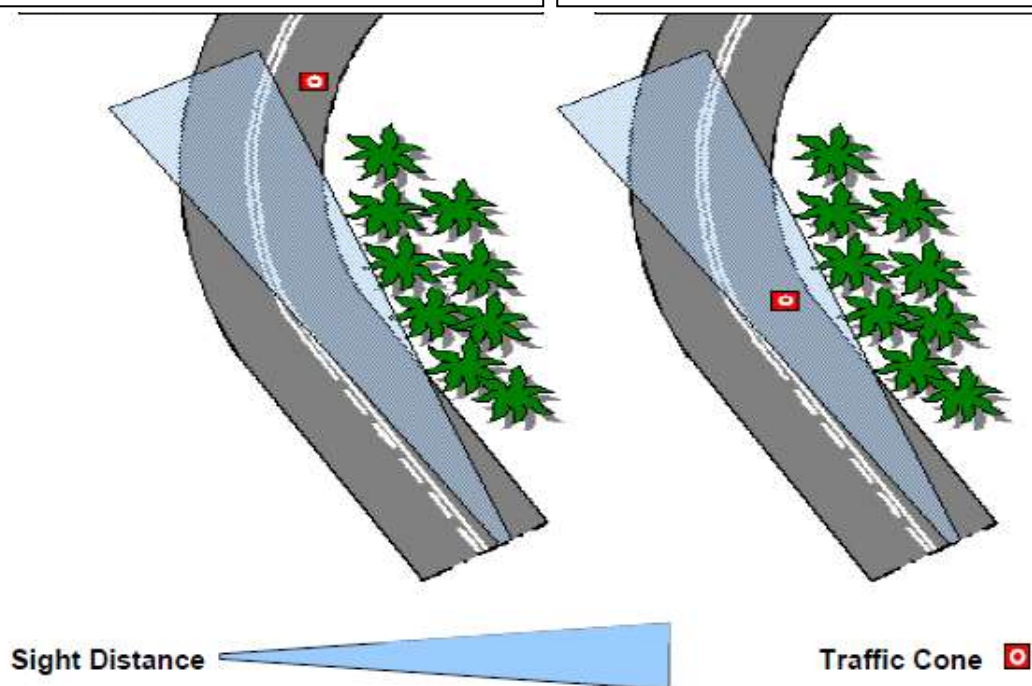
### 6.1.3.5 Glare

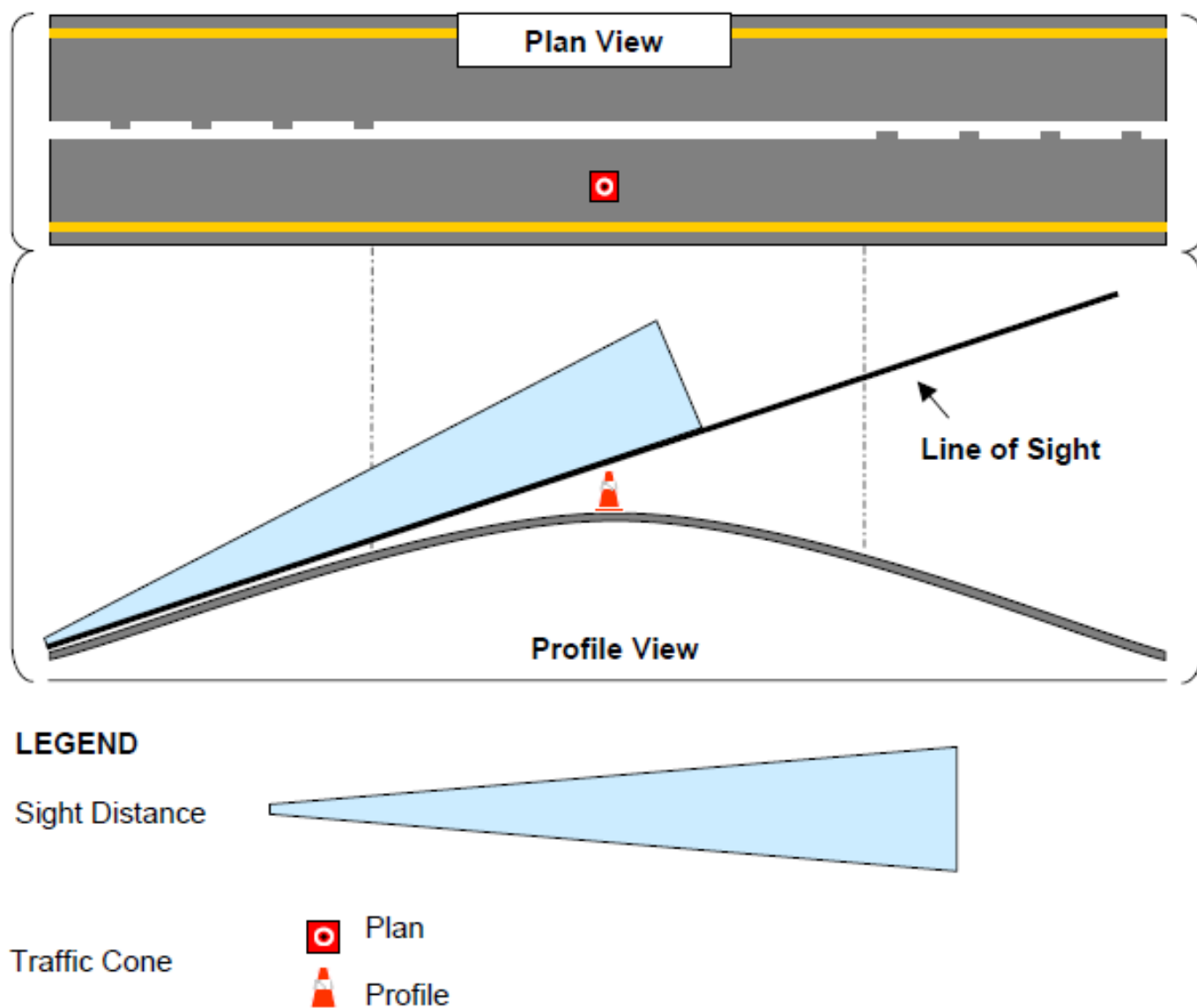
6.1.3.5.1 Glare temporarily blinds the motorist's field of vision.

- a) Headlight Glare – only at night, from oncoming traffic. (This includes emergency vehicle headlights in normal, high beam or wigwag operation).
- b) Fixed-light Glare – Backlighting, signs, stationary vehicles.
- c) Sun Glare (sunrise / sunset). Sun glare will often make many things invisible.

The traffic cone is not within the driver's sight distance. The driver is unaware of the warning device due to the view obstructions (a group of trees on the right hand side obstructing their view).

A warning device has been moved back prior to the view obstruction. This traffic cone is in the driver's "line of sight" and should provide them with sufficient **sight distance** to take corrective action.





- 6.1.4 The implementation of a Forward Control Point (FCP), and Incident Management Point, or a Central Control Point, at major scenes, will often require the implementation of alternative routes. However this need not only be implemented on major scenes, and can be implemented on smaller scenes where necessary. A Freeway Incident Management (FIM) Plan, as is set out in the comments below serves as an example of a Freeway Incident Management Guide Plan for a section of the main N2 and N3 routes in KwaZulu-Natal, where alternative routes are identified if sections of the N2 or N3 are obstructed.

6.1.4a

## WHAT IS THE FREEWAY INCIDENT MANAGEMENT GUIDELINE PLAN?

This is a document designed to help the Emergency Services efficiently manage any incident which occurs on a freeway. It provides the user with a step-by-step guide to the management of an incident.

In addition to the above information, an Alternative Route Map for each section of freeway (interchange to interchange) is included. This map diagrammatically illustrates the alternative route to be used in the event of a closure as well as the numbers of points men and/or signs needed to implement the closure. This information will assist personnel on scene to make rapid decisions even when under pressure.

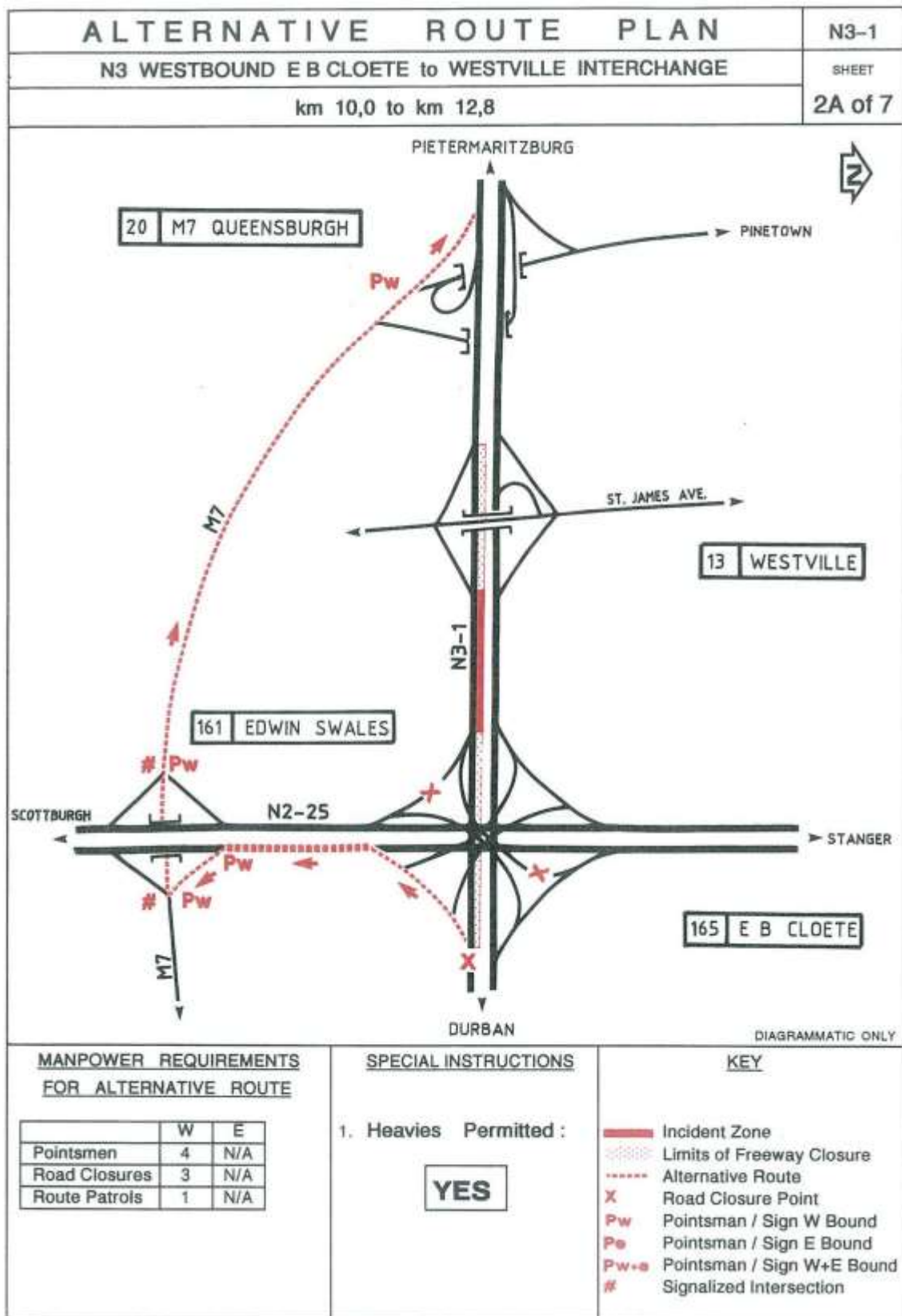
This Guideline Plan applies to incidents on the N2 freeway from Kingsburgh in the south up to Ballito in the North, and the N3 freeway from the EB Cloete Interchange on the east up to Key Ridge in the west.

## WHAT IS FREEWAY INCIDENT MANAGEMENT?

Freeway Incident Management is a preplanned, agreed set of procedures and protocols activated when a freeway incident occurs. It co-ordinates the responses of all emergency services to the scene of an incident and provides a mechanism for efficiently managing the scene of an incident. Its aim is to clear the freeway of any obstruction and to restore traffic flow to normal as quickly as possible.

- 6.1.4.1 Accompanying a Freeway Incident Management (FIM) Plan Guideline is usually a written descriptive of the alternative route plans, likewise a diagrammatic indication of the alternative route plans, as can be seen in the **following example**:

6.1.4.1a



6.1.4.2 In KwaZulu-Natal for Durban – Pietermaritzburg area, contact is Carmel Michaels, 0313122097. Each province and area has its own SANRAL approved coordinator, where details can be obtained from SANRAL.

### 6.1.5 Scene etiquette



6.1.5.1 Arguably the most important aspect of attending at, or simply being at, any accident scene whatsoever, is the issue of scene etiquette.

6.1.5.2 The first and foremost issue is to keep in mind that an accident scene is almost always a very stressful, traumatic and dangerous place to be, especially for those involved or inexperienced with such scenes. Keep this in mind when dealing with all people at the scene.

6.1.5.3 Basic principles of communication apply, where on arriving at or meeting someone at scene, one would usually:

- **Walk calmly, do not run or rush**
- **Introduce yourself clearly by your name, your rank, or whom you represent**
- **Explain why you are there**

6.1.5.4 Rule of thumb is that any accident scene is a crime scene. Therefore the attending member of the SAP (or traffic or metro) is usually the member managing the scene.

6.1.5.5 This said, there is actually no member in charge (although this is a crime scene so should be treated as such). Accident scenes should be treated as a multi-disciplined and co-operative function of the various key role players, this usually includes:

6.1.5.5.1SAPS

6.1.5.5.2Traffic Police

6.1.5.5.3Metro Police

6.1.5.5.4Medical staff

6.1.5.5.5Fire and Rescue staff

6.1.5.5.6Breakdown and recovery services

6.1.5.5.7Specific services (Road maintenance / engineering)

6.1.5.5.8Others (perhaps the damaged property owner etc.)

6.1.5.6 Each service should undertake their specific function, and thereafter step aside, for example, once the medical staff have treated the injured and or certified the deceased, they should remove themselves from the scene, either totally, or to a suitable position. Likewise, the fire department etc.

6.1.5.7 Although not always used, the appropriate attendance of a large scene of accident is through the use of the system of Forward Control Point also known as Freeway Incident Management. Other names are also used such as a Joint Operation Centre (JOC). However the principle of a single centralised control point, and a representative from each service at this point so as to allow a co-ordinated and control of services without duplication is ideal.

6.1.5.7.1Where this is implemented, it is usually easily identifiable and will often see a single cone placed on the roof of a vehicle to identify the position.

Day end

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**Day 1 – Day review questionnaire:**

- 1 What is the definition of a crash?
- 2 Does a criminal case docket contain an Accident Report?
- 3 What does AR stand for
- 4 What does CAS stand for
- 5 Name any two of the criminal charges a driver may face if involved in an accident
- 6 List one key difference between a statement and an affidavit
- 7 List three categories of accidents.
- 8 When arrested, name any four factors that the arrested person must be warned of by the arresting officer.
- 9 List the different zones on an accident scene.
- 10 What does the abbreviation P.P.E stand for?
- 11 List at least three basic pieces of equipment one should have for scene investigation.
- 12 What would one use to mark off a scene?
- 13 List any three factors that one must never assume when responding to a scene.
- 14 Name or list any one NRTA that you are likely to consider in a crash or accident investigation.
- 15 How would you define scene etiquette in your own words?
- 16 What specific Act pertains to road accidents?
- 17 What specific Act guides the investigation of accidents?
- 18 When will it be necessary to possess a PDP? Name at least three factors.
- 19 What is FIM?
- 20 What is FCP?

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**Attendee's name:** \_\_\_\_\_

**Date completed:** \_\_\_\_\_

**Signature:** \_\_\_\_\_

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**Day 2 Content:** (08:30 – 16:30 - Lunch as arranged, usually 12:00 – 13:00 or as required)

**1 Brief review of yesterday's session**

**2 Information from the road**

2.1 Identifying and deciphering the **5 different types of tyre marks**

2.1.1 Skid marks

2.1.1a ABS Skid marks

2.1.1b Skip skid marks

2.1.2 Yaw Marks

2.1.3 Acceleration marks

2.1.4 Flat tyre scuff marks

2.1.5 Imprints

2.1.5a Overall chart of the 5 tyre marks characteristics

2.2 Scrubs

2.3 Crooks & Hooks

2.4 Chops & Chips

2.5 Scrapes & Gouges

2.6 Debris

2.6.1 Glass

2.6.2 Under-body debris

2.6.3 Spatter

2.6.4 Spill and Liquids – Run off

2.7 Marking off the scene evidence

**3 Information from vehicles**

3.1 Marking off vehicles

3.2 Examining vehicles

**4 Information from people**

**5 Photography**

5.1 Vehicles

5.2 Scenes

5.3 Other

**6 Measuring and drawing of the scene**

6.1 Basic theory, methods and examples

Day end

## 1 Brief review of yesterday's session

### 1.1 Quick recap session of previous day's information:

## 2 Information from the road

### 2a Tyres in general:

Readers Digest - Book of the car

## Tyres/importance of tread patterns

### Getting the right grip for safety and economy

TREADS are designed to help tyres grip the road and to enable the car to move with maximum comfort, speed, safety and economy in any kind of weather.

Tyre treads are made of natural or synthetic rubber bonded directly on to the casing, or on to the breaker strip (the belt of cords running around the circumference of radial tyres to stiffen them).

A wide variety of patterns are moulded into the tread to drain away water and cope with various other factors dictated by the road surface and the type of vehicle being used.

On a dry road the best grip is afforded by a fairly smooth tyre, as this provides the greatest possible contact patch, that part of the tyre in direct touch with the road at any moment. But on a wet road a smooth tyre has hardly any grip, and the least trace of water acts as a lubricant. If there is a lot of water on the road, it will form a wedge in front of and underneath a smooth tyre, causing a form of skidding known as aquaplaning. The tyre, lifted off the road and riding on the water, stops turning and steering control is lost.

If there is a thin film of water on the road, the tread pattern breaks through it and grips the hard road surface.

With larger amounts of water, the tread pattern does three things. It first pushes the water aside or pumps it through zigzag grooves and channels in the tread which run parallel to the wheel. In this way the water is driven to the back of the contact patch, where it spins off behind the tyre.

Secondly, the film of water left is mopped up by sipes—slits like tiny knife-cuts in the tread which act like a sponge.

Thirdly, the tread pattern grips the remainder of the now-dry contact area.

As speed increases, contact time decreases and the first two parts of the process take up more of the contact patch, leaving less for a dry grip.

At 100 km/h on a wet road, the tread pattern on an average-sized tyre needs to move more than four and a half litres of water out of the way every second—nine litres in heavy rain—to dry enough surface to provide a grip.

Even with a moderate amount of tread pattern, a tyre's grip on a wet road decreases appreciably as the speed increases, and it will still aquaplane if there is plenty of water about.

A bold and rugged tread gives a reasonable grip in bad conditions, because the tread can quickly channel away snow, slush, mud or loose stones.



This high-speed photograph shows the contact patch, the area of the tyre in direct touch with the road at any one moment, when a tyre goes through water. It was taken beneath plate glass on a test track and shows first the bulk of water being pushed away to the sides of the tyre, or being pumped through its main channels. Then the remaining film of water is mopped up through sipes in the tread, finally leaving a tiny strip of dry surface for the tyre to grip.



A smooth tyre has no tread to disperse the water on a wet road, so water builds up in front and the tyre aquaplanes—slides on the surface of the water out of control.

THE 'FOOTPRINT' OF A TYRE



**High-speed tyre** The exceptionally wide and deep centre channel rapidly takes up water from the contact area, transverse patterns disperse the water to the side of the

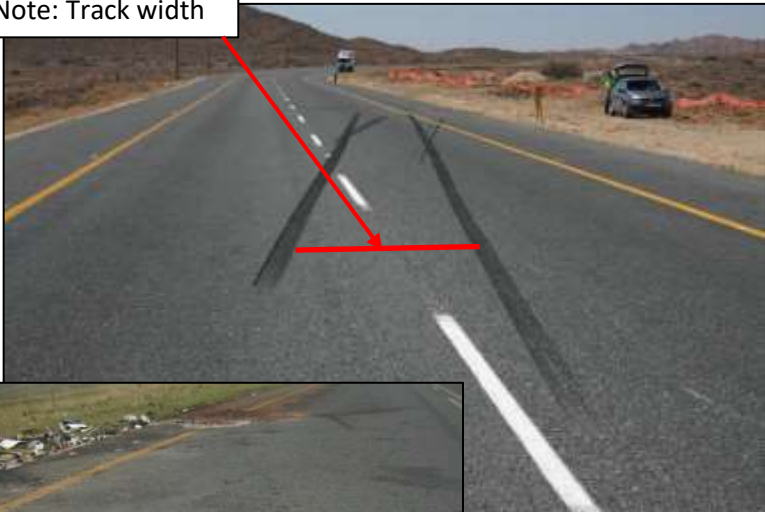
tyre, and thin slots in the tread squeeze out the remaining water to leave a comparatively dry contact area—roughly the size of the sole of a man's shoe.

### 2.1 Identifying and deciphering the 5 different types of tyre marks

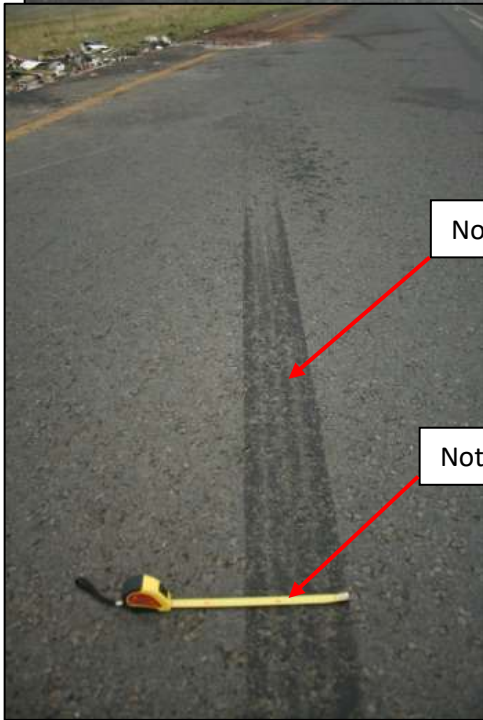
**2.1.1 Skid marks** are a tyre friction mark made by a tyre that is sliding without rotation on a road or other surface. Sliding may be due to braking, collision damage or, occasionally, to other circumstances.



Note: Track width

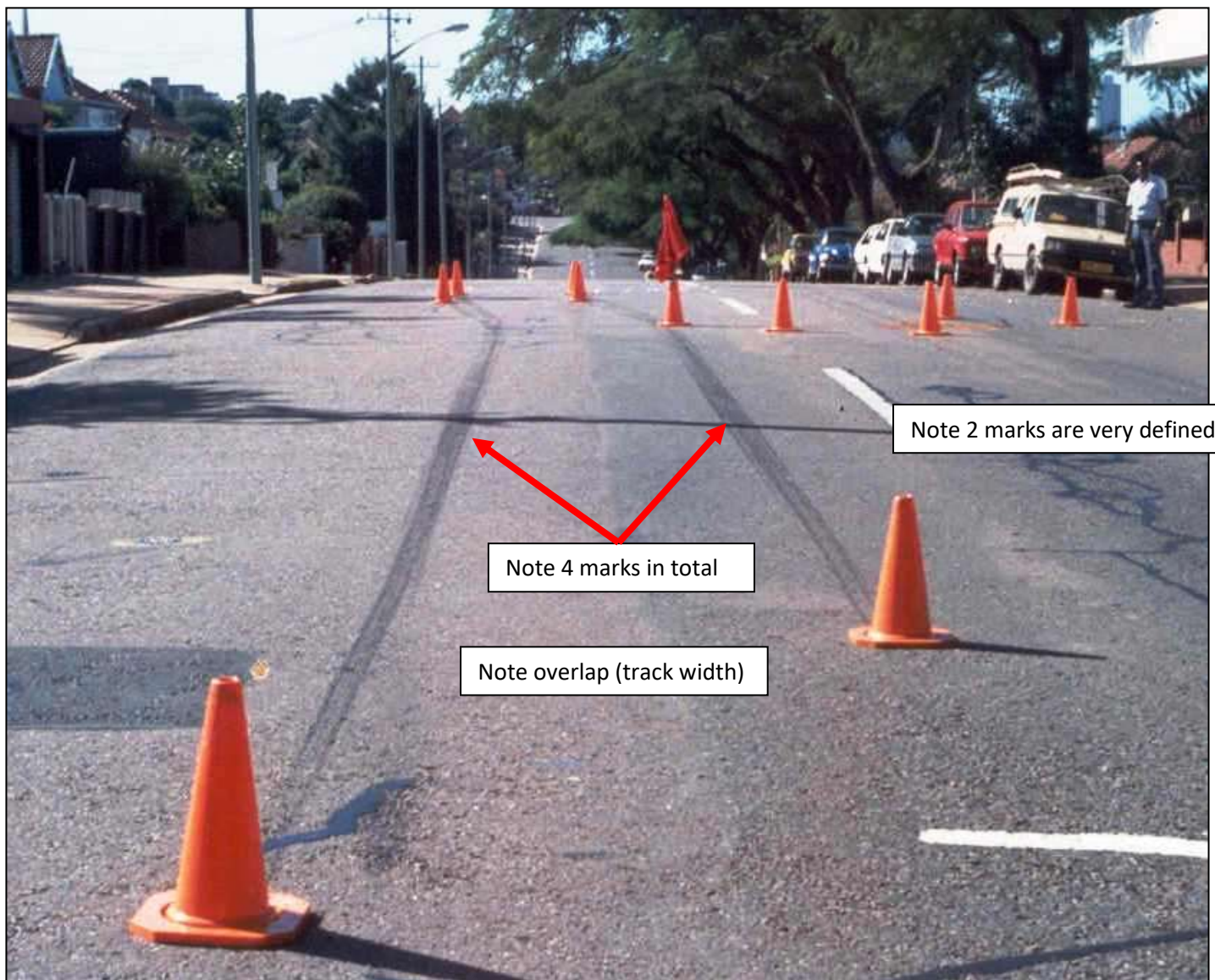


Note parallel striations



Note: Tyre width





**2.1.1.1** Note that clearly visible, well defined skid marks are far less frequent with the inclusion of ABS and other electronic management systems on vehicles. This noted, this does not preclude there being any braking marks created by a vehicle equipped with ABS (note the ABS braking mark examples that follow). ABS style braking marks made are far less evident and display a somewhat different type of evidence and are far shorter lived (Ephemeral).

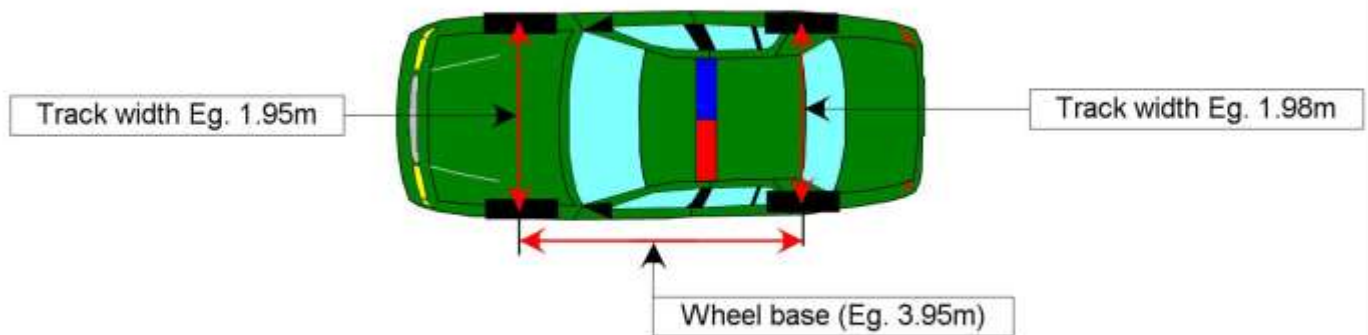




Typical scene evidence, including skid marks



A vehicles Wheel Base (WB) and Track Width (TW) is published by the manufacturer, however can be measured



Note: Rear and front TW usually differ slightly, with front wheel driver cars front TW slightly wider than the rear.

Note: Rear wheel driver cars, rear TW is slightly wider than its front, hence the slight overlap/offset of the braking marks

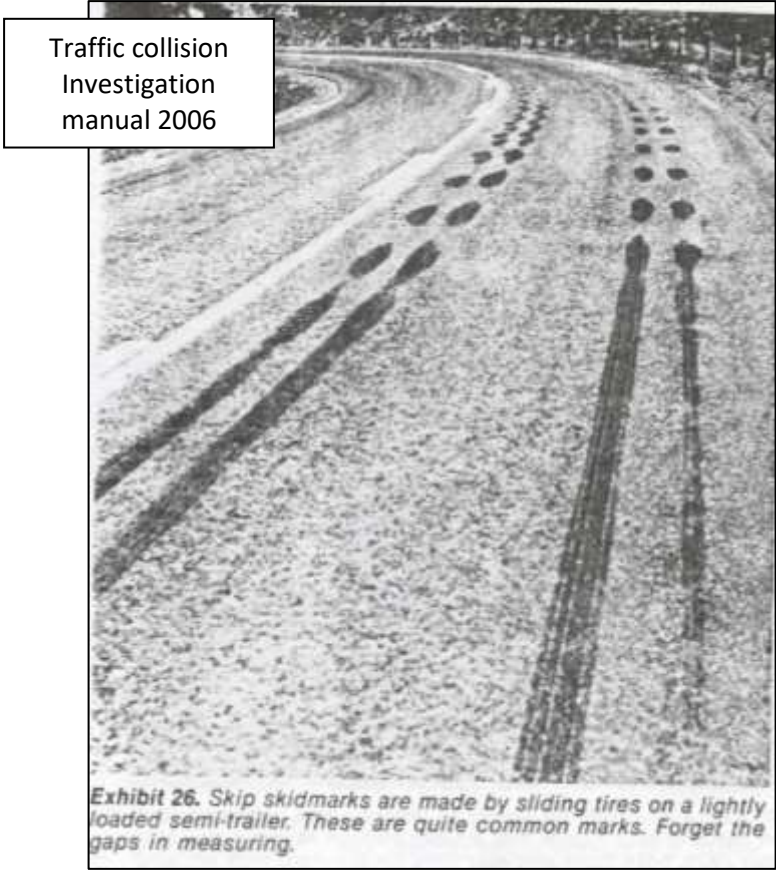
Note – Tyre mark striations, as these alongside, can help determine what the tyre that made the mark was doing at the time the mark was made.



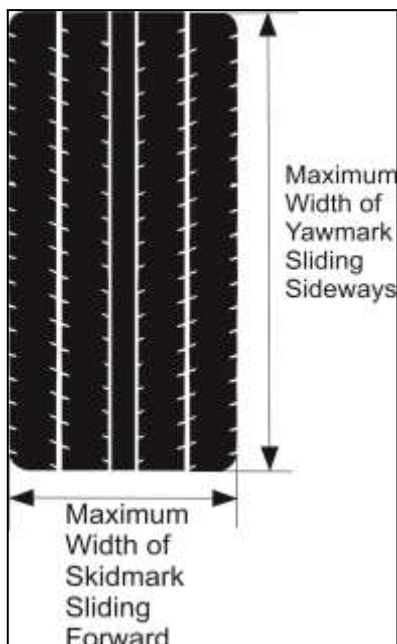
2.1.1a ABS skid marks



2.1.1b Skip skid marks

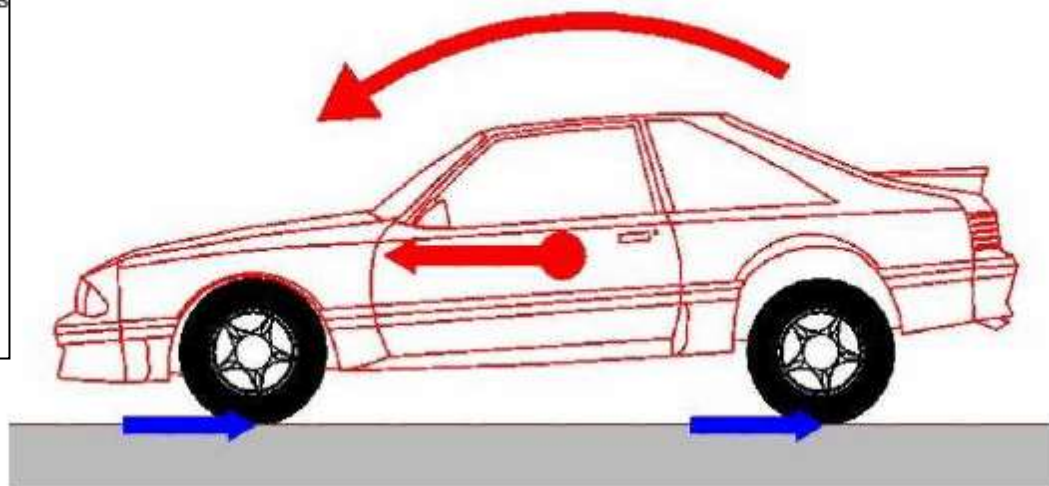




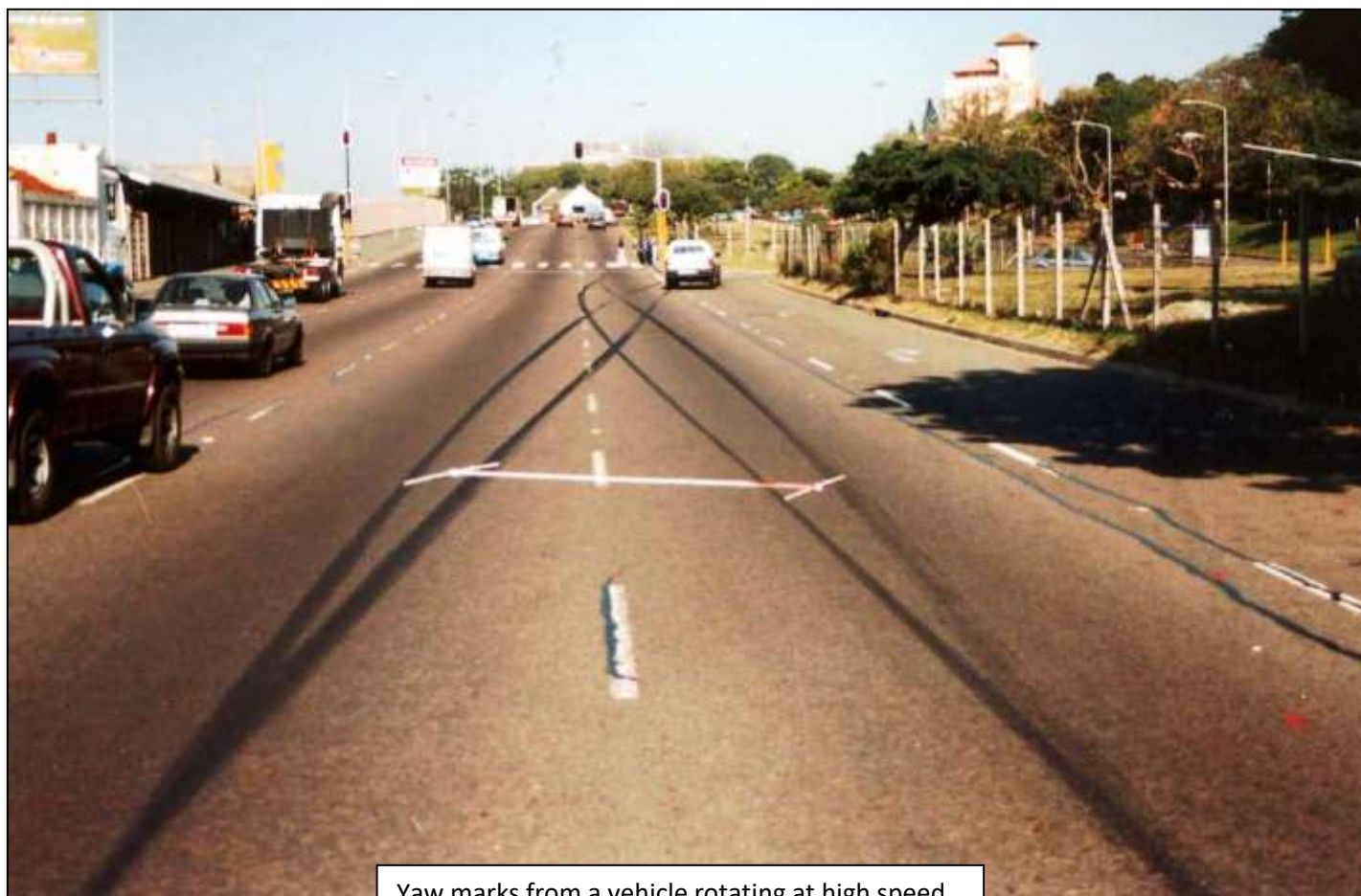


Vehicles action during harsh braking

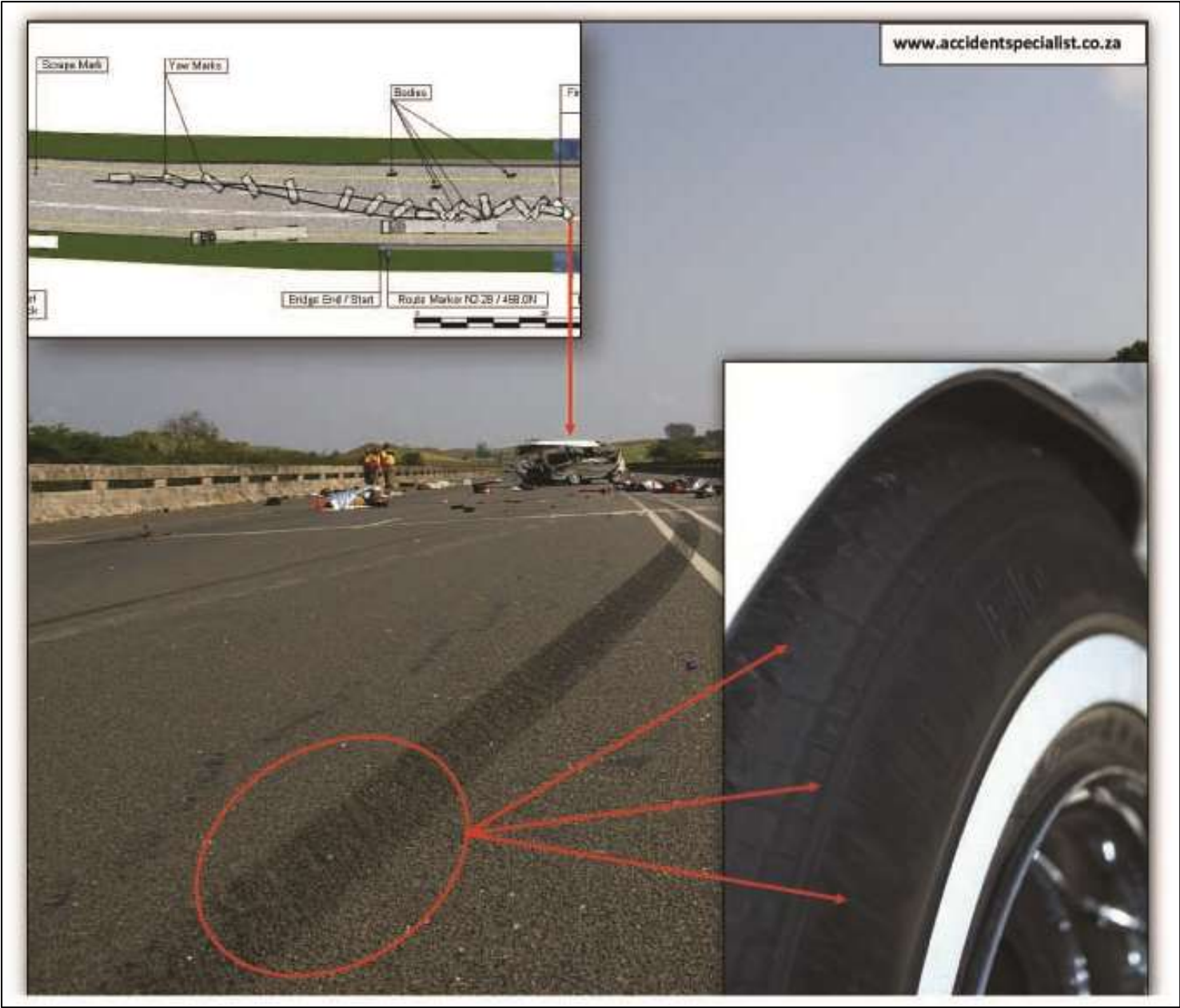
## Weight Shift Due to Braking



- 2.1.2 **Yaw marks** are a scuffmark made on a surface by a rotating tyre which is slipping more or less parallel to its axis. Sometimes yaw marks are called centrifugal skid marks, critical speed scuffmarks, or side slip marks.

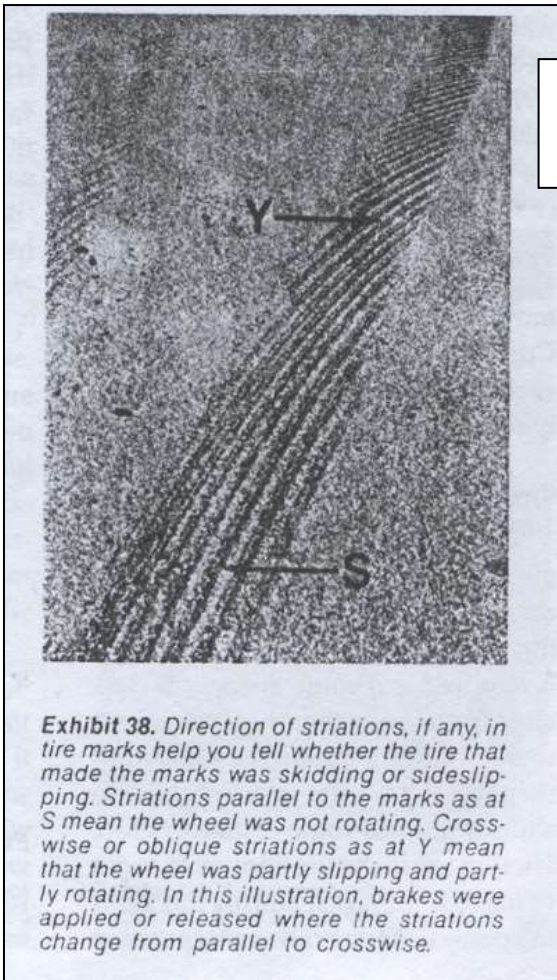


Yaw marks from a vehicle rotating at high speed







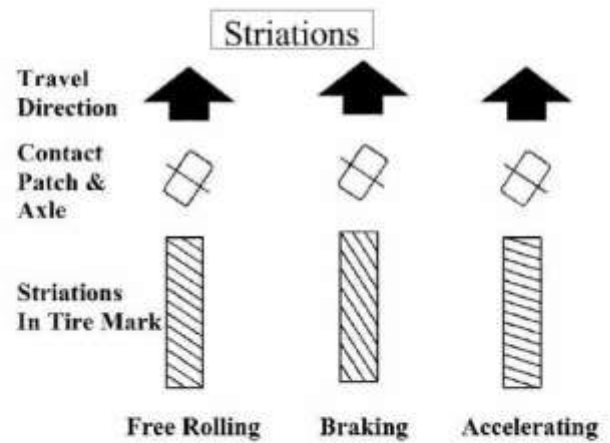


Traffic collision  
Investigation  
manual 2006

# Tire Marks-Yaw Marks

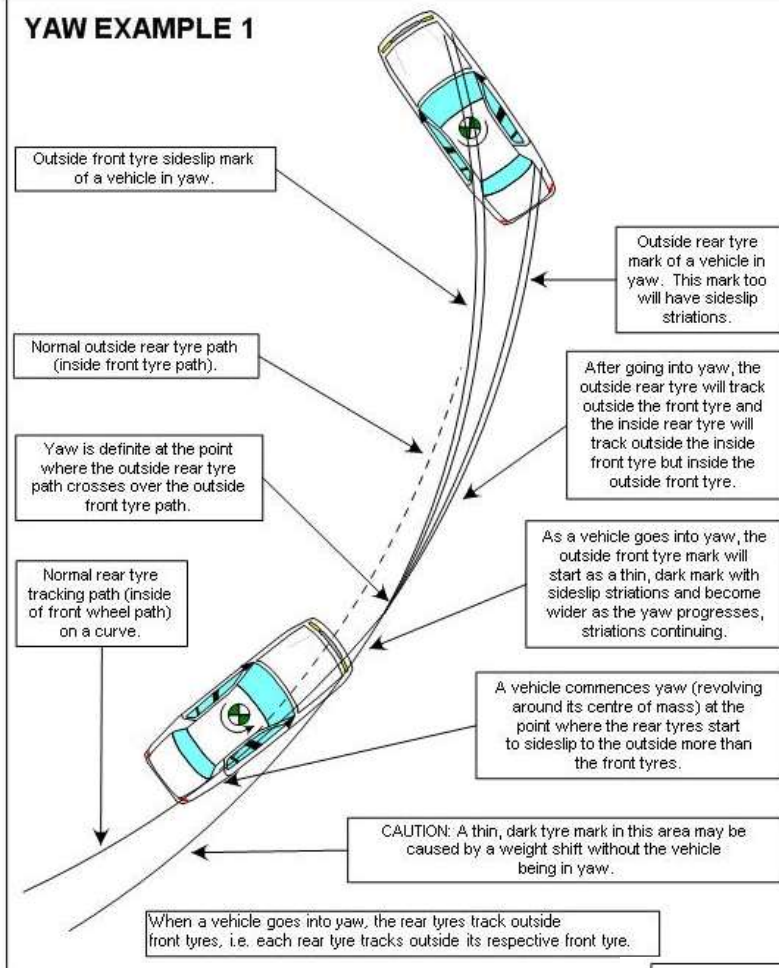
## Characteristics of Yaw Marks

	YAW MARK
WHEEL MOTION	ROLL & SIDESLIP
OPERATION	STEERING
NUMBER FROM 4-TIRED VEHICLE	MOSTLY 2 ALSO 1, 3, 4
RIGHT & LEFT TIRES	OUTSIDE STRONGER
FRONT & REAR TIRES	USUALLY EQUAL
WIDTH	VARIES FROM AN INCH TO A FOOT
BEGINNING	ALWAYS FAINT
END	STRONG
STRIATIONS	ALWAYS OBLIQUE OR CROSSWISE
OTHER DETAILS	SIDE RIB MARKS MAY SHOW
LENGTH	10 TO 200 FEET

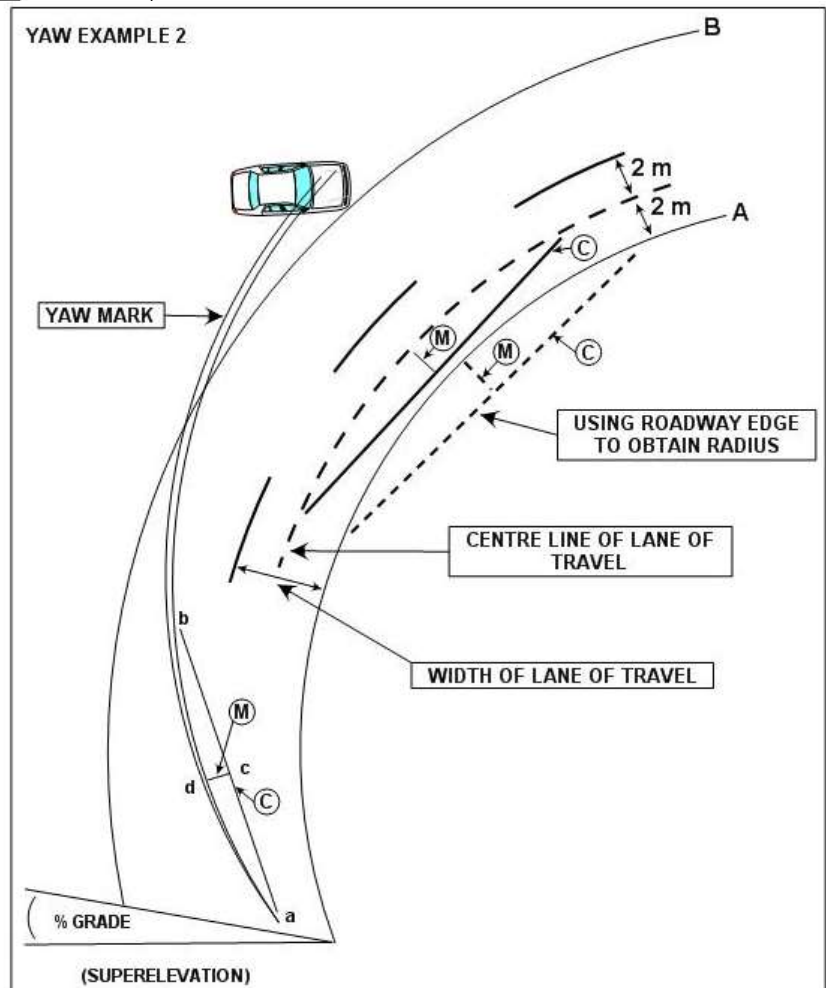




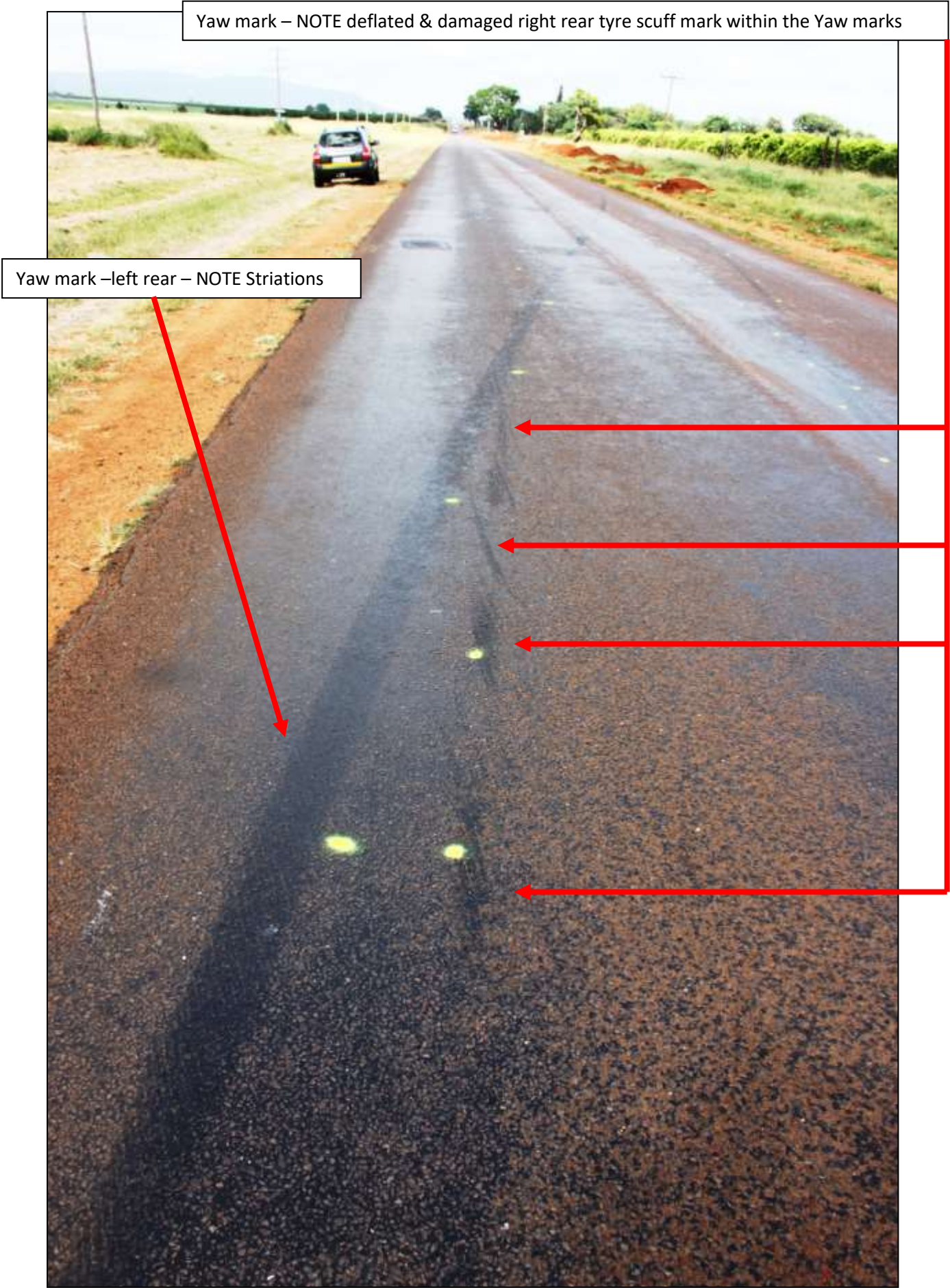
## YAW EXAMPLE 1



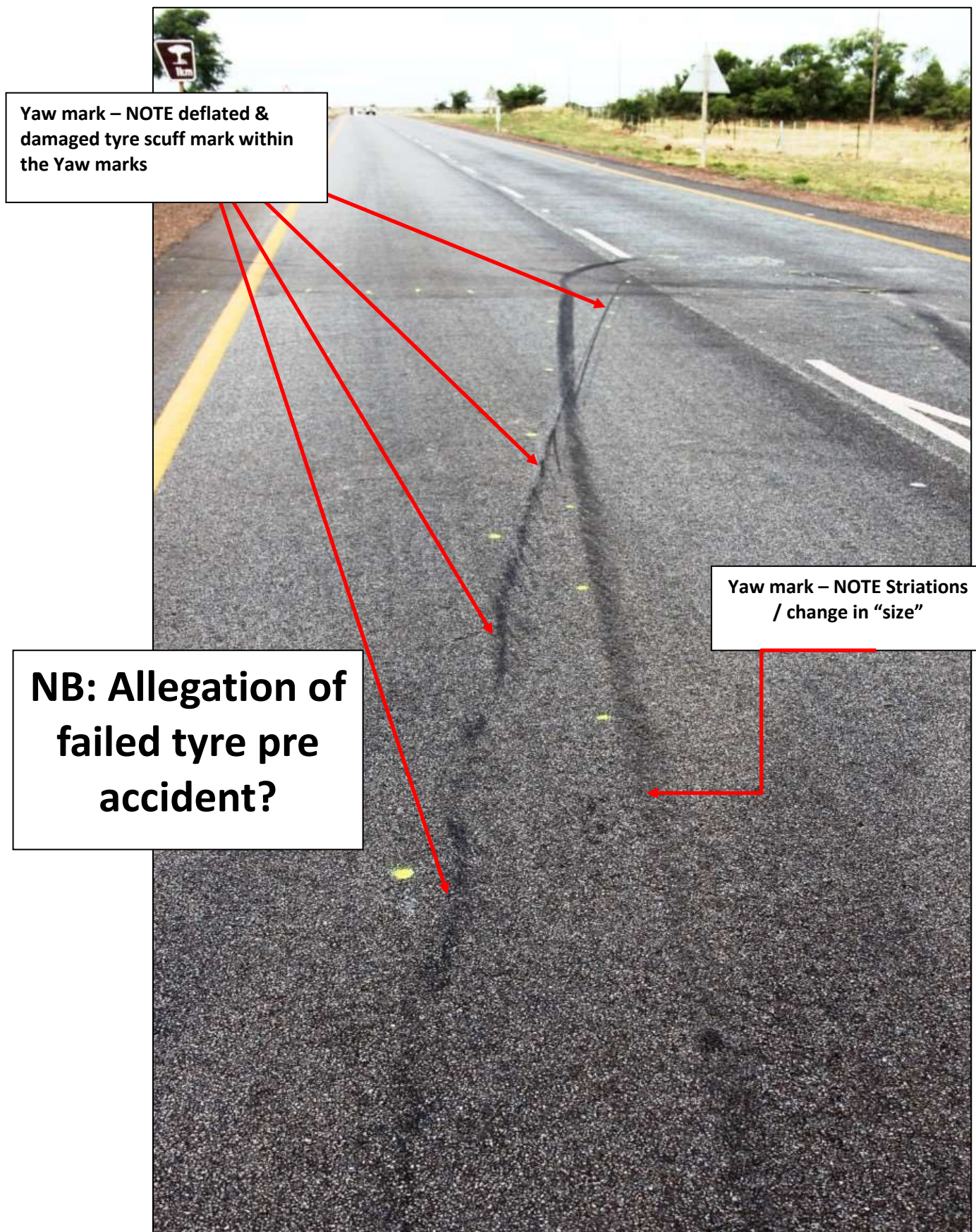
## YAW EXAMPLE 2





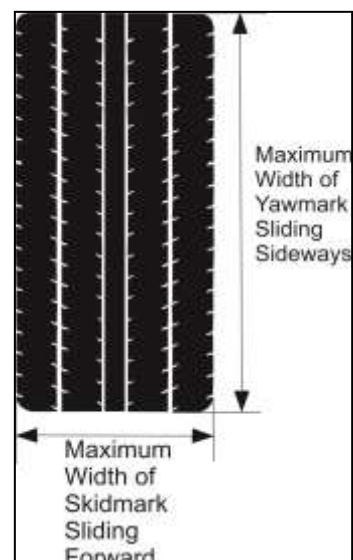
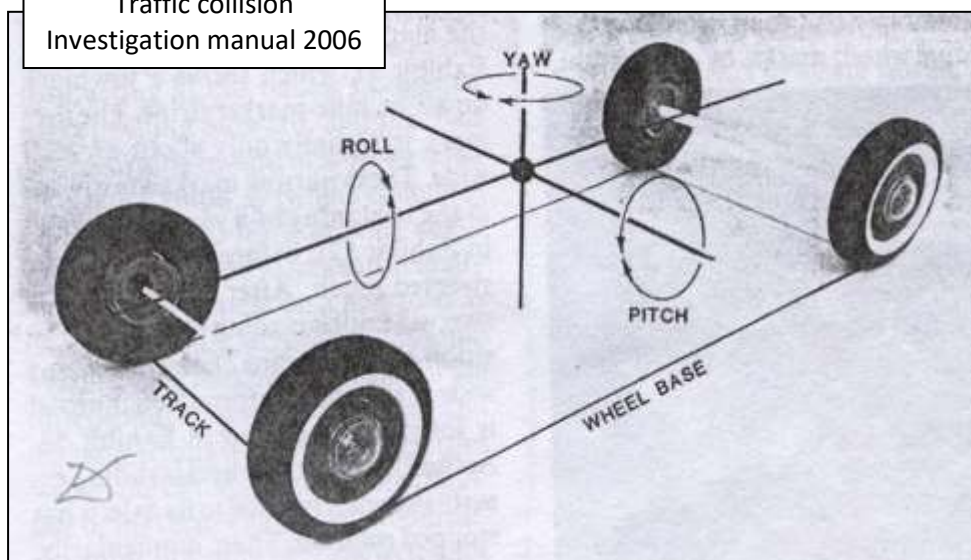






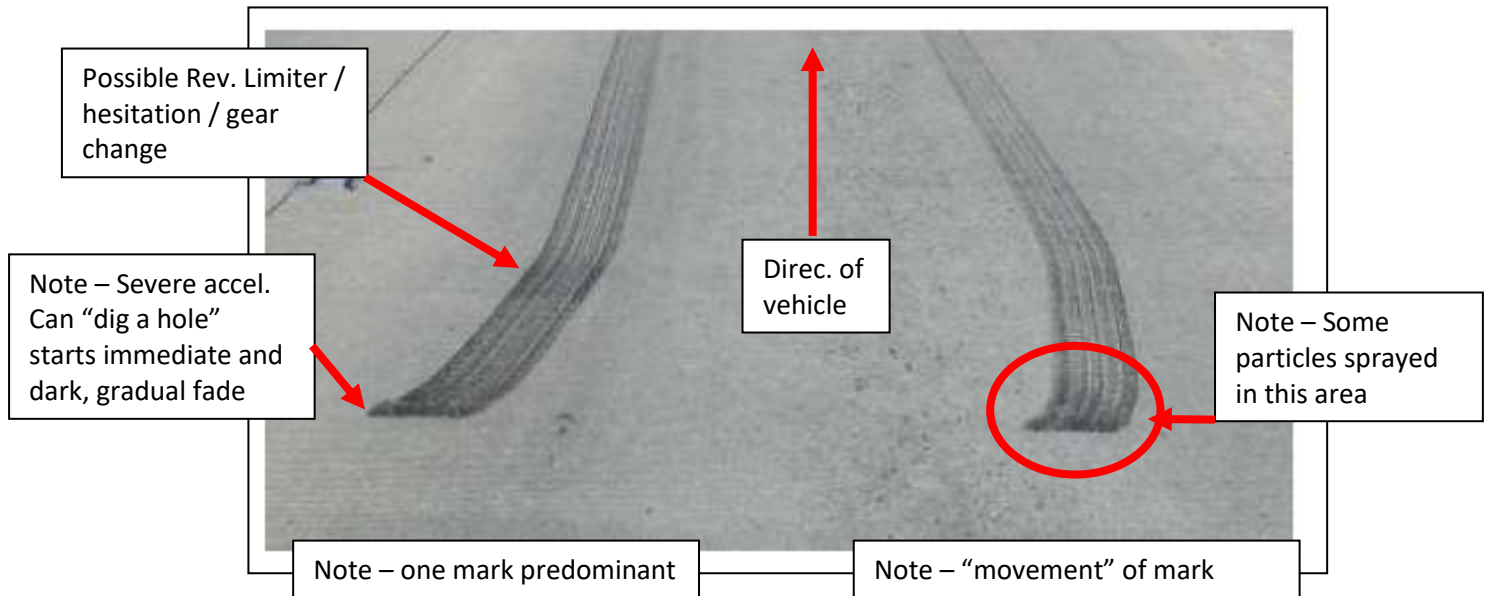


Traffic collision  
Investigation manual 2006



2.1.3 **Acceleration scuff marks** is a scuffmark made when sufficient power is supplied to the driving wheels to make at least one spin or slip on the road surface.





2.1.4 **Flat tyre marks** is a scuffmark made by an over deflected tyre, a tyre which has too little air pressure in it for the load on it.





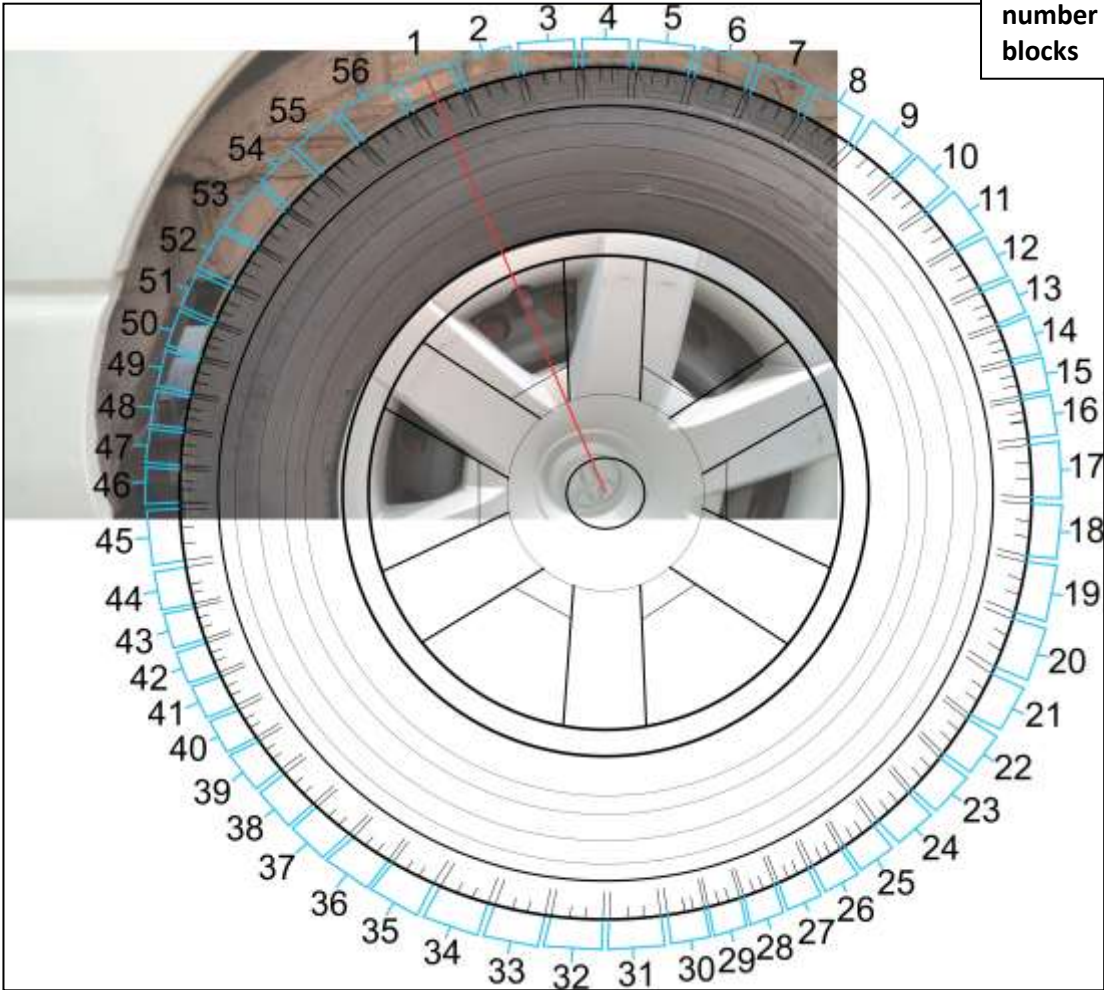
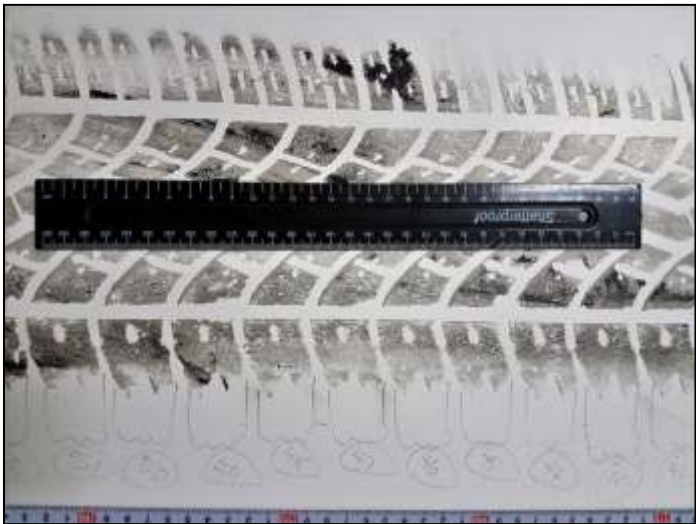


- 2.1.5 **Imprints** are a mark on a road or other surface made without sliding by a rolling tyre or a person's foot. An imprint usually shows the pattern of the tyre tread or shoe that made it. Sometimes called print, impression, or deposit.





Comparative print marks taken of a tyre (Inked and rolled), to determine various key factors under comparison:



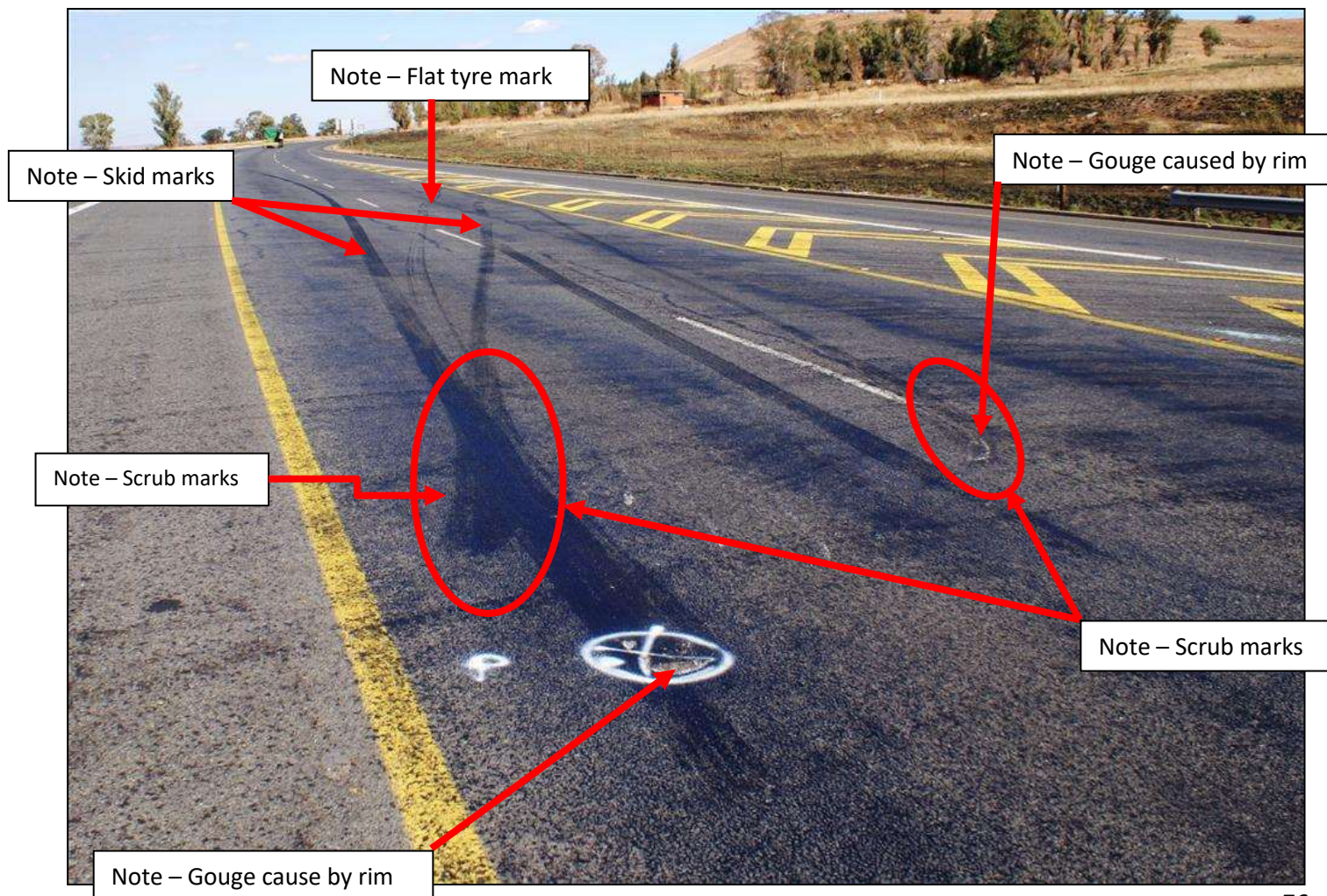
Determining the number of shoulder blocks

2.1.5a

	SKID MARK 1	YAW MARK 2	ACCELERATION SCUFF 3	FLAT TIRE MARK 4	IMPRINT 5
WHEEL MOTION	Slide, no roll	Roll and sideslip	Spin and slip	Roll, no slip	Roll, no slip
OPERATION	Braking	Steering	Speeding up	None	None
NUMBER FROM 4-TIRED VEHICLE	Mostly 4 also 2, 3, 1	Mostly 2 also 1, 3, 4	Usually 1 sometimes 2	Only 1 rarely 2	Mostly 1 also 2, 3, 4
RIGHT AND LEFT TIRES	Equally strong	Outside stronger	Equal if two	Rarely two	Usually equal
FRONT AND REAR TIRES	Front stronger	Usually equal	Only driven wheels		Equally clear
WIDTH	If straight, same as tire	Varies from an inch to a foot	Same as tire	Tire tread edge marks	Same as tire
BEGINNING	Usually abrupt	Always faint	Strong or gradual	Always faint	Always strong
END	Usually abrupt	Strong	Very gradual	Strong	Usually gradual
STRIATIONS	Always parallel to mark	Always oblique or crosswise	Parallel to mark	None	Parallel to mark if any
OTHER DETAILS	Outer edges often stronger	Side rib marks may show	Outer edges often stronger	Outer edges always stronger	Tread design may show, often broken
LENGTH	1 to 500 feet	10 to 200 feet	0.5 to 50 feet	50 feet to 10 miles	0.5 to 50 feet

2.2 Scrubs

2.2.1 **Scrubs** – These skid marks are usually not more than 3 meters long. They start abruptly when damage to the vehicle, rather than braking, locks a wheel.





Note – Bicycle tyre scrub mark (also right side crank arm impact mark) from a rear impact to a bicycle



## Traffic collision Investigation 2006

### Collision Scrubs

These skidmarks are usually not more than 10 ft (3 meters) long. They start abruptly when damage to the vehicle, rather than braking, locks a wheel. They may be very conspicuous because, during collision the force of the tire on the pavement is greatly increased for an instant. Or they may be inconspicuous if the pavement does not easily show skidmarks (Exhibit 29).

At the end of the impact, the additional downward force of the collision is released from the paving so the mark changes in appearance.

After impact,

- If the wheel is free to rotate, the skidmark stops (Exhibit 30) or changes to a scuffmark.
- If the wheel remains locked by damage, the tire continues to slide but leaves a lighter mark (Exhibit 31).
- If the wheel comes off or is damaged so that it no longer touches the road surface, the scrub mark stops.



*Exhibit 29. Sometimes a collision scrub skidmark is the only sign of where a collision took place; so it is important.*



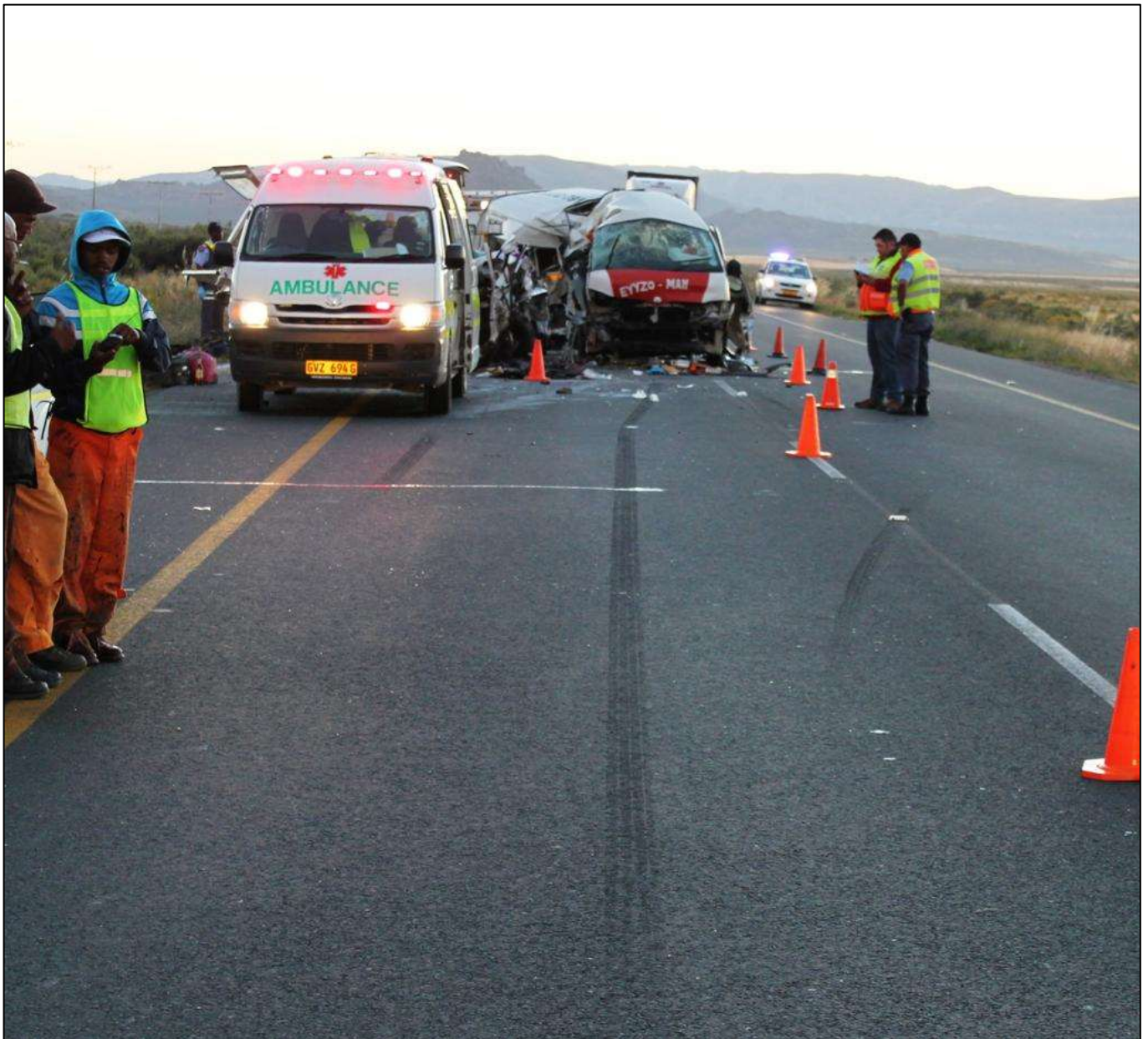
*Exhibit 30. A collision scrub skidmark may be short and curved, especially in opposite-direction collisions.*



*Exhibit 31. A collision scrub may be long and straight, especially in same-direction collisions.*



- 2.3 **Crook/ Hooks** – these, in skid marks, are often called bends or offsets. Skid marks are usually straight and even. An abrupt change in direction, often near the end, means that some external force has deflected the vehicle from its even forward motion. Like a collision scrub, marks the position of a tyre at the onset of a collision. It is rarely the actual first contact point (FCP) or “point of impact”





## 2.4 Chops and Chips

- 2.4.1 **Chops** – are broad, shallow gouges that look like an axe chopped obliquely into the paving. They are made by the vehicle frames and sometimes wheel rims. A vehicle might make a chop on a tarmac surface, and will merely scratch a cement surface. Chops are likely to occur at maximum engagement.





- 2.4.2 **Chips** – are small deep gouges where chunks of paving have been dug out as might be done with a pick axe. These are likely to occur in tarmac as cement is too hard to chip easily, except at edges and joints.



## 2.5 Scrapes and gouges

- 2.5.1 **Scrapes** are made when sheet metal body parts are dragged across the road surface or stronger metal parts move lightly over the area.





- 2.5.2 **Gouges** are places where pavement material has been forced down on the road. The shape of the gouge may suggest how it was made.



Created by prop shaft



Created by rim edge



Created by prop shaft splines



- 2.6 **Debris** – is loose material scattered about at the scene as a result of a traffic collision. Debris may be dirt, liquids, vehicle parts, cargo, personal belongings and other things.







2.6.1 **Glass** – these occur from the windscreens, windows, headlamp lens and mirrors.

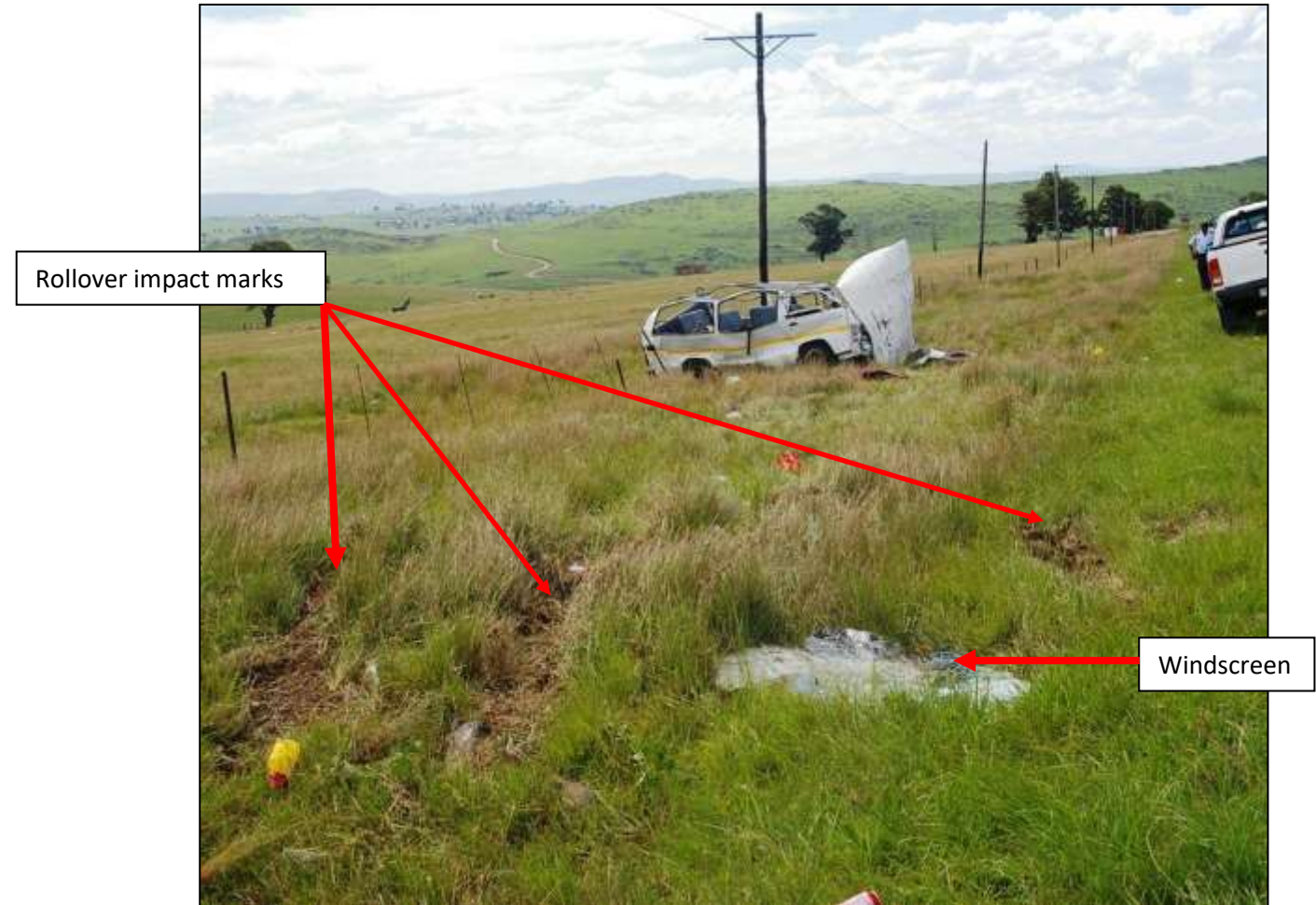
Example of forward projection of headlight glass from rear vehicle ... and “dropping” of taillight glass as front vehicle was propelled forward



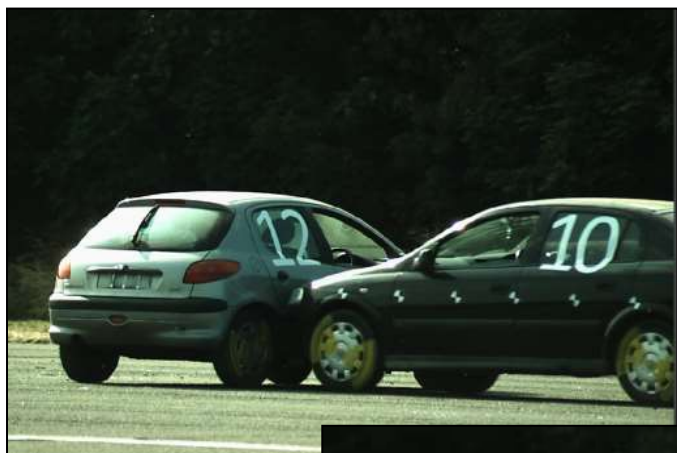
Example of Liquid, glass and general debris at the position where the vehicle came to rest







Examples of glass and component debris flying from actual crash testing

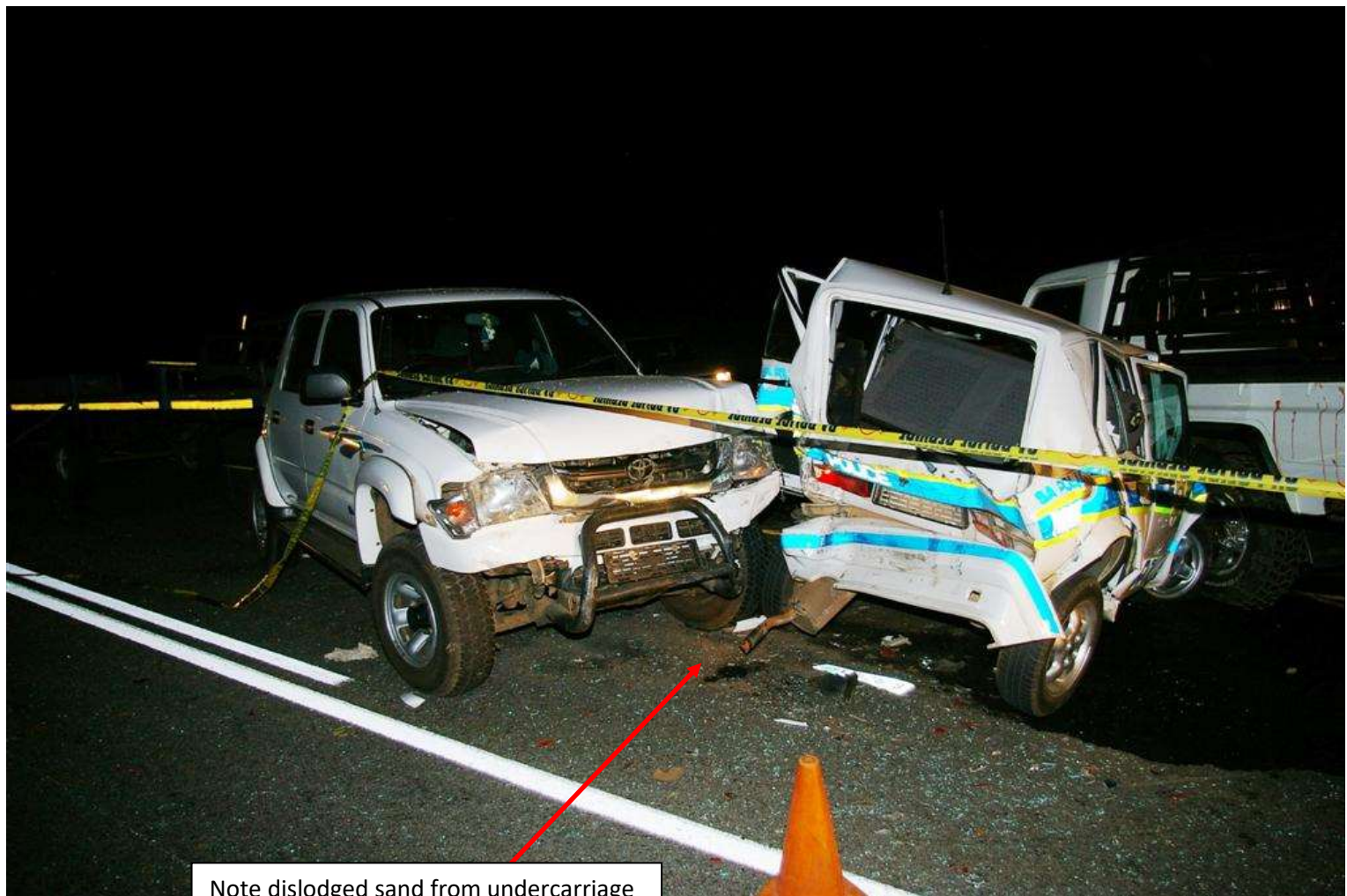




2.6.2 **Under-body debris** (mud, rust, paint, snow, and sometimes gravel) sticks to the underside of fenders, engines, body, and other parts. In a collision it comes loose in two ways:

2.6.2.1 The metal to which it is stuck bends or crinkles and debris chips off.

2.6.2.2 The shock of collision loosens it.





2.6.3 **Spatter** – occurs when the container (sump, battery, radiator, water-bottle) is collapsed by the collision. This results in the liquid squirting out violently and splashing on the road and nearby vehicle parts. E.g. the liquid from a radiator in a collision does not drip out and fall to the ground. It is forced out under great and sudden pressure during a head-on impact. Such spatter areas are dark, wet spots, irregular in shape, and often composed of or surrounded by small spots or “freckles”. Sometimes copious spatter makes an elongated “splash” pattern. Spatter reaches the road before the damaged vehicle moves very far and it is, therefore, a good indication of where it was when the collision collapse or broke open the liquid container. Spatter may be obscured by under body debris or smeared by road sweeping after the collision. Spatter may dry out or soon be obliterated by passing traffic; therefore it may easily escape attention in collision investigation.

2.6.4 **Spill and liquids** – these can be from coolant, oil, battery acid, fuel, and other fluids may escape from containers in a vehicle during and after a collision. Blood and other body liquids may also appear. The importance of such debris and its pattern on the road is often overlooked. Vehicle liquids appear on the road in six ways.

- 2.6.4.1 Spatter
- 2.6.4.2 Dribble
- 2.6.4.3 Puddle
- 2.6.4.4 Run-off
- 2.6.4.5 Soak-in
- 2.6.4.6 Tracking



Spatter from violent impact



Blood dribble from injured driver standing alongside his vehicle





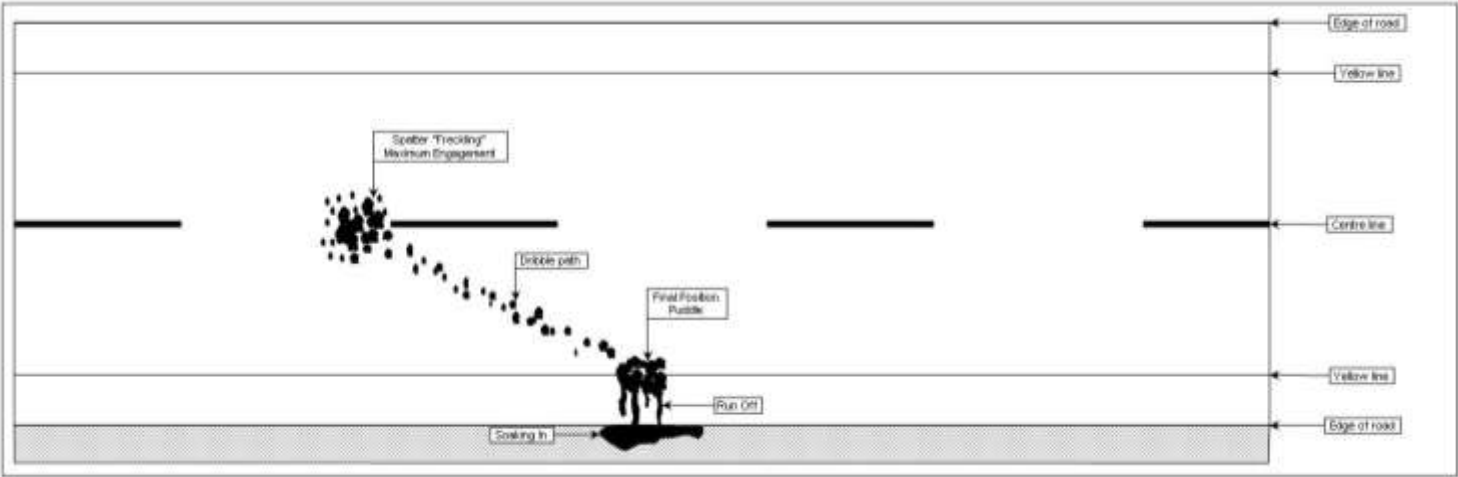
Liquid draining from damaged vehicle (vessel), where vehicle is at rest, liquid run off across road.



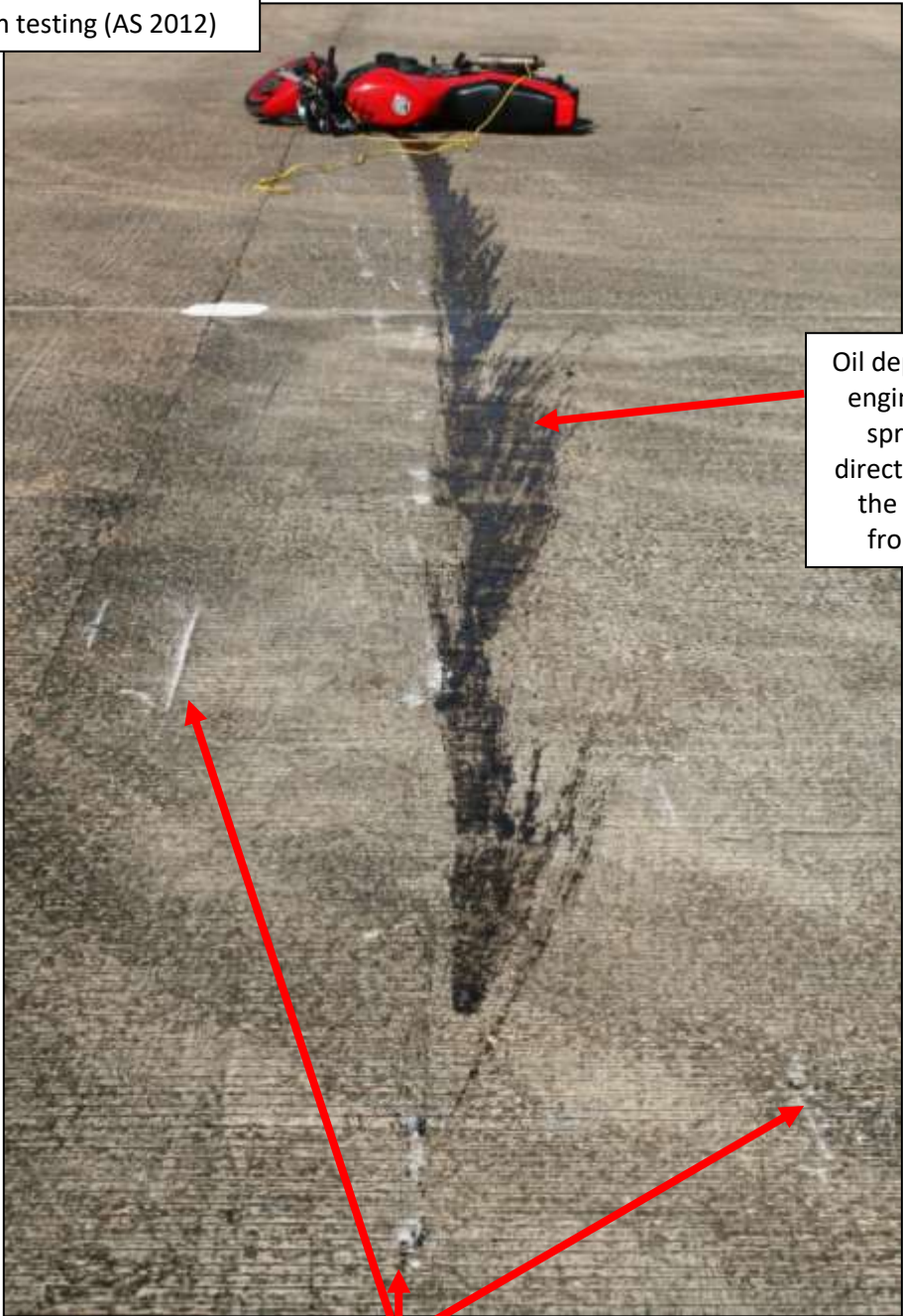
Liquid draining from damaged vehicle (vessel), as vehicle moved from impact to rest



Blood where deceased pedestrian lay, run off



Actual crash testing (AS 2012)



Oil deposit from damaged engine side cover- note spray (projection) in direction of movement of the motorcycle (away from photographer)

Scrapes



2.6.5 Wooden logs impact with road, creating evidential marks and wood debris transfer



## 2.7 Marking of the scene evidence

- 2.7.1 There is no legal method or requirement, however it is best to mark vehicles off at all four corners where possible, not at the wheels.



- 2.7.2 Deceased position can be marked at a single point, either head, foot, or belly button, or at two points, head and foot. Motorcycles and bicycles can be marked in the same manner.



- 2.7.3 Tyre marks (skid marks, yaw marks) are marked at the start and end of the mark, and at a few points along the mark, either on both sides of the mark or on one side of the mark, NOT ON the mark.







2.7.4 Debris (shoes / glass / specific items)

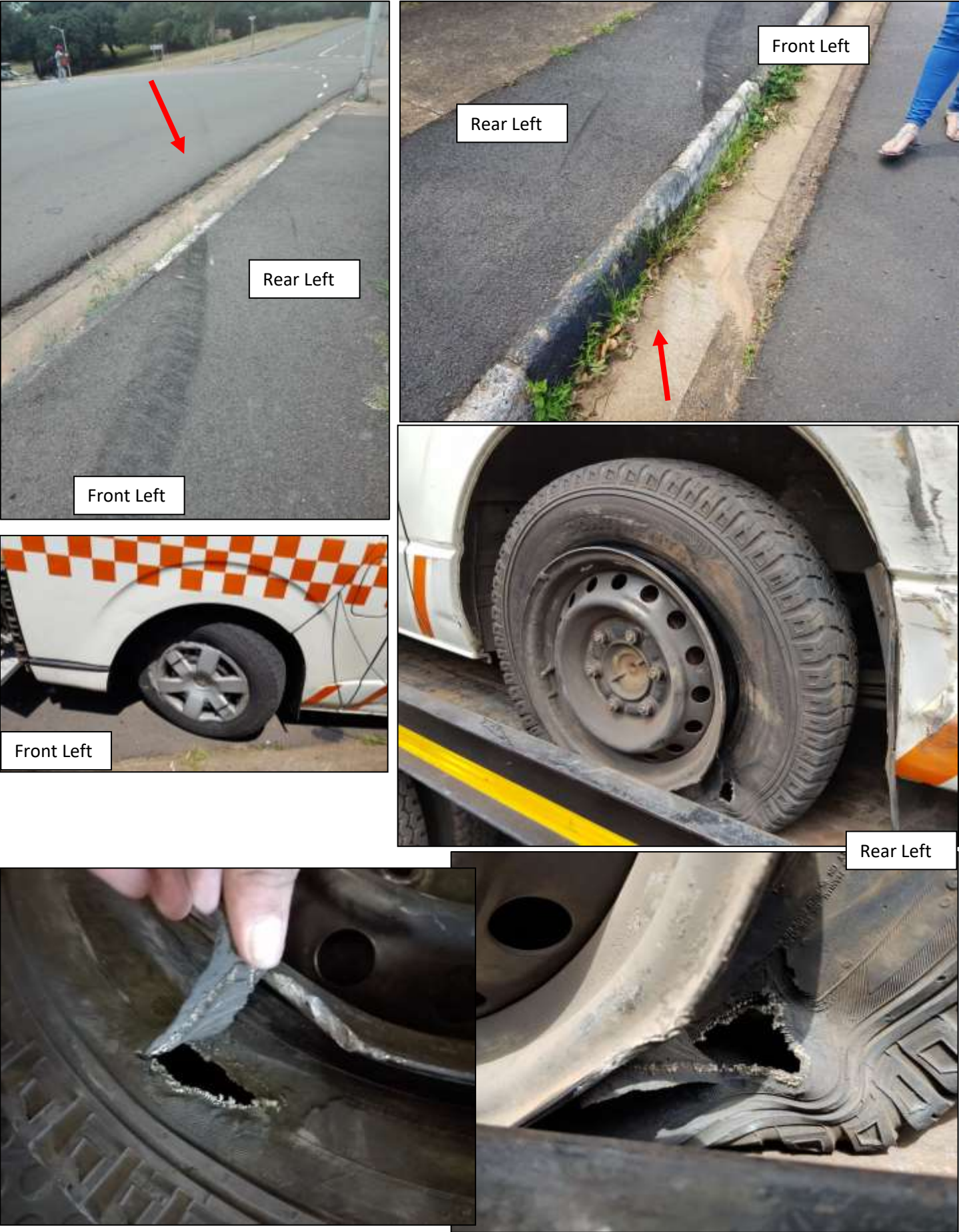


2.7.5 Pavement (Curb) strikes / mounts by tyre and or wheel





2.7.5a **Raised pavement edge / Curb strike** scene evidence and vehicle evidence - case example – Vehicle cornering right, leaves Road & climbs/ crosses the pavement edge:





- 2.7.6 Other positions, such as where it can be identified where a pedestrian first struck the ground, and then struck the ground a second time before sliding to rest

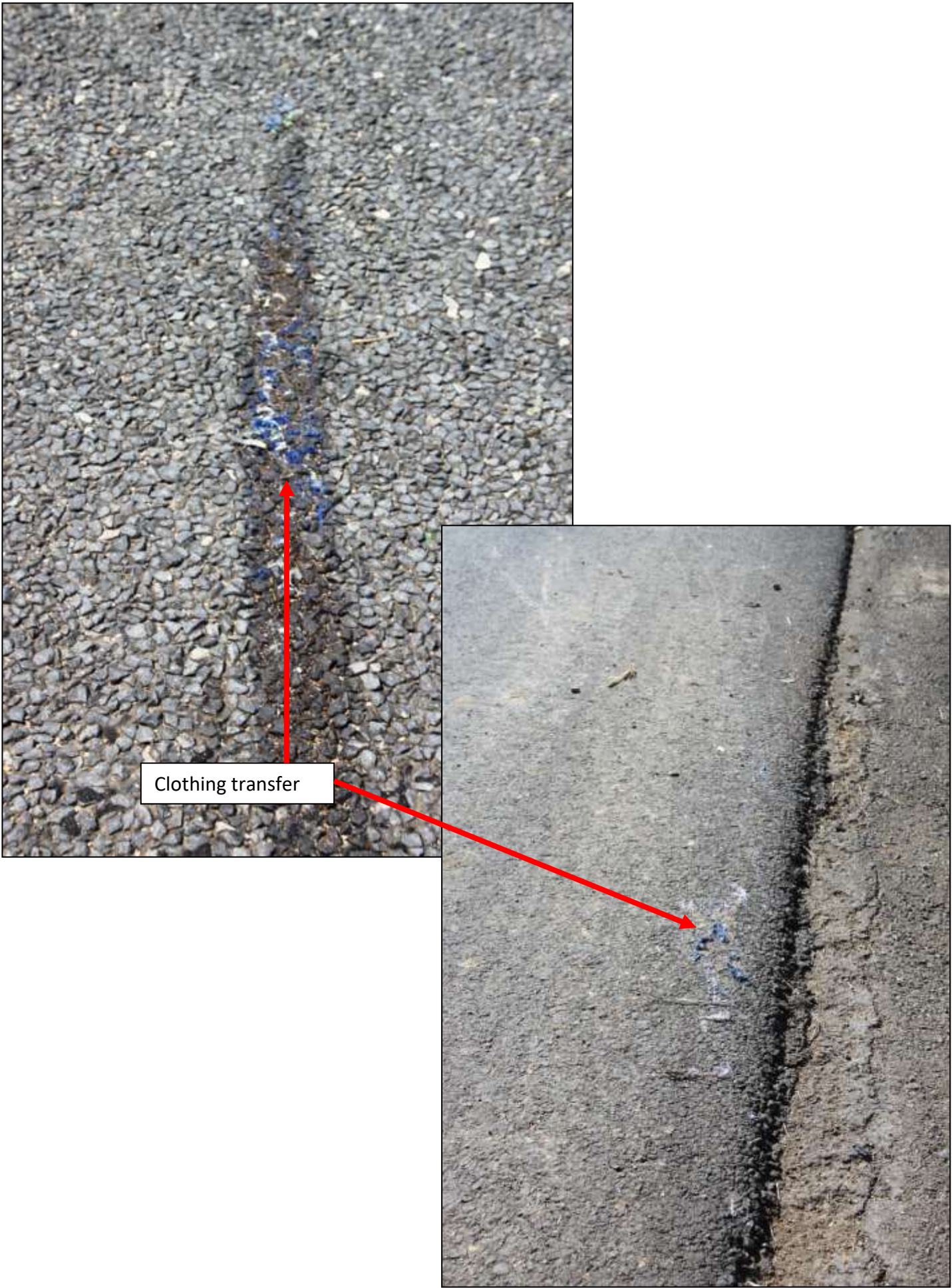


Pedestrian first impact with road



Pedestrian second impact with road





### **3 Information from vehicles**

3.1 It is crucial to record the basic information of any vehicle involved in an accident. This starts off with the following basic factors:

3.1.1 Registration number

3.1.2 Make

3.1.3 Model

3.1.4 Colour

3.1.5 Chassis number

3.1.6 Engine number

3.2 Over and above these basic initial factors, examination of a vehicle is usually the domain of technical specialists such as a mechanic, a qualified vehicle examiner or a mechanical engineers etc. Any such detailed examination reports are typically undertaken by them either on the scene or during follow up technical investigations. Nonetheless, some basic observations that can and should be made at the scene by the attending member can quite easily be listed on a pro forma type document that would list things such as:

- a) Damage location (i.e. front left, front right, rear, etc.)
- b) Damaged parts (i.e. broken right front wheel etc.)
- c) Whether it could be identified that seatbelts were present and/or worn or not
- d) Whether it could be identified whether headlights were present (on/off) or not, and likewise whether the light switch was found in the on or off position
- e) The general specifications of the tyres such as the make, size and general condition such as tread depth or any obvious defects and/or whether the tyre was deflated or not
- f) Any other specific or obvious factors that may need to be noted such as open alcohol bottles in the vehicle, how many, what type and their location
- g) General condition of the vehicle e.g. rust/previous damage
- h) Foot pedals / hand brake, gear lever, their condition
- i) Steering and components such as steering wheel, overall condition
- j) Automatic or manual vehicle
- k) Child seats: their make, type, location, condition, secured or not.
- l) Rear view mirrors, their condition.

3.2.1 There are no set parameters for a vehicle examination as this is dependent on various factors. However an example of a basic vehicle examination form that serves as reminder for light and heavy vehicles and can be adapted to as required (as set out below):

## **VEHICLE EXAMINATION NOTES: (example)**

### **Vehicle:**

Registration: \_\_\_\_\_  
Make: \_\_\_\_\_  
Model: \_\_\_\_\_  
Type / series: \_\_\_\_\_  
Colour: \_\_\_\_\_  
Odo reading: \_\_\_\_\_  
Vin No: \_\_\_\_\_  
Chassis No.: \_\_\_\_\_

Written descriptive details of damage (if necessary):

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Diagram of damage and/or damage profile measurements:

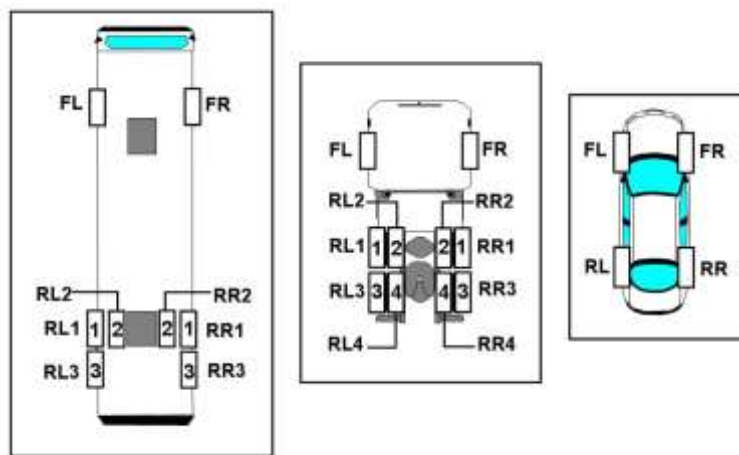
### **Note:**

**Damage examination in itself, in respect of determining the Principal Direction Of Force (PDOF), is a specific subject matter on its own.**

**Examination of vehicles from a technical perspective is an extremely wide and yet specific knowledge subject matter.**

**Many of the necessary guiding research papers & books on both issues are provided in reference material section 8**





Wheels & Tyres							
	Type / series	Date of Manufacture	Size	Inf. / Def.	Tread		
					Inner	Middle	Outer
Front Right					mm	mm	mm
Front Left					mm	mm	mm
Rear Right					mm	mm	mm
Rear Right					mm	mm	mm
Rear Right					mm	mm	mm
Rear Right					mm	mm	mm
Rear Left					mm	mm	mm
Rear Left					mm	mm	mm
Rear Left					mm	mm	mm
Rear Left					mm	mm	mm
Spare					mm	mm	mm

**If necessary, please take detailed notes and pics of tyre issues, especially if failure is indicated or suspected**

Drum and brake disc / pad thickness:

	Drum / disc Thickness (mm)	Brake Pads			
		Leading Pad / shoe		Trailing Pad / shoe	
Front Right	mm	mm	mm	mm	mm
Front Left	mm	mm	mm	mm	mm
Rear Right	mm	mm	mm	mm	mm
Rear Left	mm	mm	mm	mm	mm
		mm	mm	mm	mm

**Tyres:**

**Check tyre / wheel condition – flat spots / damaged sidewall / under inflation / missing wheel nuts etc.:**

---

**Visual inspection where possible:**

**Air Suzie's are coupled correctly and not broken or linked:** \_\_\_\_\_

---

---

**Couplings non interchangeable and trailer couplings have striker plugs to open airlines:**

---

---

**Suzie's correct colour – Red Emergency & Yellow Service. Check for presence of line tags:**

---

---

**Check park brake on truck and trailer is functioning – valve does not leak on application and release:**

---

---

**Listen for truck and trailer brake system air leaks – with truck park brake applied:** \_\_\_\_\_

---

---

**Listen for truck and trailer brake system air leaks – with truck service brake applied:** \_\_\_\_\_

---

---

**Check visible nylon piping for kinking:** \_\_\_\_\_

---

---

**Check visible rubber hoses for chaffing or tears or perishing:** \_\_\_\_\_

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**Drain truck and trailer air reservoirs daily and check for excessive moisture and possible oil:**

---

---

**Note air system charge up time – longer than usual time to charge air system may indicate compressor problem (if possible):** \_\_\_\_\_

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**Visual check that spring brakes are not “loose” – falling off brackets:** \_\_\_\_\_

---

---

**Visual check that slack adjusters are at same lever strength on each axle:** \_\_\_\_\_

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**Trailer ABS working if valves “click” on brake application or when ignition turned on:**

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---

**Permanent power – trailer ABS / EBS warning light “on” in truck dashboard – indicates ABS error:**

---



---



---

**Stoplight power – green trailer light stays on (or does not come on briefly then off when brake applied) indicated ABS error:**

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---



---

**Check under truck and trailer at wheels for loose / broken sensor cables:** \_\_\_\_\_

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**Check truck ABS dashboard light – if stays on after ignition switched on – indicates ABS error:**

---



---



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**Seats (Pictures please):**

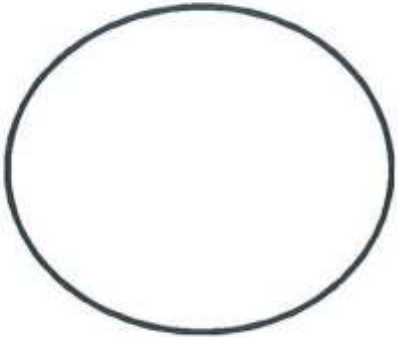

	Bucket / Bench	Back broken		Loose on track		Position on track	Seat inoperable		Integral head rest		Position of head rest		Head rest broken	
		Yes	No	Yes	No		Yes	No	Yes	No	Up	Down	Yes	No
FR														
FL														
Rear														
Other														
Other														

**Seatbelts (Pictures please):**

	Belt type		Cut: Accident	Cut: Extrication	Loading	Torn	Other
	Passive	Active					
FR							
FL							
RR							
RL							
Other							
Other							
Other							
Other							



**Restraints / Airbags (Pictures please):**Driver side SRS Deployment: Y ☐ / N ☐Passenger side SRS Deployment: Y ☐ / N ☐Transfer of driver side airbag: Y ☐ / N ☐Transfer of passenger side airbag: Y ☐ / N ☐

Air bag marking	indicate makeup, hair, flesh and other transfers
	
Driver/ "wheel" airbag	R/F airbag

**Light examinations / notes (Pictures please):**

ABNORMALITIES OF SUPPORTS, GLASS, AND BASE		FR				FL				RR				RL			
		Single	Small	Low beams	Other, if not single	Single	Small	Low beams	Other, if not single	Single	Small	Low beams	Other, if not single	Single	Small	Low beams	Other, if not single
Filament Supports	Broken																
	Bent																
	Rusted																
	Pitted																
	White deposit																
	Dirt or other deposit																
Glass	% missing																
	Loose in base																
	Darkened																
	White deposit																
	Dirt or other deposit																
Base	Damaged																
	Pitted																
	Dirt or corrosion																
ABNORMALITIES OF FILAMENTS		Single	Small	Low beams	Other, if not single	Single	Small	Low beams	Other, if not single	Single	Small	Low beams	Other, if not single	Single	Small	Low beams	Other, if not single
Broken																	
% missing or detached																	
Loose in bulb																	
End melted or tapered																	

End fractured																	
Blackened																	
Tinted or light coloured																	
White deposit																	
Moderately elongated																	
Stretched out, uncoiled																	
Fused glass																	
Pitted																	
Other, show in note below:																	
INDICATIONS AND OPINIONS		Single	Small	Low beams	Other, if not single	Single	Small	Low beams	Other, if not single	Single	Small	Low beams	Other, if not single	Single	Small	Low beams	Other, if not single
Indications	Incandescent																
	Hot																
	Cold																
	Aged																
	Burned out																
	Impact Shock																
For definite opinion, put two marks, xx, on the applicable line in the column for the filament. If the filament is possibly but not definitely off, put one mark, x, in the off line for that filament. If which one of two filaments was on is indeterminate, put one mark, x, in both the on line and the indeterminate line for each of the pair of filaments																	
Opinion																	
	Off																
	On																
	Indeterminate																

**Notes on lights:**

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**Vehicle contents of note – alcohol bottles / drugs / glasses / cigarette. etc**

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**(Pictures please)**

**Modifications – previous repairs & Other notes (improper repairs) (Pictures please):**

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**Fire Extinguisher Present:** Yes ☐ / No ☐ - Location: \_\_\_\_\_

**Emergency Hammer Present:** Yes ☐ / No ☐ - Location: \_\_\_\_\_

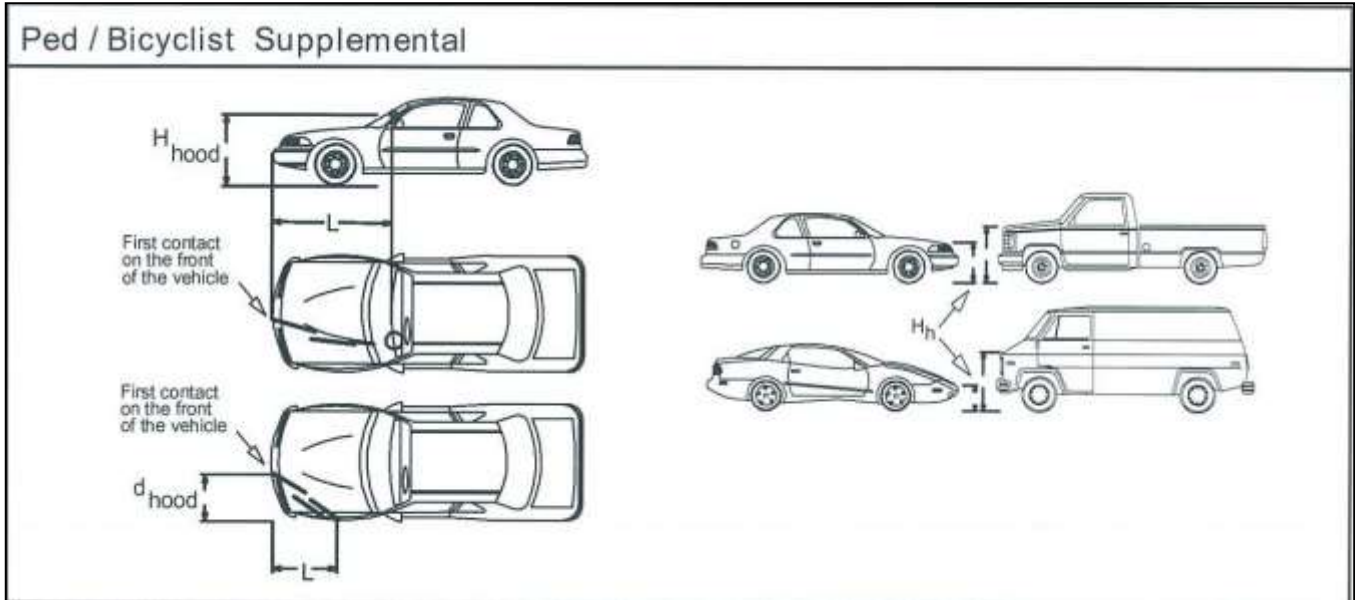
**Notice of Emergency Exits:** Yes ☐ / No ☐ - Location: \_\_\_\_\_

**(Pictures please)**

**Trem card / hazard papers / etc & mounting box if hazard chem. case:**

**(Pictures please)**

**Pedestrian / Bicycles:**



**Any other notes:**

**NB** Photograph, examine and consider information from the foreign registration vehicle or the 3<sup>RD</sup> party vehicle first, “your vehicle” is always available.



Some examples:

Pedestrian, animal, cyclist, motorcycle strike:

Animal strike

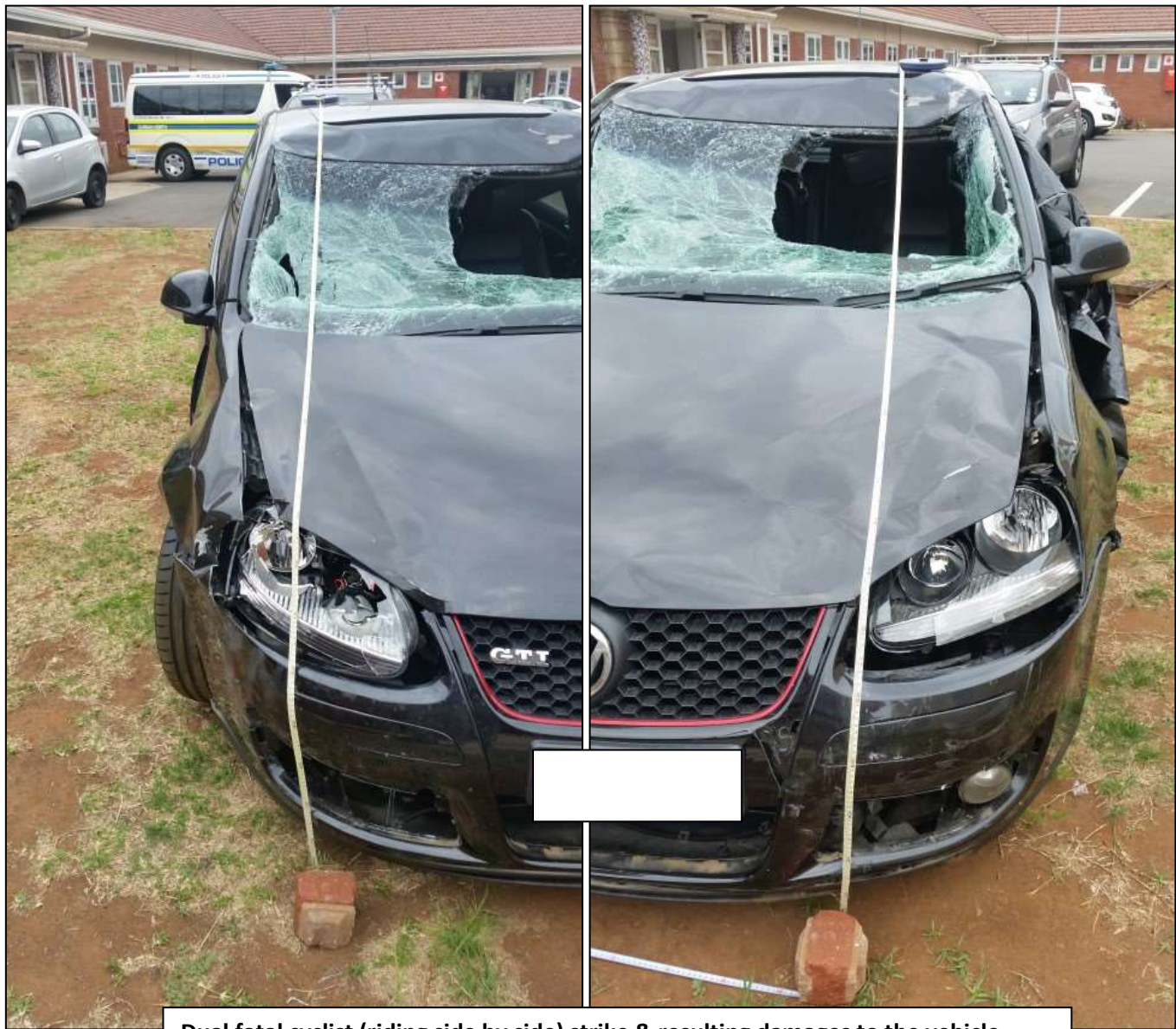


Pedestrian strike

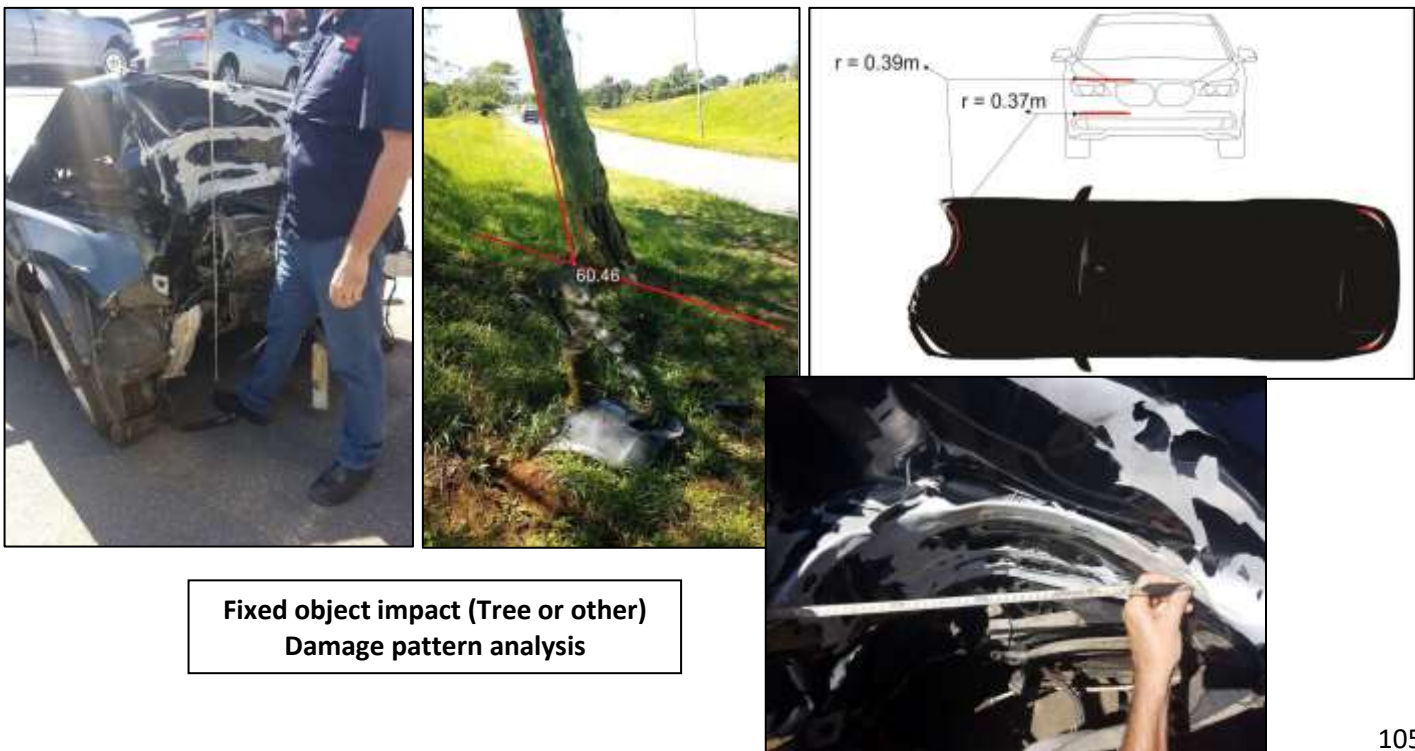


Bicycle & rider strike





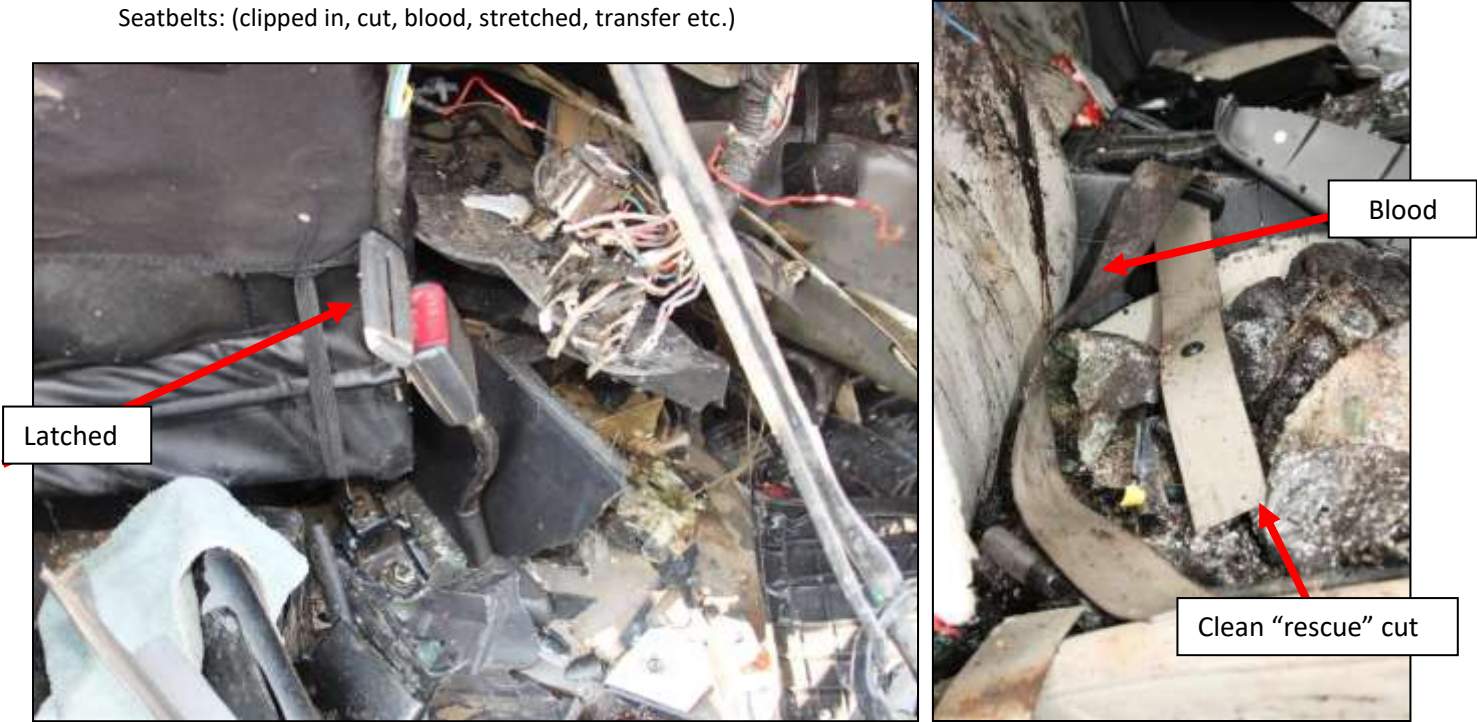
Dual fatal cyclist (riding side by side) strike & resulting damages to the vehicle



Fixed object impact (Tree or other)  
Damage pattern analysis



Seatbelts: (clipped in, cut, blood, stretched, transfer etc.)







Severe loading / High heat



Clothing transfer to belt



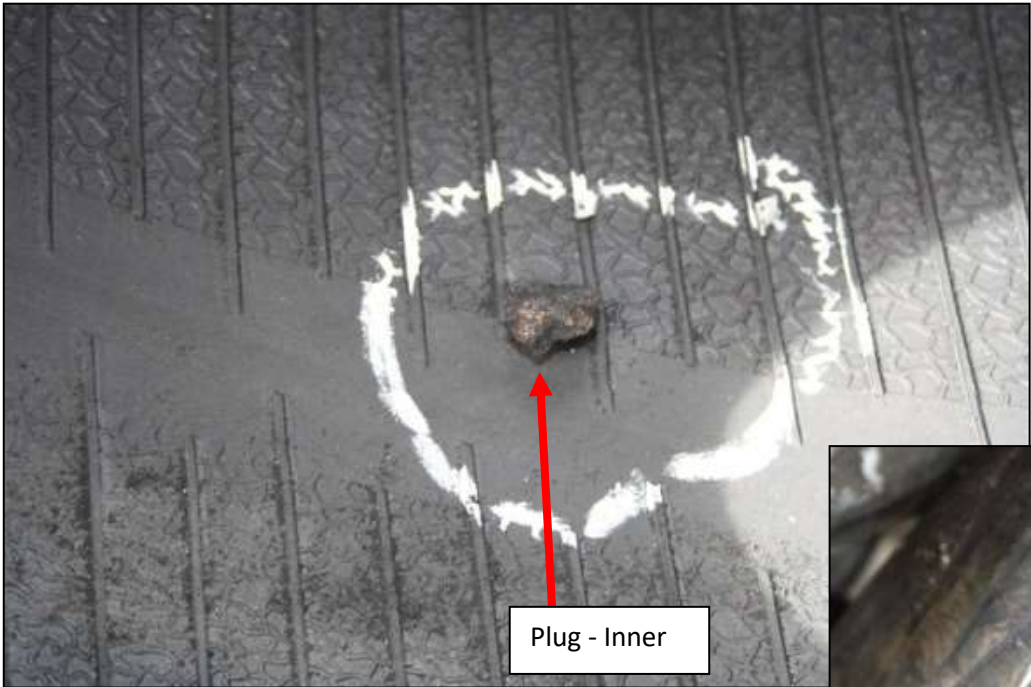
Severe loading deformation

Bulbs: (Incandescent hot flex)



Specific subject matter of its own Metallurgy – becoming obsolete due to LED technology

Tyre damage: (impact laceration, flat tyre inside and outside marks, plugs, objects etc.)



Same plug – Outer















"Slap" transfer marks

Circumferential rim damage (continued driving) and associated body panel tyre slap damage



Tyre evidence: An extensive amount of evidence can be found on tyres, most importantly, they need to be examined internally if anything tyre related is suspected.



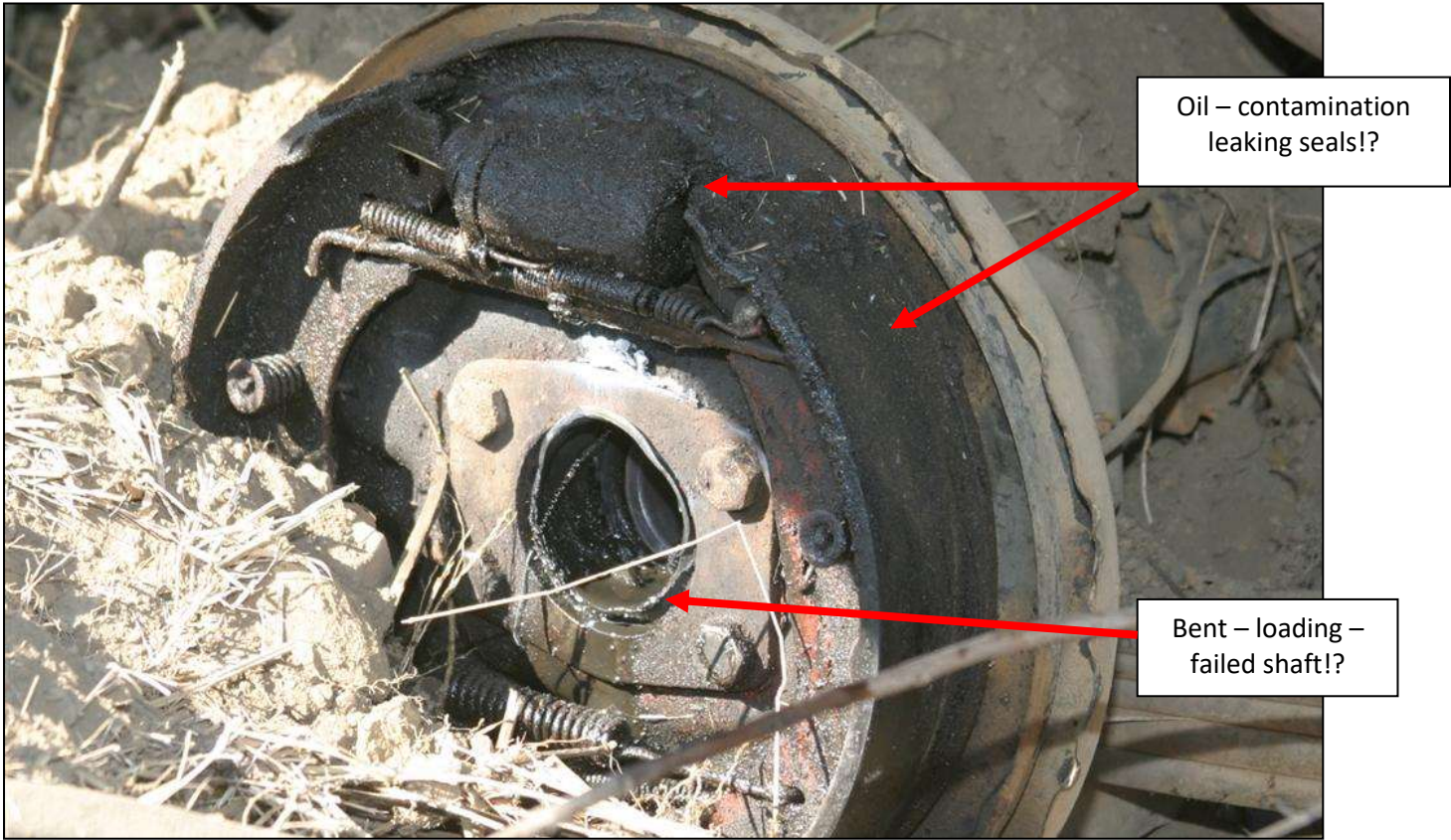
Overloading damage – bulge and “run flat” marking







Brakes: Worn pads, cracked discs, gaps between drums and pad, missing bolts etc.





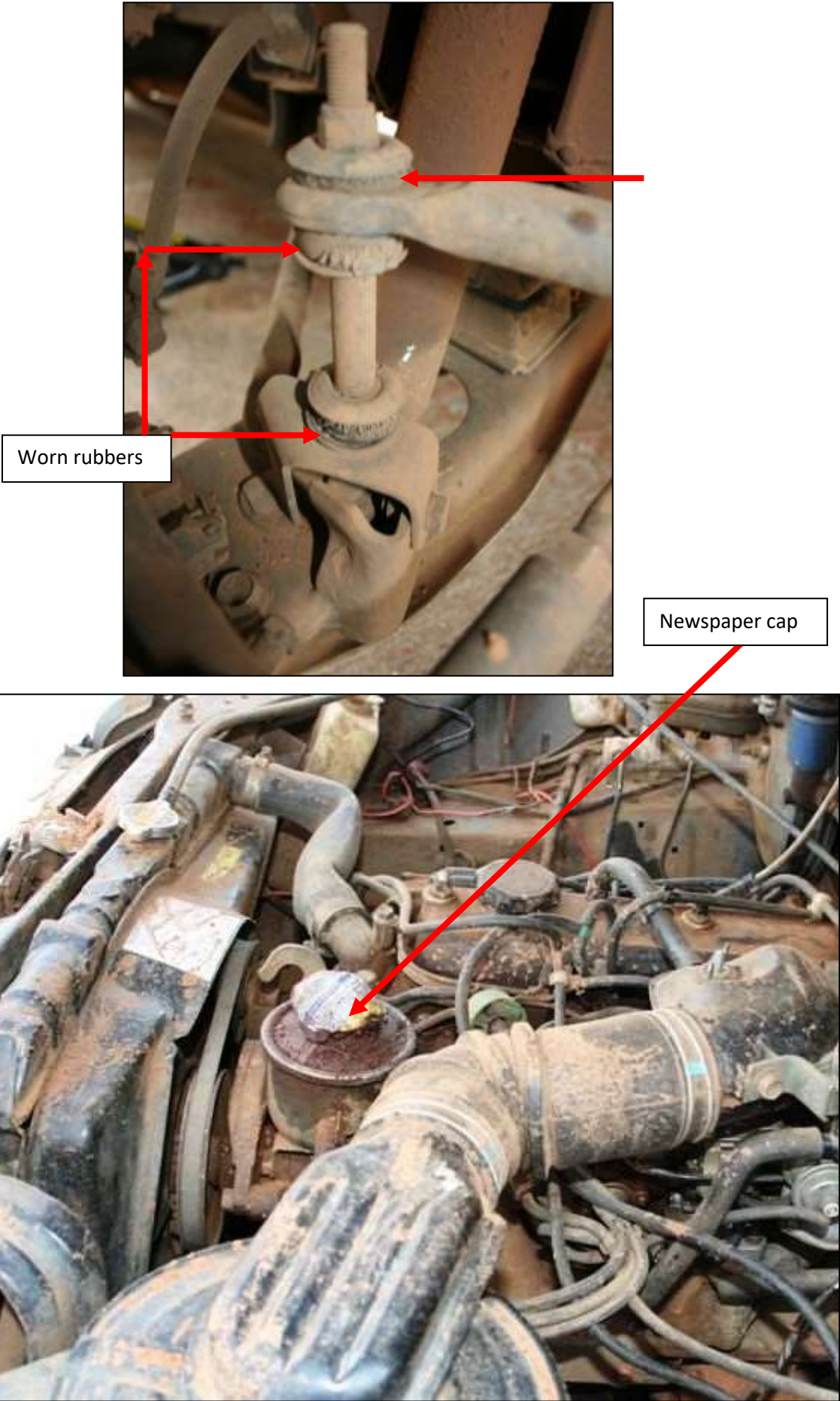
Note bluing of disc / high heat



Note: scored drum & shoe material



Steering & suspension: cap missing, worn rubbers, missing bolts etc.







Steering rack control arm, Missing nut!?

- 3.3 It is important to note that the examination of the vehicle, and your handwritten notes are extremely important, and do not take precedent over any photographs that are taken of the vehicle. Your hand written notes and photographs taken serve as confirmation of each other.
- 3.4 It is critically important that it is understood that although a vehicle examiner may examine the vehicle and have specialist knowledge of the vehicle and the mechanics thereof. The examiner is very often guided by the on-scene attending member's indications of various factors. For example, where the on-scene member can confirm to the vehicle examiner that a long set of brake marks appeared to be made by this particular vehicle, the examiner can then check the tyres and the braking system for evidence thereon of braking, and likewise the vehicle examiner would then know to take into account the width of the tread and likewise the track width of the vehicle in order to assist the on-scene attending members and/or any follow up investigations in confirming that the tyre braking marks evident in the scene were from this particular vehicle, among various other factors.
- 3.5 Likewise, where you yourself may not be taking the various photographs of the scene itself and/or vehicle itself, where you are at the scene of accident and may be present where these are done. It is important that assistance be given to the photographer in his taking of the photographs as there may be certain factors that he may not be aware of, has simply missed, or likewise that he is somewhat preoccupied with his own safety on the scene and therefore is not necessarily paying attention. Assistance to the photographer in all of these aspects often creates an excellent photography listing of the scene.
  - 3.5.1 **Far too often it is noted that of 20 or 30 photographs taken, the majority of these are simply of the bodies and close up of the bodies within the vehicle and that very little or no photographs of the evidence on the road surface such has been recorded at all.**

### What is this?





Other evidence:



Beer & wrappers & purchase receipt







Hand grinder – attempting to replicate slide / rollover scratching



## 4 Information from people

### 4.1 Speaking to and/or obtaining information

#### 4.1.1 People in anyway related to the accident are generally classified into four sections, namely:

4.1.1.1 **Driver:** the person who drives the vehicle, or who is physically in control of the vehicle.

4.1.1.2 **Passenger:** any person in or on a vehicle at the time of the accident.

4.1.1.3 **Witnesses:** any person other than the driver or passenger of the vehicle who was at the scene and actually witnessed the accident or some events leading to the accident. Such as drivers or passengers in other vehicles or pedestrians standing nearby.

4.1.1.4 **Acquaintances:** these are any persons other than the driver, passengers or witnesses who are acquainted with the people or vehicles connected with the collision, or know of some result or other circumstances relating to the accident. A further example of this may perhaps be a bar tender at a local pub where the driver may have been drinking immediately prior to the accident.

4.1.2 The locating and identifying of all of the above persons is crucial to the proper investigation of the accident. It may not be necessary that you yourself formally obtain a statement from these people at the scene. However it is crucial that they be identified and that at least their contact details be obtained, this will include:

4.1.2.1 Full names

4.1.2.2 Identity number

4.1.2.3 A landline number

4.1.2.4 Cell phone number

4.1.2.5 Email address

4.1.2.6 Physical address

4.1.2.7 Postal address

4.1.3 Where it is necessary that you obtain specific details from these people, perhaps for some particular reason, the following “questionnaire” will assist you in establishing in what category the person that you are speaking with, falls or will simply assist you in asking pertinent questions.

#### 4.1.3a

General First Questions of Anyone at the Scene	
1. How did you first know about this collision?	Reveals relationship to collision. Indicates perception of hazard.
2. Where were you at that time? A. In the vehicle? B. Elsewhere?	Indicates ability to observe. Helps to identify the driver. Locates the informant.
3. What were you doing? A. In the vehicle B. Vehicle movement on road C. As a bystander or passer by	Shows opportunity to observe. Helps to identify the driver. Describes vehicle movement. Confirms relation to collision.
4. What is your name?	Identifies informant for future questioning if necessary.
5. Where do you live?	

Any person in Involved Vehicle	Bystander or Passer By
1. Which direction were you traveling before the collision?	1. Show me where the vehicle (pedestrian) was when first seen by you.
2. Who was driving the vehicle you were in?	2. What was he (it) doing at that time?
3. What was he (you) planning to do?	3. If you saw the actual collision, show me exactly where it occurred.
4. How did he (you) try to avoid the collision?	4. Show me where the vehicle (pedestrian) came to rest.
5. Show me exactly where the collision occurred.	

- 4.1.4 Extensive efforts should be made in determining exactly who the driver is, who the passengers are, who the witnesses are, and where necessary who the acquaintances are. If these factors are not located immediately at the scene, it inevitably becomes more difficult to find and obtain a person's details and likewise their cooperation.
  - 4.1.4.1 It is also important to note that these people may also be located by other means, such as through security camera video footage, through recording of registration numbers and thereby establishing who was in and/or driving the vehicle at the time, and by general questioning of surrounding people.
- 4.2 It is extremely important to note that obtaining details from any persons is a learned and practiced process particular to certain situations. However some key factors to remember when questioning people are as follows:
  - 4.2.1 Explain who you are.
  - 4.2.2 Explain your objective.
  - 4.2.3 Be positive.
  - 4.2.4 Be specific.
  - 4.2.5 Do not argue.
  - 4.2.6 Do not suggest answers.
  - 4.2.7 Be diplomatic and understanding.
  - 4.2.8 Be adaptable.
  - 4.2.9 Note the person's general demeanour, clothing, and attitude for your own reference so that if necessary you can validate that that you spoke to that particular person.
  - 4.2a A helpful thing to remember is to take a few extra "overall pictures" of the scene that included the various people at the scene that are standing around that you may have spoken to, or wish to identify.**
- 4.3 Certain pro forma questionnaires are easily available, or can be formulated by yourself and are often an easy method for obtaining information from people about the accident. It must be remembered that although pro forma questionnaires are of great assistance, these should not be seen as the only or correct method as each scene differs from one another. However making use of pro forma questionnaires allows at least the basic collection of information that can be followed up at a later stage.
- 4.4 Information from people can include noting in writing, from their description or your own visual observation or by photography, injury patterns. Some examples below:
  - 4.4.1 Mrs Smith suggests that she has bruising across her chest from shoulder across and down top her left hip;
  - 4.4.2 Mrs Smith suggested, and showed the writer, that she has bruising across her chest from shoulder across and down top her left hip;
  - 4.4.3 Or, photographs as exemplified below:





Front seated passenger injuries



Window winder handle strike



"A" Pillar head strike



Lower dash – knee strike



Airbag and airbag cover injury  
(Confirmed in actual case –  
BMW vehicle)



Pedestrian slide ("Road rash")

- 
- A collection of various camera accessories including lenses, a flash, a camera body, and a remote control.

- a) As a permanent, accurate, unbiased record of something specifically observed by an investigator.
- b) To capture the detailed appearance of something such as a mark on the road or damage to a vehicle, which may later reveal significant details that were not observed at the time the photo was taken.

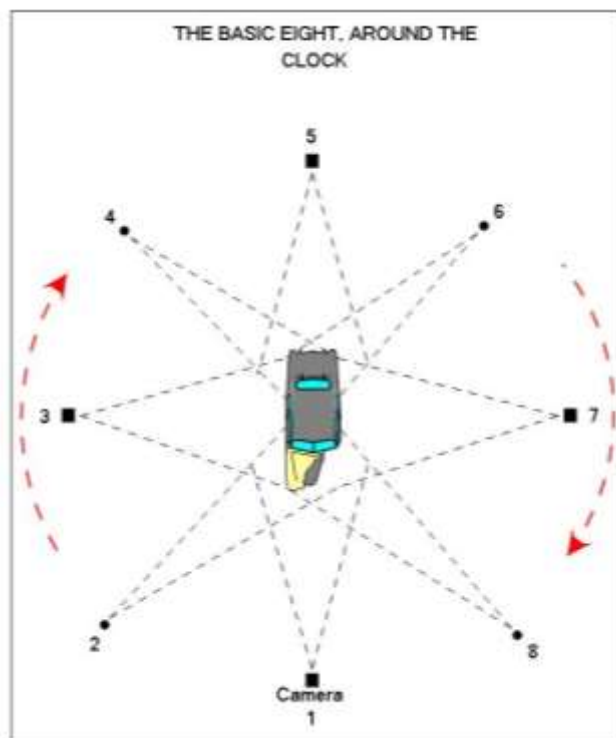
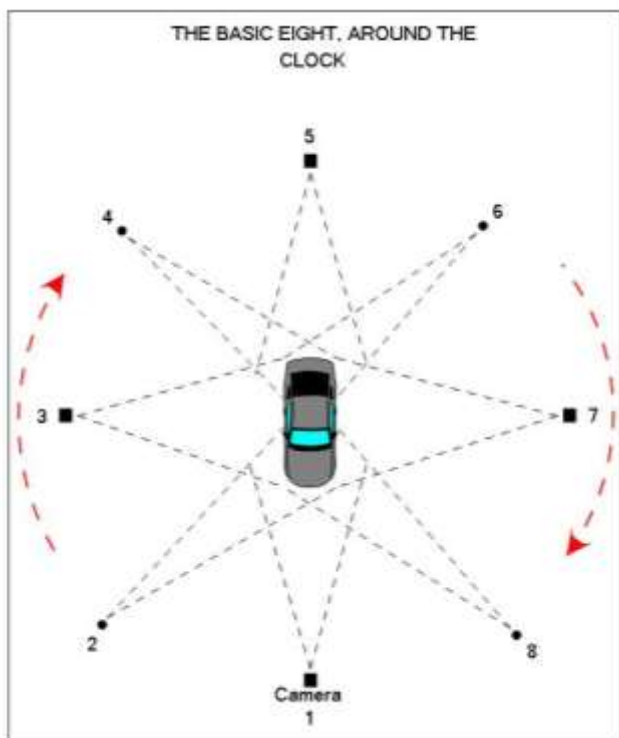
- 5.1.1 Photography need not be undertaken at the level of a fully trained professional photographer (that is a level of specific training on its own) to be useful. Very often it is the member of public images that are used, where a scene may not have been photographed properly. However, having a good grasp of what to photograph, how to photograph will always be an excellent way of attending a scene properly.
- 5.1.2 As has been highlighted at the equipment, although a full manual professional camera is the best equipment, even the images taken carefully on a cellular phone can suffice.

- 5.2.1 The damage to the vehicles involved in the collision is photographed to help reconstruct the collision. It is preferable to take photographs of the vehicles whilst they are at the accident scene and before they are moved away. This will eliminate the possibility of photographing damage to the vehicle that was caused when it was moved, or the vehicle being tampered with.
- 5.2.2 Taking photographs at the scene will also tend to show the relationship of damage to other vehicles or fixed objects, with which damage vehicles are engaged or struck. Photo records are essential because if data interest shifts to other areas not listed on the form, photo interpretation can update the report. They also verify the report data.
- 5.2.3 Reasons for photographing damage, is to help reconstruct the collision, and or to evaluate the probable cost of repairs.
  - 5.2.3.1 In reconstruction, we want to know such things as how one vehicle fitted against another vehicle or fixed object at maximum engagement and from what direction the major force (PDOF) came, or whether it was involved in more than one contact during the collision.
  - 5.2.3.2 In evaluating the cost of repairs for financial responsibility assessments or claim settlements, one wants to know what parts will require replacement.
- 5.2.4 As an on scene investigator one needs to establish what needs to be photographed first and where one needs to start photographing the scene. **A good way to remember is to photograph the short lived evidence first and the evidence that is not short lived can be done later.**
  - 5.2.4.1 One should also try mark off the scene first, and then photograph the scene. This allows the marks made for the various positions to be identified in the images, and therefore confirming them.

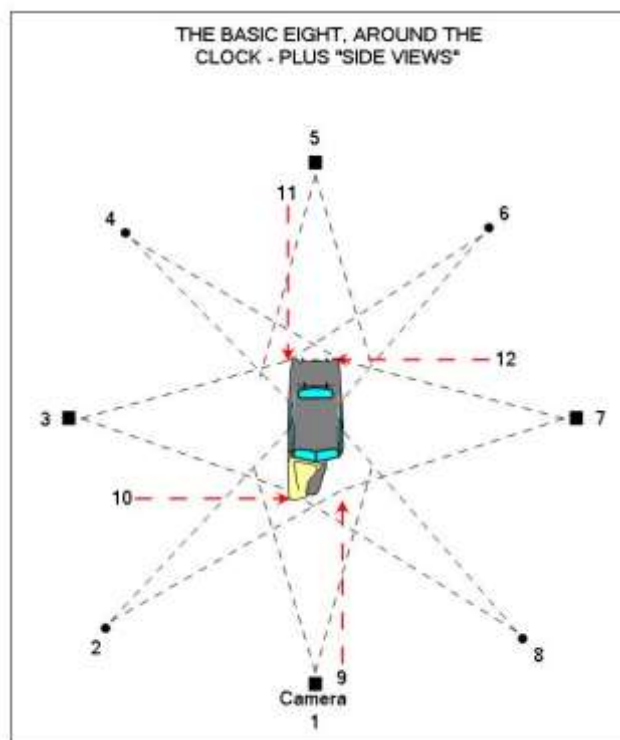
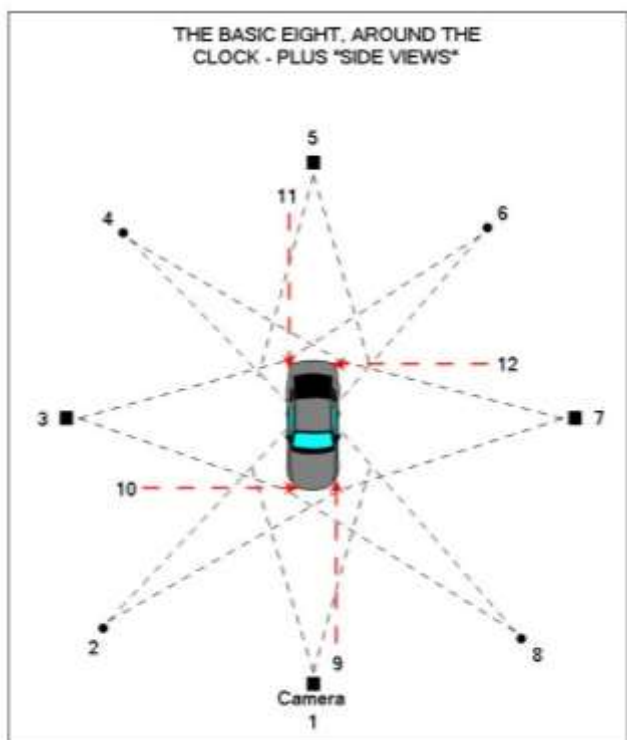


5.2.4.2 Sometimes it's necessary to delay taking the photos up until the road surface is clear of debris. Sometimes marks on the road surface are obscured by debris, water, and other foreign objects. Be aware of this and take pictures before this.

5.2.5 For a complete photographic record of the case vehicles, it is recommended that descriptive photographs of the vehicle be taken around the vehicle in the following fashion:



5.2.5.1 Try and teach yourself to start with the same set of images every time you photograph a vehicle, the basic 8 around (look carefully at the image above and the pictures indicated by number) the vehicle as set out above, followed by a further four as below:



5.2.6 These pictures are then followed by specific pictures as required, some inside and outside example pictures are shown below:



Close ups should be taken in conjunction with marking or labelling the part you are photographing where possible



Driver

### 5.3 At Scene Photographs

5.3.1 The most important and often the most difficult collision photographs are those taken at the scene before the vehicles have been removed. These record facts about the situation more accurately, in greater detail, and more quickly than any observer possibly could. These photographs are difficult to obtain due to all the scene activity and obstruction from other vehicles and people. If possible, take pictures while all activities are in progress (usually medical treatment and body recovery) then wait until all emergency and immediate work is complete, clear the scene of people and vehicles (emergency) and take “clean” scene pictures.

#### 5.3.2 Basic at scene pictures

5.3.2.1 The particular purpose of on scene pictures is to show how the situation looked when vehicles came to rest after the collision, how objects were arranged and how things were related to each other. Likewise what physical evidence such as tyre marks, scratch, scrape and gouge marks etc were evident. Thus, the main purpose of at scene photos, you will need at least one and possibly several general views showing how things were. Therefore plan these photographs to show a combination of two (2) or more of the following:

- Final positions of rest of vehicles and bodies
- Signs of the collision on the road
- Signs of the collision on the roadside
- Recognizable landmarks such as traffic signs which will identify the location on the road
- The view that a driver may have had approaching the first contact point or the place where the vehicle left the road.





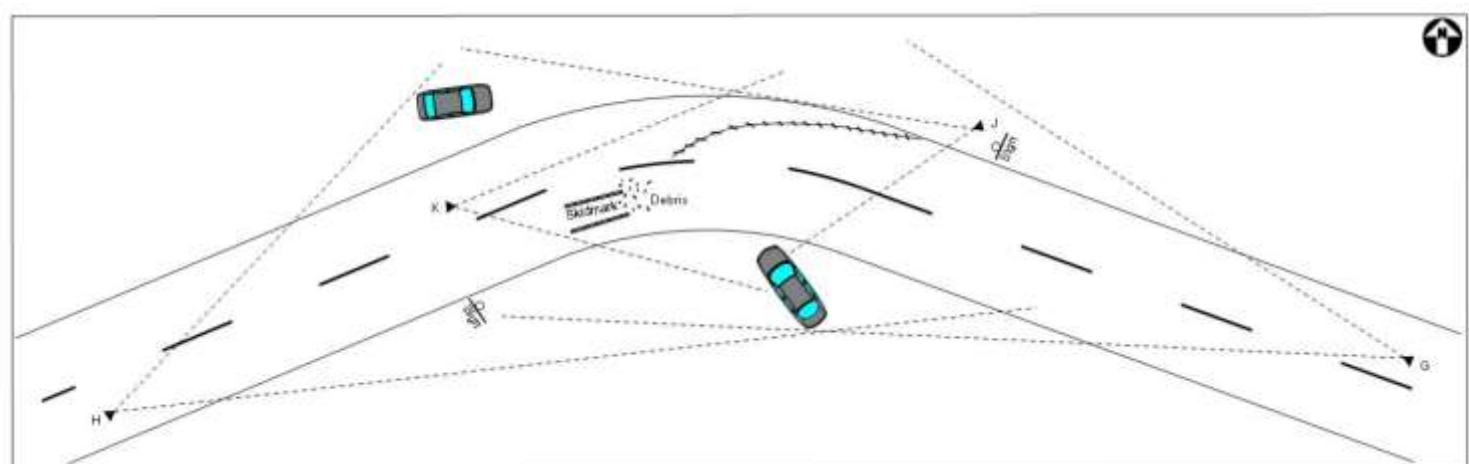
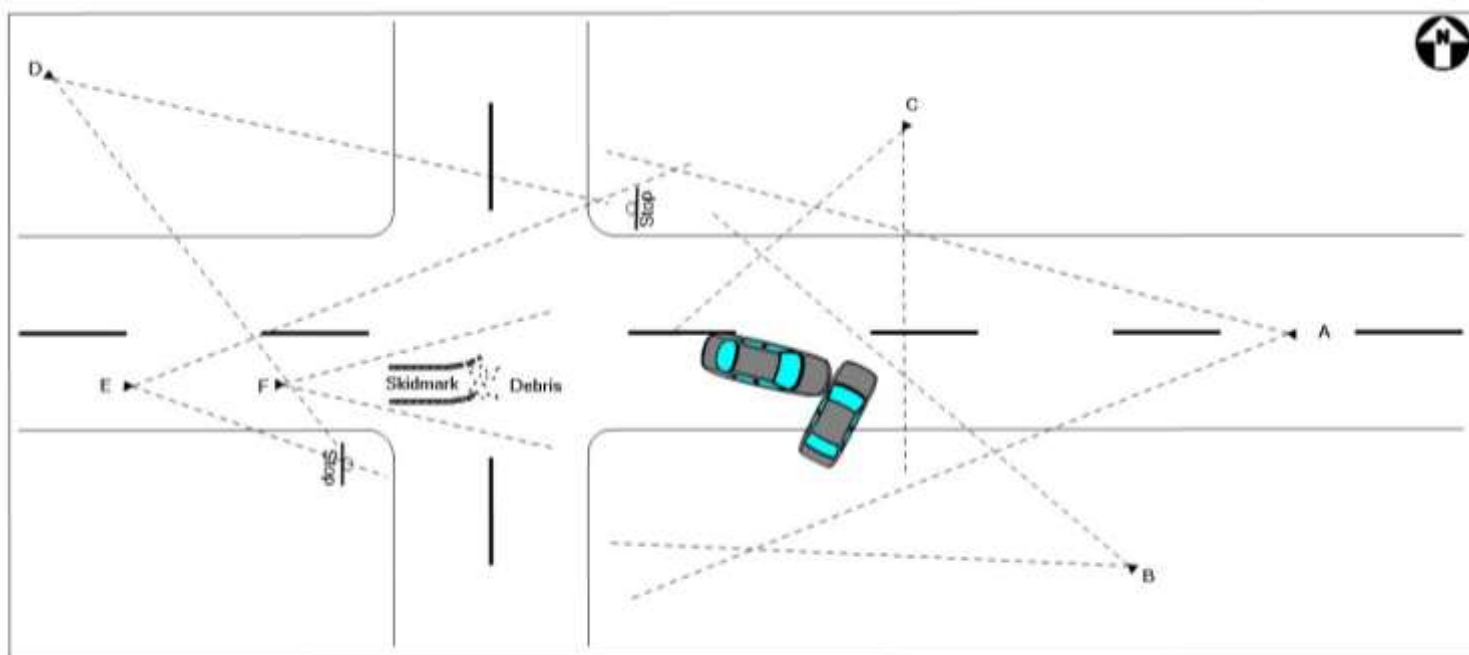
Good example of an overall scene image



5.3.2.2 An excellent way of photographing the scene is to start photography from the original direction of each vehicles approach, away from the scene from a distance of about 200 meters, the walk towards the scene take pictures ever 10 – 20 meters, you may also want to use road surface or road side markings to indicate your distance as is shown below:



5.3.2.3 For a complete photographic record of the scene, it is recommended that descriptive photographs of the scene be taken from the camera positions shown below:



5.3.2.4 **Night time photography** can be somewhat more difficult and is a skill learned, where flash fill and time laps photographs allow excellent night photography. However, making use of torches and headlights will greatly assist. Try not to have any lights facing towards the camera as this causes difficult, with camera focus. Some examples are set out below





### 5.3.2.5 Aerial examples:

#### 5.3.2.5.1 Helicopter



Remote control aerial vehicle with remote camera



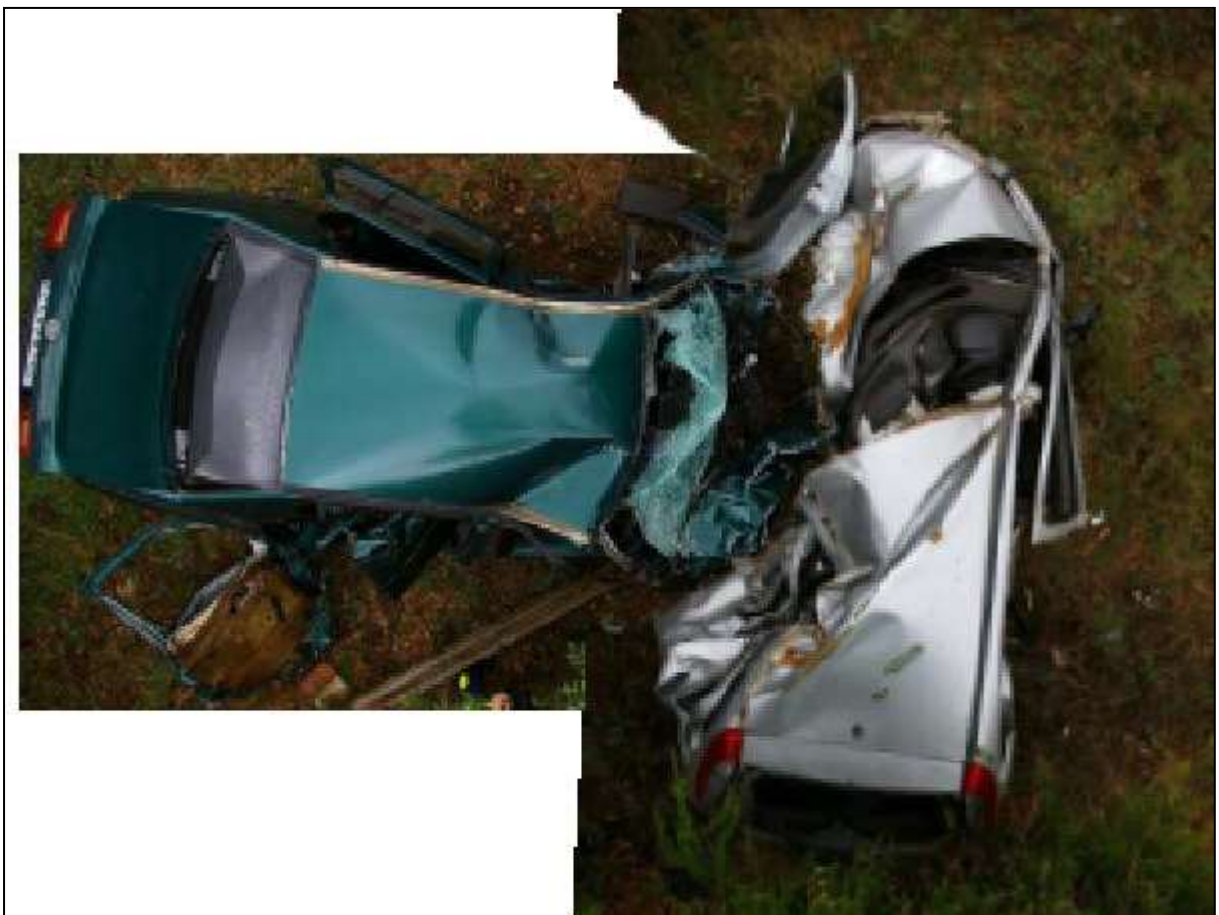


5.3.2.5.2 Link-stick





5.3.2.5.3 In the following images, a link-stick was used for an “aerial” image of each vehicle, software was then used to overlay and “fit” the vehicles into/onto one another to show the orientation of the vehicles in order to determine how the impact damages were incurred.





## 6 Measuring and drawing of the scene

### 6.1 Basic theory, methods and examples

6.1.1 One of the most important aspects of the entire accident investigation process is taking and recording of accurate and adequate measurements during the on- scene investigation.

6.1.2 There are basically five (5) kinds of accident results that one should look for:

6.1.2.1 Locations of vehicles

6.1.2.2 Locations of deceased or injured persons

6.1.2.3 Tyre marks, including skid marks, yaw marks, scrubs marks, ruts and furrows.

6.1.2.4 Damages to the roadway surface and roadside objects.

6.1.2.5 Debris, such as patches of glass, liquids and dirt; personal belongings; broken and detached vehicle parts and load spillage.

6.2 A field sketch should be completed on the scene. This is a rough drawing made quickly and as soon as possible after the investigator arrives on scene (Proportional – or as accurately as possible in a sketch). The prime purpose of a field /rough sketch is to record the positions and measurements of items that will soon be moved, lost, destroyed, altered, or mutilated.

6.2.1 Field sketches must also clearly show the distances and relationships between items at the accident scene. These items include bodies, debris, marks on the roadway, objects on or beside the roadway, roadway markings, ditches, obstructions and any other type of physical evidence that has or might have bearing on the accident.

6.2.2 The important requirement of a field sketch is to provide the investigator with adequate data to complete an accurate scale diagram.

6.2.3 When preparing a field sketch:

6.2.3.1 Include only that what is seen at the time the sketch is made.

6.2.3.2 Do not include objects and features from other situations.

6.2.3.3 Indicate an area or approximate point of impact based on scene evidence and/or the statements of witnesses.

6.2.3.4 Draw objects that are relative in size and distance (proportional – see 6.3 below)

6.2.3.5 Decide on the method of taking measurements, i.e. triangulation or the base line method.  
**These will be discussed later**

6.2.3.6 Identify and measure from a clear fixed point, identify and list this fixed point

6.2.3.7 The person who records measurements to be placed on the field sketch should be the person who reads the measurements from the measuring device.

6.2.3.8 Take accurate and sufficient measurements to satisfy the investigation.

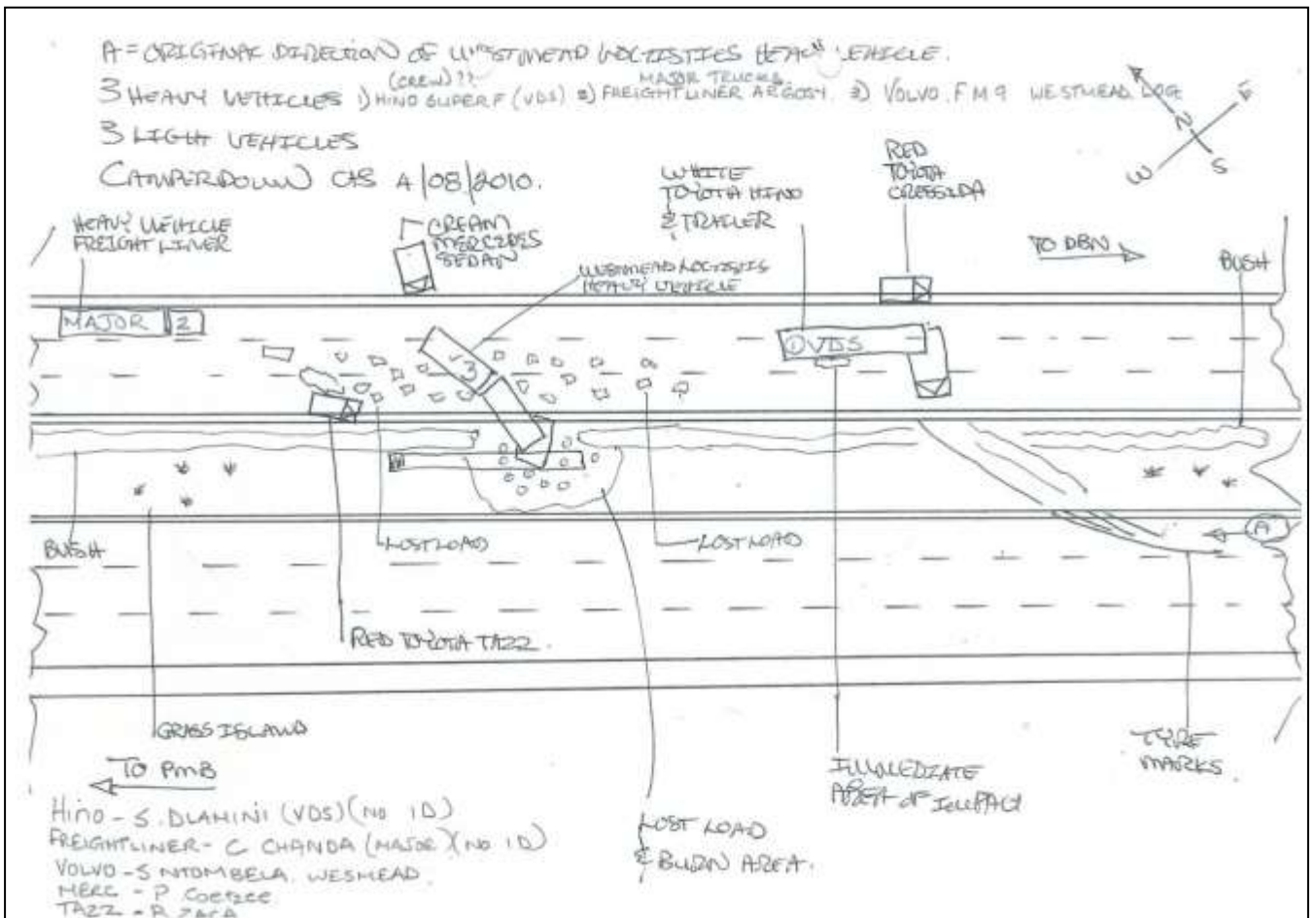
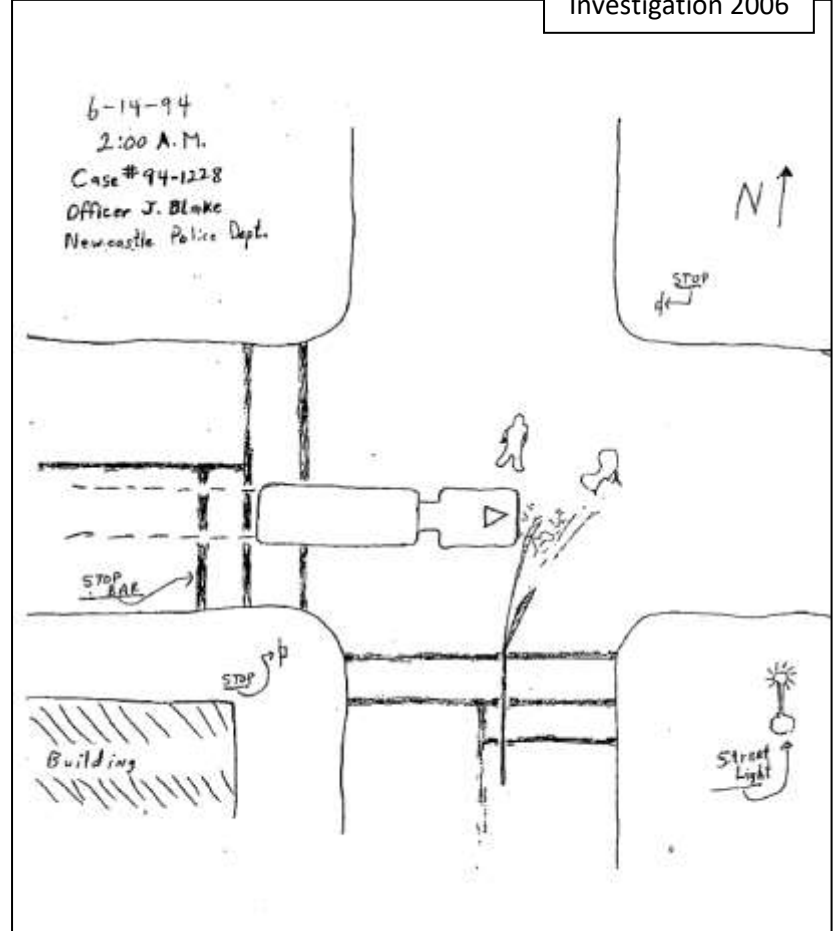
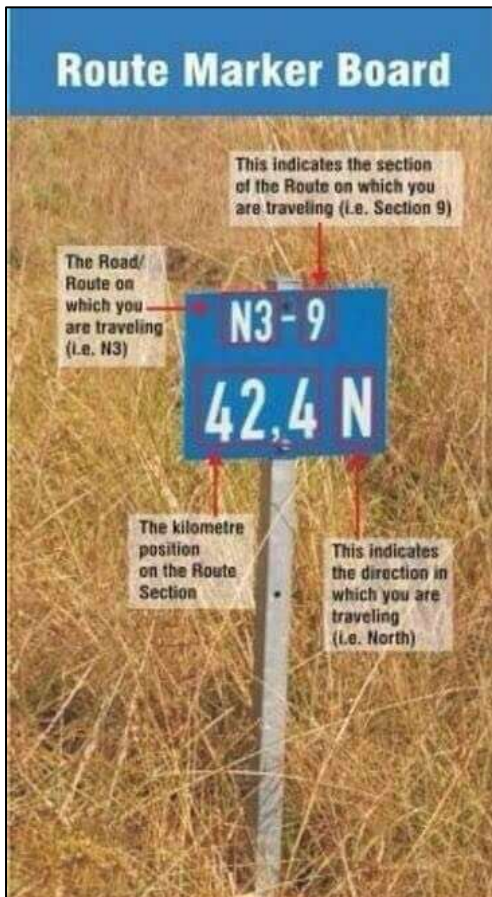
6.2.3.9 Use the symbols as shown in section 6.3 below.

6.2.3.10 Complete a field sketch as neatly as possible. Once it is completed, do not remake it for the sake of neatness as this affects the validity or admissibility in court.

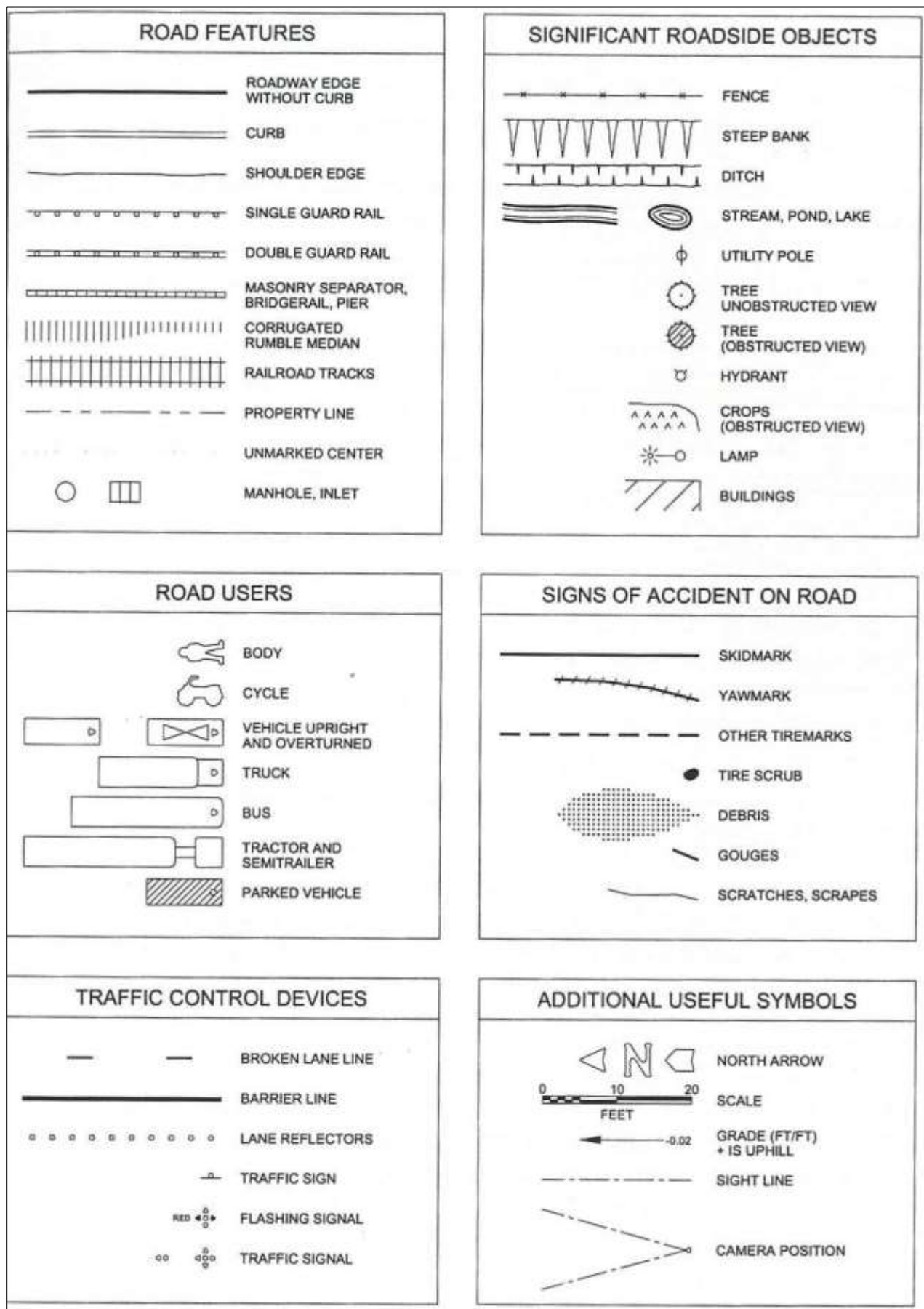
6.2.3.11 Include a north arrow on the sketch, or if this is not known, included directions i.e. to Cape Town, to Bloemfontein

**Example of field / rough sketch without measurements**

Traffic collision  
Investigation 2006



- 6.3 The descriptive images below are generically recognised drawing symbols and serve as an indication to the diagrammatical symbols useful in preparing field sketches





## 6.4 Methods of measuring

### 6.4.1 Triangulation method

This is a method of locating a point or a spot on an item of evidence or within an area by measurements taken from two or more reference points (tangible or intangible). The locations and types of reference points used must be identified for future use.

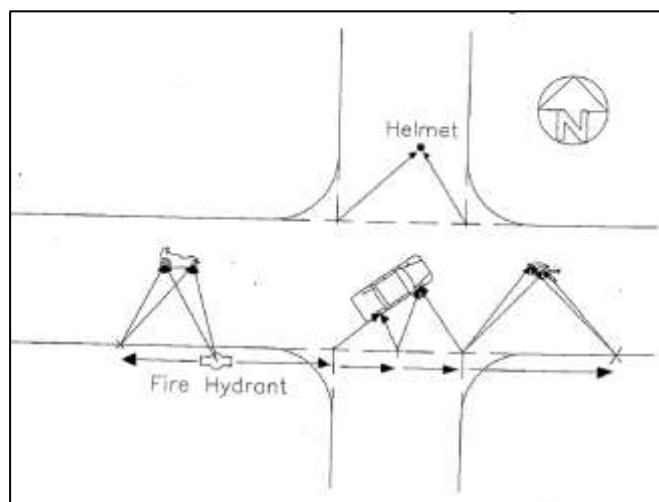
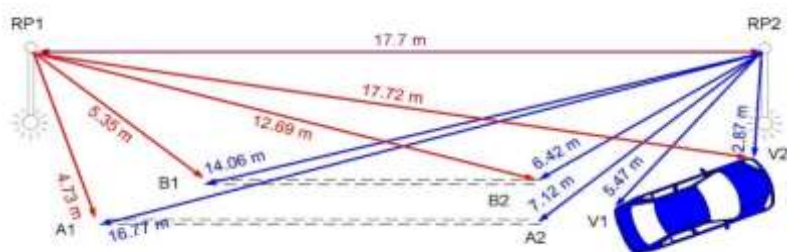
6.4.1.1 There are 3 basic steps in measuring by triangulation:

6.4.1.1.1 Locate 1 or 2 tangible (permanent) points or one tangible and one intangible reference point on or near the roadway edge, constructed baseline, or feature that is being used as a baseline.

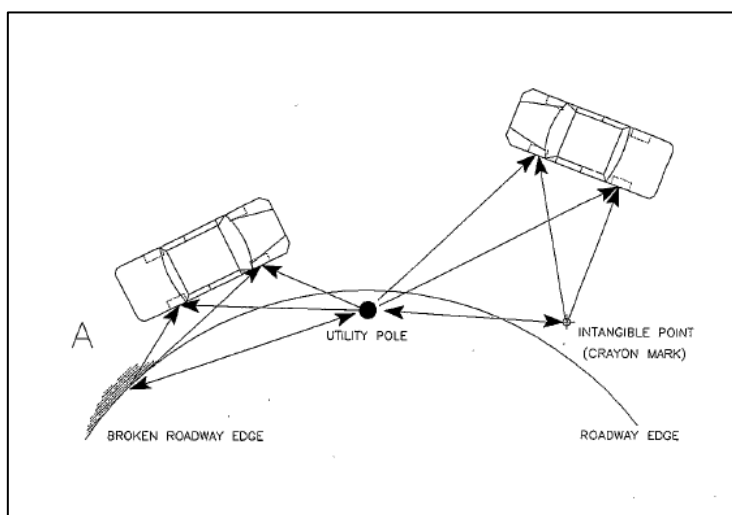
6.4.1.1.2 Measure from each reference point on the object or item of evidence being measured to.

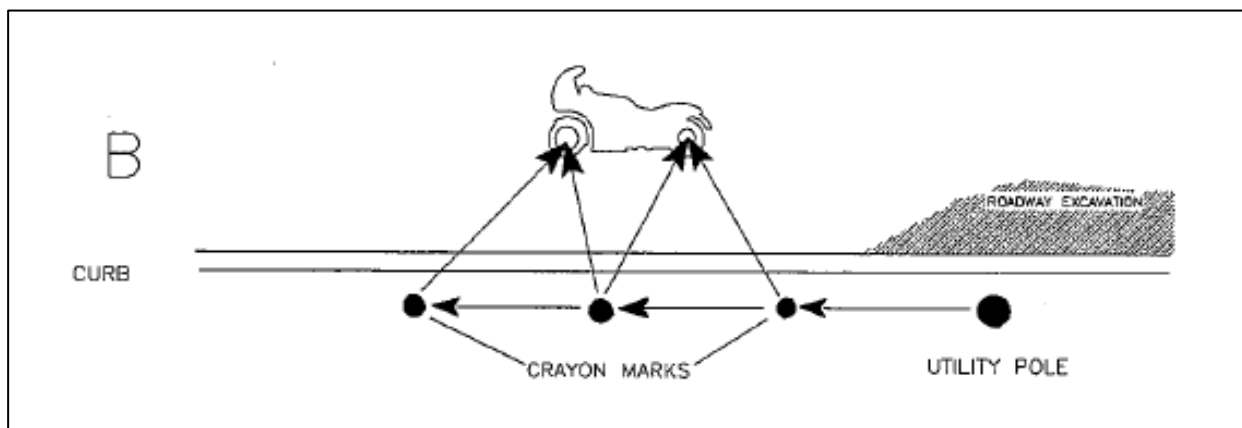
6.4.1.1.3 Measure in a direct line between the reference points to form a triangle.

**The use of triangulation to fix the positions of the items of evidence on the rough sketch**



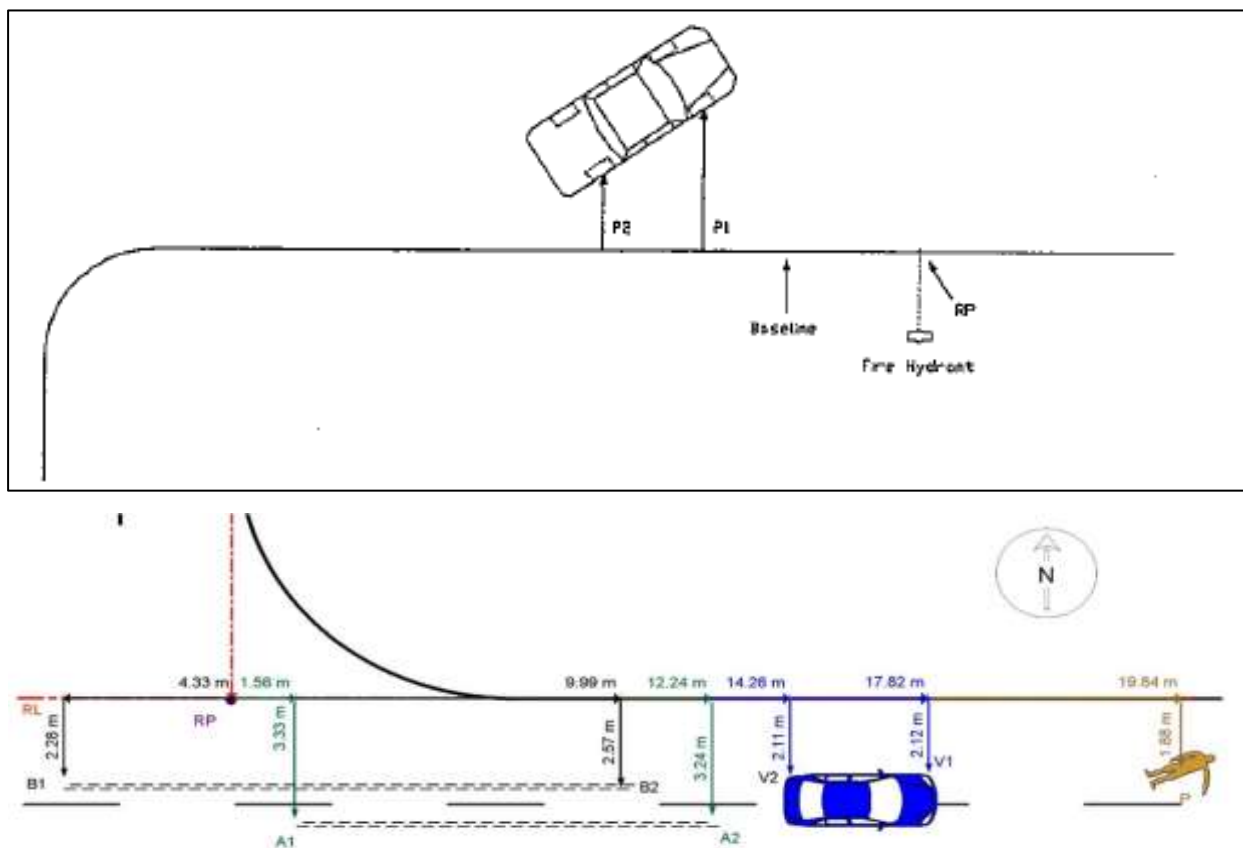
6.4.1.2 In both the diagrams A and B below, the use of a combination of *tangible* and *intangible* reference points are shown to fix positions from which to make measurements. The utility poles and the broken roadway edge are *tangible* reference points, the crayon marks on the roadway and along the curb edge are *intangible* reference points.



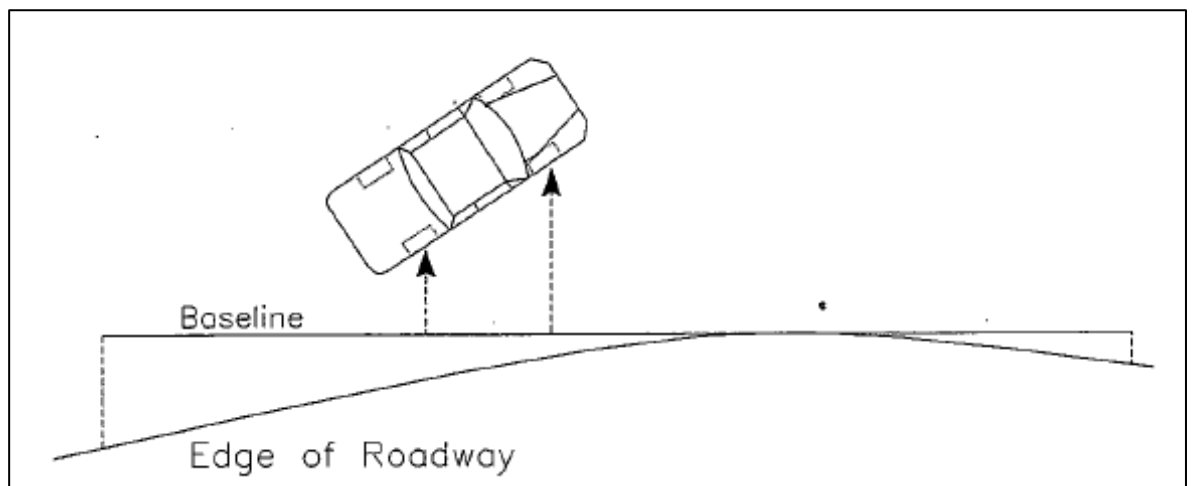
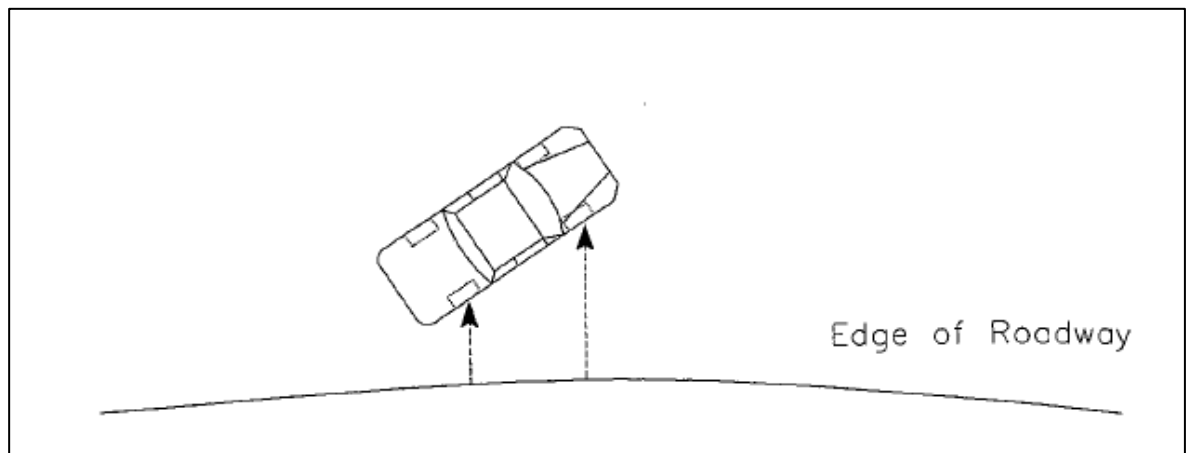
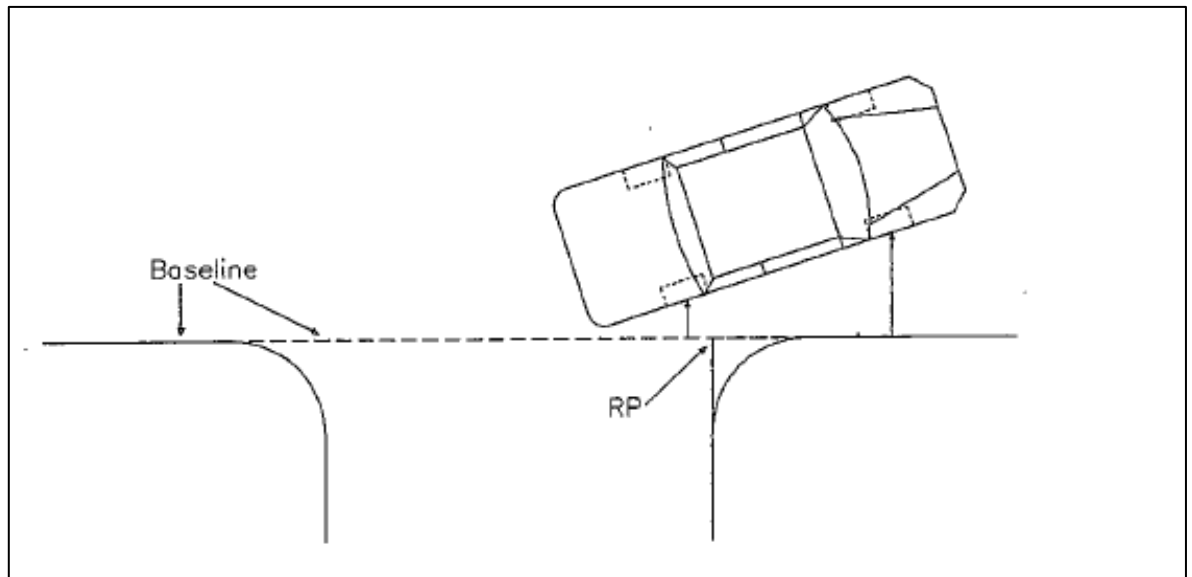


#### 6.4.2 Baseline method

- 6.4.2.1 These are distances that are measured at **right angles** from the baseline (**straight line**) to a point on an item of evidence. When the edge of the roadway is straight or it has only a very slight curve, the edge may be used as the baseline. For the purposes of location and future reference, the baseline must be related by measurement to a reference point.
- 6.4.2.2 The RP should be a point on the baseline or roadway either at or related to a permanent, recognizable landmark or object. The RP is the zero point from which to measure the distance to other point along the baseline.
- 6.4.2.3 If a permanent object does not lie directly on the baseline, an intangible point that is close by and easily related by measurement to such an object may be labelled RP and used as the zero point. See image below



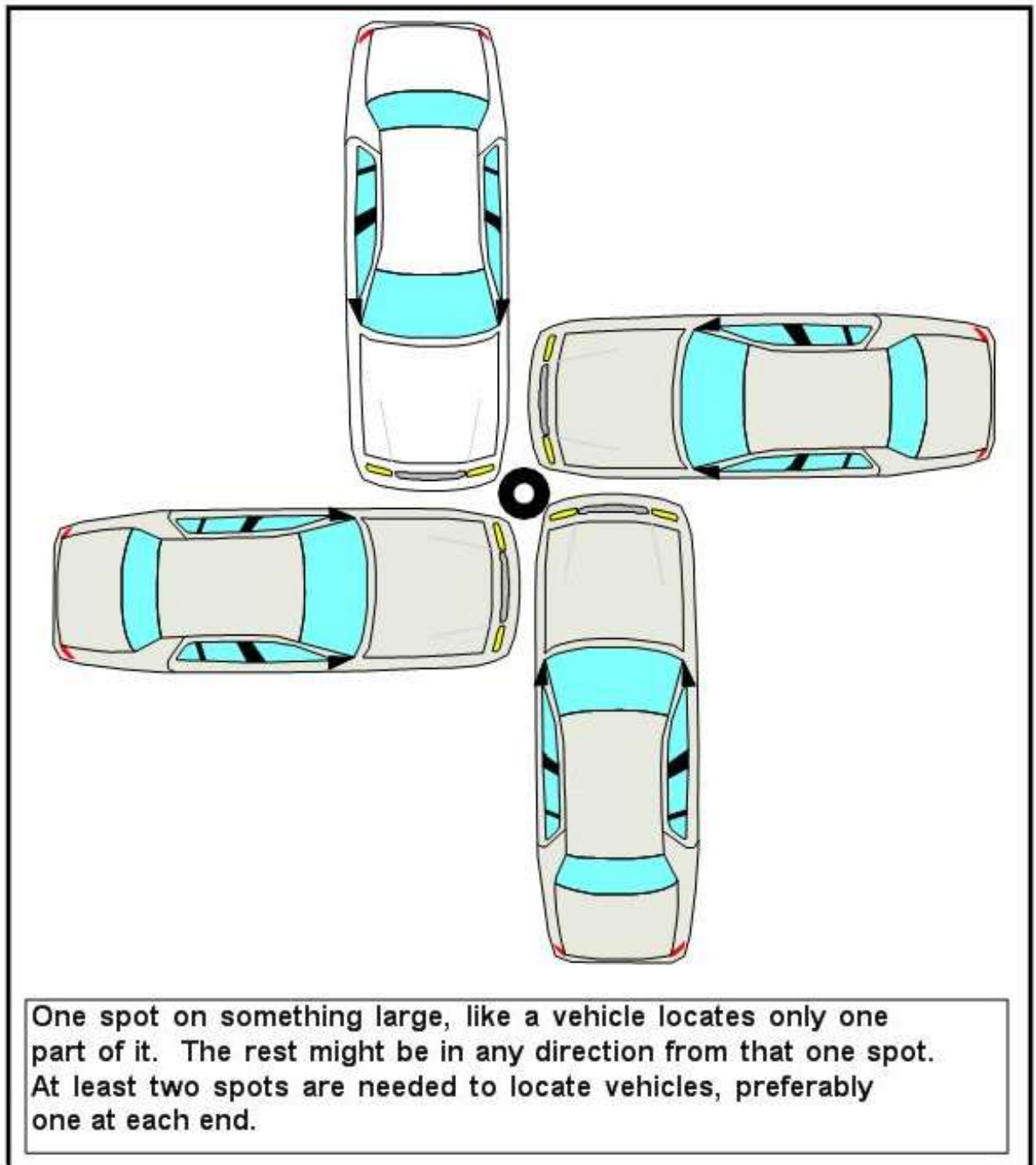
- 6.4.2.4 Sometime curb lines or road edges can be extended to intersect at such an intangible point. See image below



6.4.2.5 Scene measuring is not difficult at all, with some practice and guidance; scenes can be sketched and measured accurately and quickly with the use of very basic equipment such as a tape measure, measuring wheel, pen and paper.



**6.4.2.6 Typical error:**



Day end

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**Day 2 – Day review questionnaire:**

- 1 List the 5 different tyre marks?
  - 2 Name at least three factors that will identify if a tyre mark is a Yaw mark
  - 3 What are striations?
  - 4 ABS can leave braking marks, true or false
  - 5 A set of dark continuous skid mark means that the wheels are rotating, true or false?
  - 6 Name at least 3 factors that indicate the immediate area or point of impact?
  - 7 Name at least two types of debris?
  - 8 Vehicles should be marked off how (i.e. wheels, or corners) and at how many positions?
  - 9 When speaking to people on scene, name at least 3 factors to keep in mind?
  - 10 Photographs are taken to? - List two main factors or reasons?
  - 11 It is not important to measure the positions of evidence at a scene, true or false?
  - 12 Two main types of measuring methods are?
  - 13 At least how many basic photographs should be taken of any vehicle?
  - 14 All measuring must start from a permanently identifiable known point, also called a fixed point, true or false?
  - 15 All measuring must be in a straight line from one point, directly to another, true or false?
  - 16 A sketch plan is to scale and only shows the road layout, true or false?
  - 17 Why should a scene be marked off?
  - 18 Name 3 of the 6 possible ways liquid debris is found
  - 19 Name at least 3 key things that should be included on a scene diagram
  - 20 Which is larger, Track width or Wheel base
  - 21 Name four types of persons involved, or related to an accident
- 

**Attendee's name:** \_\_\_\_\_

**Date completed:** \_\_\_\_\_

**Signature:** \_\_\_\_\_



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**Day 3 Content:** (08:30 – 16:30 - Lunch as arranged, usually 12:00 – 13:00 or as required)

**1 Brief review of yesterday's session**

**2 Technical follow-up**

- a) Further scene inspection
- b) Examination of vehicles
- c) Medical reports
- d) Further statements
- e) Other

**3 Reconstruction**

**4 Cause analysis**

**5 Investigative and case aids**

- a) GPS Systems
- b) Google earth
- c) Drawing programs
- d) Calculation programs
- e) Vehicle tracking reports tachographs / information data keys / IVMS
- f) In-car cameras / monitoring cameras (security/freeway)
- g) Internet research

**6 Using or consulting with independent experts and specialists**

**7 Compiling reports / Report writing**

**8 Reference material**

- a) Books / papers / research
- b) Websites / Online facilities / online databases

Day end

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**1 Brief review of yesterday's session**

- 1.1 Quick recap session of previous day's information.

**2 Technical follow up**

- 2.1 Technical follow-up is a crucial part of all accidents; it is rare that there is no follow-up that is necessary. Technical follow-up can consist of a wide range of items that need to be dealt with over and above what was already done at the scene. Some examples are as follows:

a) Further scene inspection:

Very often it is difficult to complete a full, detailed on scene investigation at the time of the accident, perhaps due to weather, heavy traffic, dangers posed by chemicals and other issues. This is one of the reasons why the marking off of evidential factors is crucial, allowing the "re-visit" of the scene effectively without having destroyed the scene.

Likewise, even where you may have processed the entire scene at the time of the accident, some information may come to light that needs you to re-visit the scene and consider other factors.

b) Examination of vehicles:

Vehicles may have been examined where an allegation of some technical issue, such as brake failure or a tyre blowout has been made or is suspected. Therefore a detailed examination of the vehicle or the specific part may be required, and is usually undertaken by a specialist, resulting in a report that will be submitted into the case docket as evidence at a later stage.

c) Medical reports:

Such as where blood may have been taken from a driver, or perhaps that the blood results from a fatal pedestrian or even fatal driver are awaited, likewise the post mortem report may be outstanding.

d) Further statements:

These are usually statements that need to be taken from the actual parties involved (drivers/passengers) if this was not done on the scene (which is not common); likewise those statements may need to be taken from other parties (witnesses/acquaintances), where this was not done at the time of the accident.

e) Other:

It may come to light that service history records are required for a vehicle and that these need to be sourced, or that a tracking system affixed to a vehicle can yield information and may need to be sourced.

**3 Reconstruction**

- 3.1 An accident has four basic levels of process of consideration. The complete process can be considered in four aspects as follows:

**3.1a Investigation**

**3.1b Technical follow-up**

**3.1c Reconstruction**

**3.1d Cause analysis**



- 3.2 Expert reconstruction (what happened and how) of an entire accident based on all of the evidence on the road surface, from the vehicle, the environment, and other evidential factors, including calculations that may need to be made allows a concise indication of what happened.
- 3.3 Most cases can be reconstructed very accurately where the information has been collected properly; however there are cases that are very difficult to understand.

***“Traffic accident investigation and reconstruction is the effort to determine, from whatever information is available, how an accident occurred”***

**(Case study examples PPT – CPP280 / CPP1208 / CPP50 / CPP497 / CPP1391 / CPP658)**

#### 4 Cause analysis

- 4.1 As has been indicated above, the final product that most people (lawyers, judges, insurance companies) want to know immediately, is the reason, or contributing factors, this is also known as the “cause analysis”.
- 4.2 Reaching the cause analysis may in some cases be easy and immediately apparent, however this is usually reached through the process of the on scene investigation, the Technical follow-up, the reconstruction and, finally, from these the cause analysis.

**(Case study examples PPT – CPP828 / CPP319 / CPP771 / CPP1281 / CPP940 / CPP933)**

#### 5 Investigative and case aids:

- 5.1 There are many investigative aids, some of these aids have already been identified under section 5.3 advanced equipment, these pieces of equipment can assist you in recording more evidence, quicker and more accurately. However there are other investigative aids than can assist you in attending to, collecting and understanding evidence. Some are:

a) GPS Systems:

Global positioning systems (GPS) come in a wide variety of make and types of machines, from a watch, your cell phone, dash or windscreen mount and even built in car systems as we see below:



Perhaps initially, the most useful purpose of these systems, to you, is that of locating the scene of the accident by the system of the GPS Coordinates. An example of GPS positions are as follows:

SAPS East London

-

s33 1.229 / e27 54.139

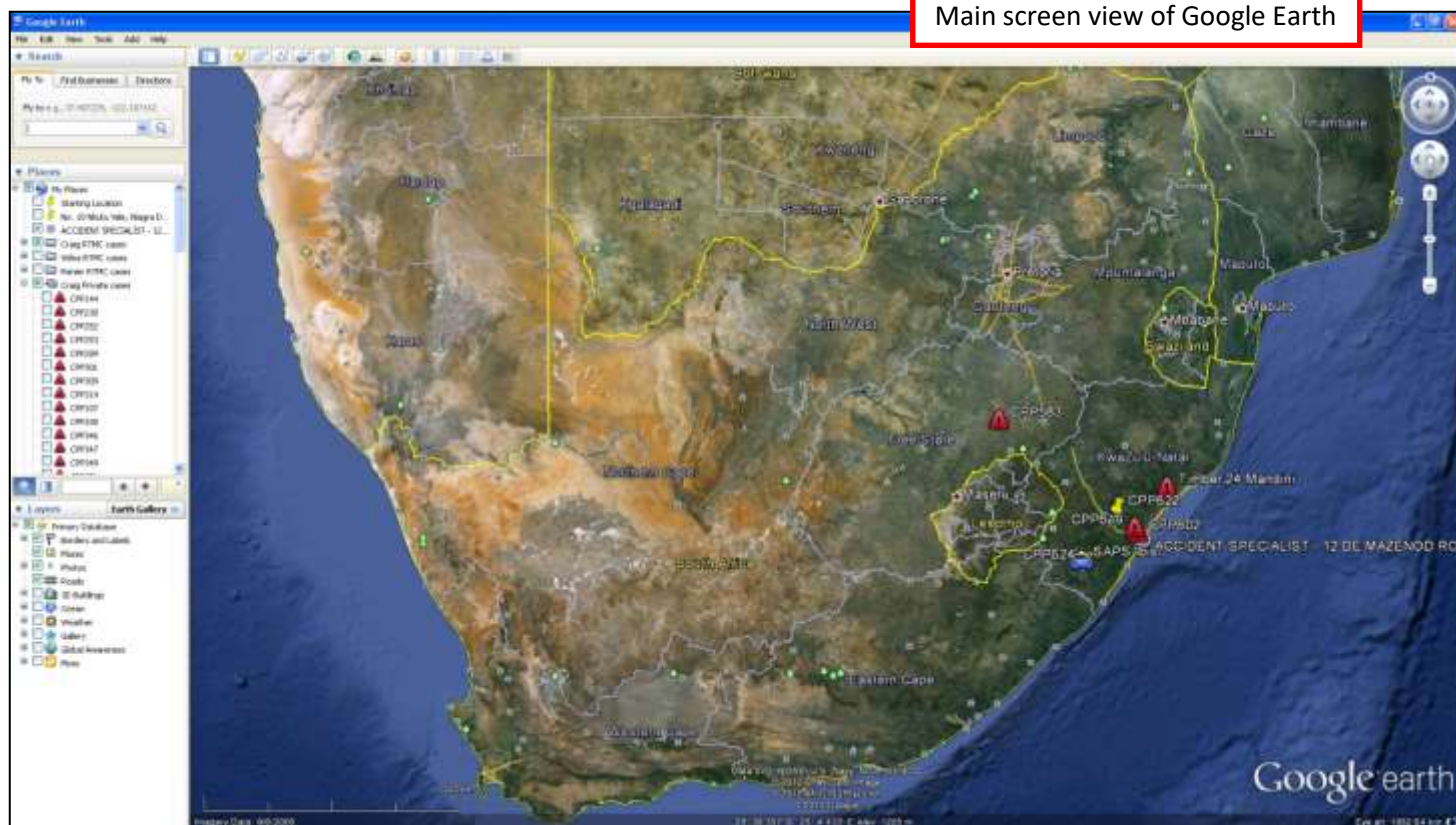


GPS systems can track and record your speed, distances to and from, and even highest speed. Therefore where an accident is attended where a GPS system is in a vehicle that may have been in use, careful consideration of the information from the GPS may be of assistance.

b) Google earth:

An extremely useful tool for the general investigation of almost any scenes of accident is the Google Earth system. **It must immediately be cautioned that this system must not be utilised as a “be all and end all” system, even where such items are listed thereon as north directions, scaling, and various other factors.**

Main screen view of Google Earth

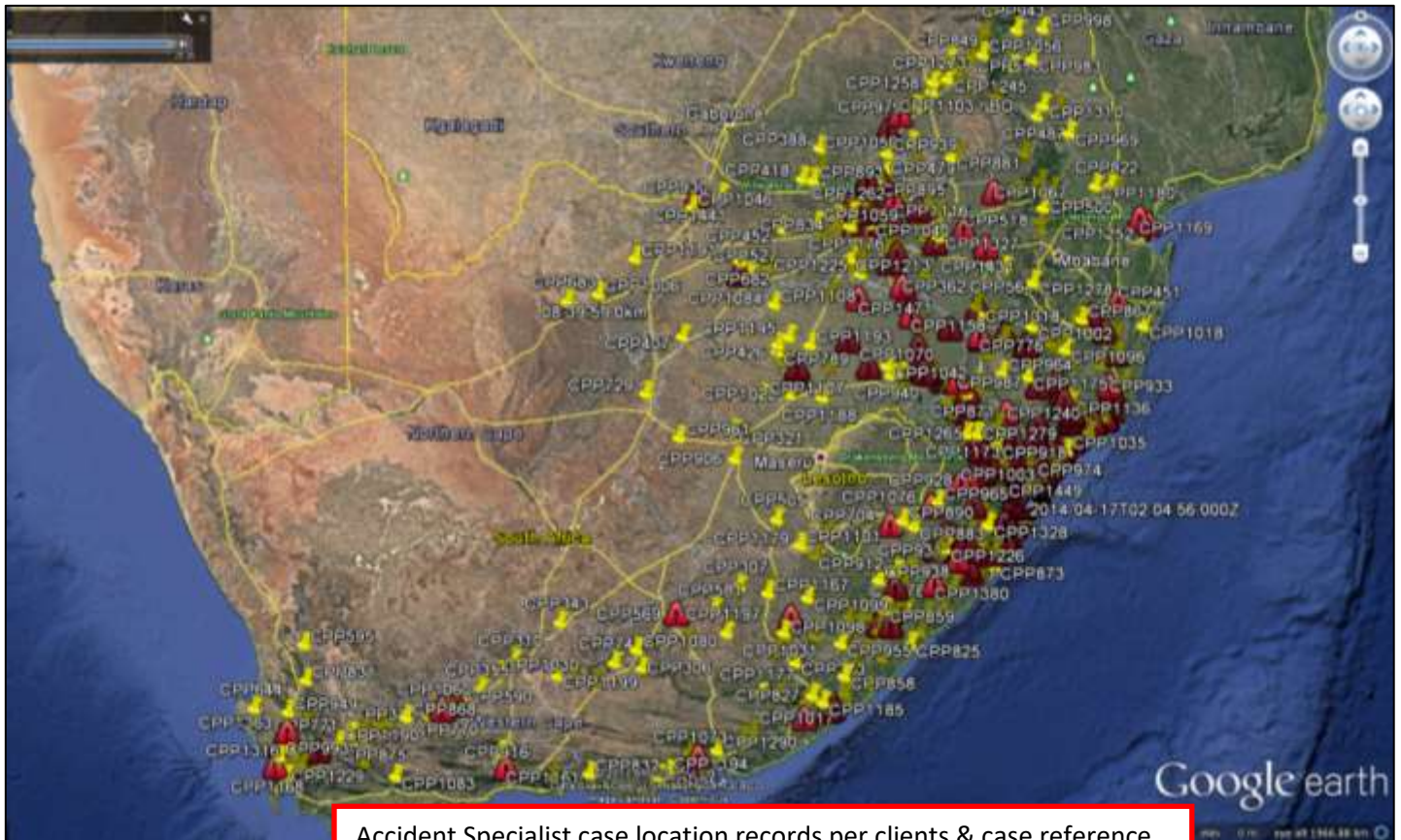




Nonetheless, Google Earth allows an extremely convenient method of indicating the general location of the scene and the layout of the road with relevance to surrounding areas, cities, towns etc.

It has the ability to indicate the general layout of the road from an aerial perspective, perhaps in such situations where the accident has occurred on an extremely windy section of road, or simply on a straight section of road, or even at a four way intersection. These images can serve to give a basic understanding of this.

Google Earth also allows an excellent storage point of all accident scene locations.



Google Earth is a free download program and runs on almost all computer systems, however does require internet access when in use.

c) Drawing programs:

Keep in mind that a scene drawn by hand, and measured will always be accepted. However making use of technology through drawing programmes usually makes these tasks easier. Making use of drawing programmes emphasises the need for you to understand how and what to measure as the input to these drawing programmes needs to be correct.

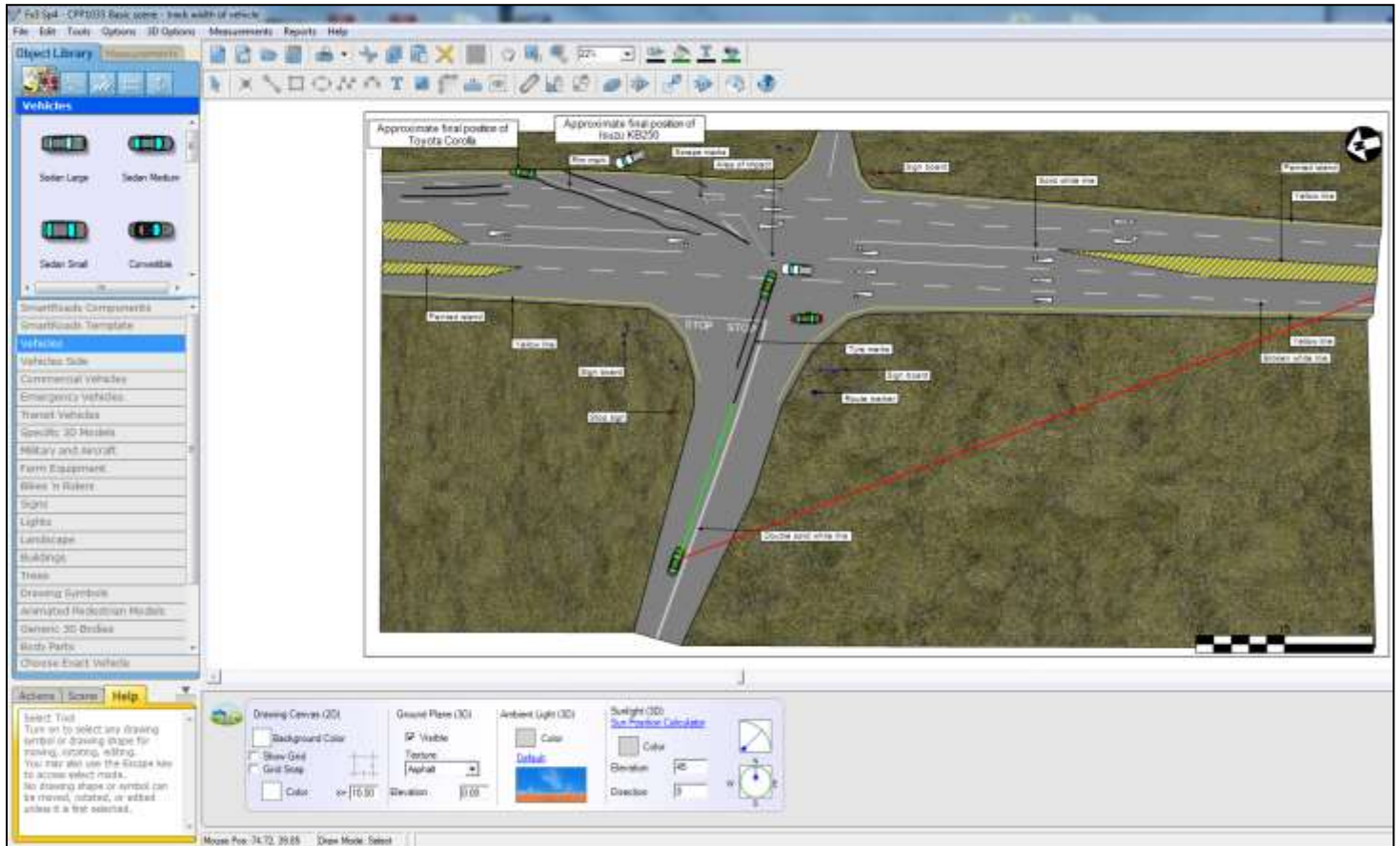
There are many drawing programs that are available, some general drawing programs that can be utilised in order to simply “sketch” or draw a proportional diagram. In most of these programs, also the ability to draw a scale diagram. Some such programs are:

- Sketch up (downloadable off the internet)
- Visio (download off the internet)
- Easy Street Drawing
- CAD (various versions of CAD will all suffice in drawing basic scenes)
- Crash Zone (specialised crash and crime scene programme)
- Visual Statement FX3 {Edge FX} (specialised crash and crime scene programme)



- g. Map-scenes (specialised crash and crime scene programme)
- h. Photomodeler

The majority of these programs are relatively easy to learn, and can be self-taught. Although, where advanced use of these programmes becomes necessary, the necessary basic, intermediate and/or advanced training on this software is undertaken by the user with the manufacturer and/or supplier of the software. Example screen shot of Visual Statement drawing software FX3:



d) Calculation programs:

Although basic attendance at the scene of an accident will usually not require the scene investigator to undertake any calculations. Where the basic investigator takes his investigative knowledge to advanced levels, basic knowledge of calculations and the input parameters will be required and learned. Where advanced investigation and reconstruction is considered, extensive use of calculations in the consideration of the accident are usually undertaken.

Use of a simple calculator and the necessary formulae in the calculations can and should be done manually. However once the application of the calculations is mastered, use can be made of various specific calculation programmes that can be downloaded, purchased and/or that accompany advanced forensics diagramming programmes such as that of PC-Crash, Mapscenes, Visual Statement FX3, Edge FX, FARO, CSI Mapping and others.

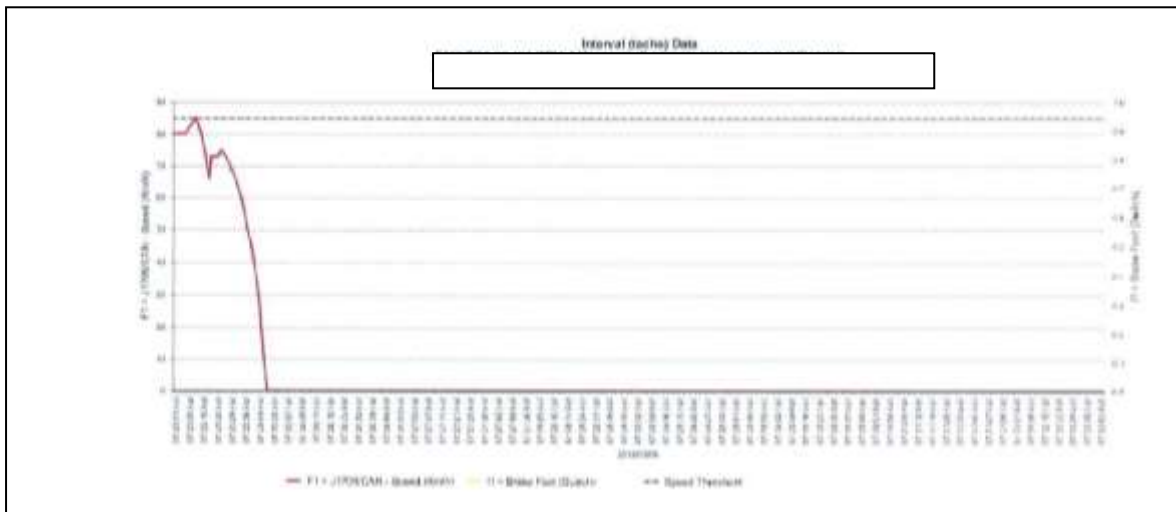
e) Vehicle tracking reports tachographs / information data keys / IVMS:

With technology of some sort now almost always available in all vehicles, or easily adaptable to vehicles, especially in heavy duty vehicles, fleet vehicles or company vehicles, such items as real time (full time) tracking systems on the vehicles, older systems of tracking and recording such as mechanical tachographs, data key recording systems and all forms of In-Vehicle Monitoring Systems (IVMS) are now commonly found on vehicles involved in accidents.

Although it is difficult for an investigator to understand and have the ability to find and download information from all of these systems, the investigator should at least be aware that such systems exist, and that extensive efforts should be made on the scene and during follow up investigations to establish whether any of the vehicle involved in the accident are fitted with such systems. Where necessary, when the information from these systems is subpoenaed and/or obtained from the owners of the vehicles, manufacturers or insurers through appropriate means to ensure that this information can be considered.

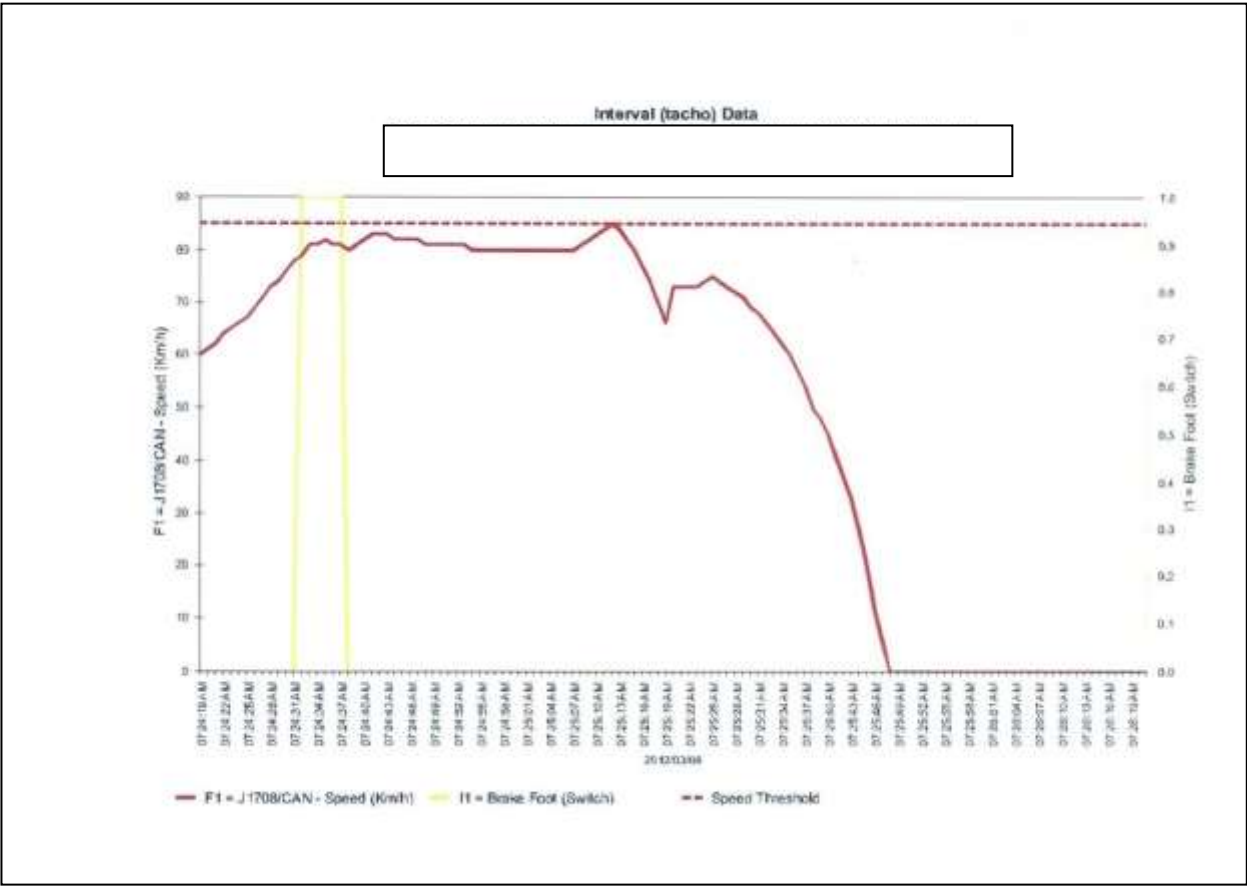


Typical example of a basic tracking report is seen below:



Typical example of the above basic report analysed in detail ("second by second breakdown"), below:





Example of the above information plotted / overlaid on image to locate vehicle relative position:







Actual example: Note stationary times and moving time intervals (10min)

Time Reported (hh:mm:ss)	Vehicle Location	Latitude	Longitude	Max Speed (km/h)	Dist (km)	Acc Dist (km)	Ignition Status	Odometer (km)	Events
17:55:52	3.33 Km SW of Durban, Southern Freeway (M4), Congella Durban KwaZulu-Natal	-29°52'54"	31°00'01"	-	-	0.64	Off	106519	
17:55:52	3.33 Km SW of Durban, Southern Freeway (M4), Congella Durban KwaZulu-Natal	-29°52'54"	31°00'01"	5	-	0.64	Off	106519	
17:55:52	3.33 Km SW of Durban, Southern Freeway (M4), Congella Durban KwaZulu-Natal	-29°52'54"	31°00'01"	-	-	0.64	Off	106519	
18:43:34	3.33 Km SW of Durban, Southern Freeway (M4), Congella Durban KwaZulu-Natal	-29°52'54"	31°00'01"	-	-	0.64	On	106519	
18:43:34	3.33 Km SW of Durban, Southern Freeway (M4), Congella Durban KwaZulu-Natal	-29°52'54"	31°00'01"	-	-	0.64	On	106519	
18:59:32	4.40 Km NE of Yellowwood, Southern Freeway (M4), Congella Durban KwaZulu-Natal	-29°53'53"	30°58'45"	70	1.25	1.89	On	106521	
19:05:32	2.30 Km SE of Queensburgh, St John's Ave (M7), Mowbray, Durban KwaZulu-Natal	-29°52'37"	30°55'50"	70	6.06	6.94	On	106526	
19:13:31	2.25 Km SW of Pinetown, N3, Pinelands Durban KwaZulu-Natal	-29°50'14"	30°51'26"	85	7.72	14.66	On	106533	
19:23:31	3.48 Km NE of Dassenhoek, Marianth's Toll Rd (N3), Tregate South Durban KwaZulu-Natal	-29°49'22"	30°48'13"	75	3.16	17.83	On	106537	
19:23:32	3.96 Km SE of Drummond, N3	-29°47'14"	30°43'11"	70	3.56	21.39	On	106540	
19:43:32	1.30 Km SE of Hamden, N3	-29°44'19"	30°38'22"	65	8.78	30.17	On	106549	
19:53:31	0.65 Km E of Cato Ridge, N3	-29°43'56"	30°35'43"	65	2.74	32.90	On	106552	
20:03:31	1.55 Km SE of Ashburton, N3	-29°40'15"	30°27'52"	60	13.31	46.21	On	106558	
20:13:32	1.53 Km N of Pietermaritzburg, N3, Athlone Pietermaritzburg KwaZulu-Natal	-29°35'09"	30°22'39"	65	13.00	59.21	On	106578	
20:23:31	3.87 Km SE of Reiselrope, N3, Montrose Pietermaritzburg KwaZulu-Natal	-29°34'51"	30°20'17"	60	0.82	60.03	On	106579	

Page 6 of 8 This report was generated by Thales Telematics Friday 08 August 2008 13:09

Actual example: Moving time intervals (5min)

Date	Driver	Status	Speed	ODO	Location
2008-07-21					
18:15	10000	Driving;	0	52	AI JDT DEPOT
18:20	10000	Driving;	0	52	AI JDT DEPOT
18:25	10000	Driving;	0	52	AI JDT DEPOT
18:30	10000	Driving;	0	52	AI JDT DEPOT
18:35	10000	Driving;	0	52	AI JDT DEPOT
18:40	10000	Driving;	0	52	AI JDT DEPOT
18:45	10000	Driving;	0	52	AI JDT DEPOT
18:50	10000	Driving;	0	52	AI JDT DEPOT
18:55	10000	Driving;	37	52	Mariannhill Toll Rd (N3); Waterfall
19:00	10000	GPS Unlocked;	0	54	Mariannhill Toll Rd (N3); Camperdown Outlying; KwaZulu-Natal
19:05	10000	Driving;	4	58	Mariannhill Toll Rd (N3); Camperdown Outlying; KwaZulu-Natal
19:09	10000	Ignition OFF;	0	58	Mariannhill Toll Rd (N3); Camperdown Outlying; KwaZulu-Natal
19:10	10000	Startup;	0	58	Mariannhill Toll Rd (N3); Camperdown Outlying; KwaZulu-Natal
19:15	10000	Driving;	31	58	Mariannhill Toll Rd (N3); Camperdown Outlying; KwaZulu-Natal
19:20	10000	Driving;	82	64	Mariannhill Toll Rd (N3); Gato Ridge; KwaZulu-Natal
19:25	10000	Driving;	82	70	N3; Camperdown
19:30	10000	Driving;	65	70	N3; Camperdown
19:35	10000	Driving;	54	81	N3; Shons Retreats; KwaZulu-Natal
19:40	10000	Driving;	0	83	AI MKONDENI DIESEL DEPOT.
19:43	10000	Ignition OFF;	0	83	AI MKONDENI DIESEL DEPOT.
19:48	10000	Startup;	0	83	AI MKONDENI DIESEL DEPOT.
19:51	10000	Driving;	0	83	AI MKONDENI DIESEL DEPOT.
19:52	10000	Ignition OFF;	0	83	AI MKONDENI DIESEL DEPOT.
19:54	10000	Startup;	0	83	AI MKONDENI DIESEL DEPOT.
19:55	10000	Ignition OFF;	0	83	AI MKONDENI DIESEL DEPOT.
20:02	10000	Startup;	0	83	AI MKONDENI DIESEL DEPOT.
20:07	10000	Driving;	0	83	AI MKONDENI DIESEL DEPOT.
20:12	10000	Driving;	55	84	N3; Epworth; KwaZulu-Natal
20:17	10000	Driving;	91	90	N3; Woodlands; KwaZulu-Natal
20:22	10000	Driving;	34	95	N3; Athlone; KwaZulu-Natal
20:27	10000	Driving;	41	98	N3; Morningside; KwaZulu-Natal
20:32	10000	Driving;	30	101	N3; Hilton Gardens; KwaZulu-Natal
20:37	10000	Driving;	60	107	N3; Howick
20:42	10000	Driving;	73	113	N3; Howick
20:47	10000	Driving;	40	118	N3; Howick
20:52	10000	Driving;	68	125	N3; Howick
20:57	10000	Driving;	68	130	N3; Howick
21:02	10000	Driving;	64	138	N3; Mool River
21:07	10000	Driving;	39	140	N3; Mool River
21:10	10000	Ignition OFF;	0	140	N3; Mool River
22:26	10000	Startup;	0	140	N3; Mool River
22:30	10000	Ignition OFF;	0	140	N3; Mool River
22:36	10000	Startup;	0	140	N3; Mool River
22:41	10000	Driving;	0	140	N3; Mool River
22:43	10000	Ignition OFF;	0	140	N3; Mool River
23:47	10000				

**NB:** Tracking reports of a crash / accident should be specifically requested for the period of the crash as a “second by second” crash report.

f) In car cameras / monitoring cameras (security/freeway):

Although not in common use, however becoming ever more popular (think “big brother”), some private individuals however mostly large transport companies, make use of permanent recording in-vehicle monitoring cameras, or at least in-vehicle monitoring cameras that record and hold noteworthy incidents such as aggressive cornering, swerves and/or impacts. These in-vehicle camera systems are usually easily notable. However sometimes are discreetly implemented, therefore the investigator should at least be aware of such systems and look for, or enquire as to their existence in a vehicle.







Likewise, extensive use is being made of cameras for both “red lights” as well as monitoring and recording cameras on main freeways, access is usually relatively easy gained to such cameras where they can be identified on an approach to and/or at the scene of accident and that these cameras may hold some information.

Similarly, the investigator should always investigate the possibility of surrounding properties, buildings, and businesses having security cameras that may have caught the event on their systems, such security camera footage can be vital to the case and is usually relatively easily obtained through appropriate means.

This type of footage almost always allows an accurate indication of what transpired, or at least of the vehicles speed.

g) Internet research:

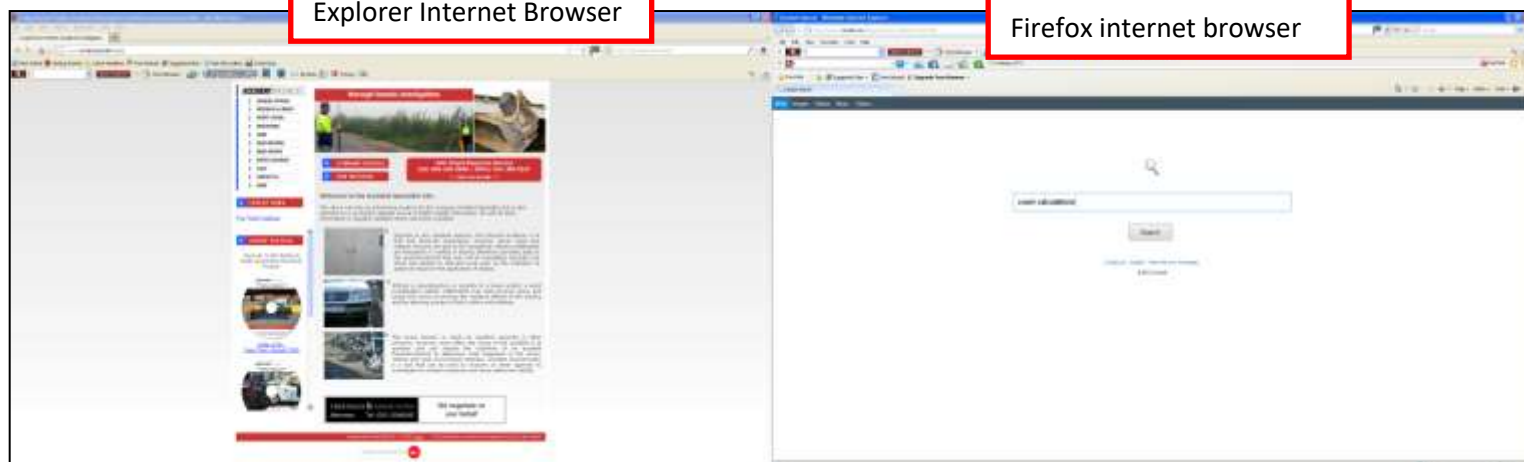
Although not usually a technique utilised by accident scene investigators during the basic level of accident investigation; where somewhat more advanced investigation is required, such as those undertaken during technical follow ups and/or reconstruction and cause analysis, use of internet research for establishing of various factors can be key.

Establishing factors such as the mass of the vehicle involved, the length, width, track width, wheel base and other factors such as whether the particular year model is fitted with airbags, ABS systems; traction control systems and the like can be of extremely useful in determining, verifying or disproving various facts.

Internet use has also proven useful in finding, contact and establishing the image and identity of a driver, passenger, witness or associate through such media as **Facebook** and others.

Explorer Internet Browser

Firefox internet browser





## 6 Using or consulting with independent experts and specialist

- 6.1 During most circumstances, the use of an independent expert or specialist for the initial on-scene investigation is not common practice. As has been referred to earlier in the training, the on-scene investigation is usually done as a matter of process as dependent on the type of accident (slight / moderate / serious) where the scene of accident is usually attended to and investigated by the SAPS and/or in combination with the Metro Traffic and Provincial Traffic.
- 6.2 However, where some companies have experts or specialists at hand, as either an in-house staff member, a contracted service provider, or that the specialist is contracted to such institutes as the local Metropolitan office, the provincial Department of Transport or perhaps the National Department of Transport (as is the lecturer), the attendance at the scene of accident by an expert can be undertaken in conjunction with the usual service providers.
- 6.3 The appropriate investigation of an accident scene, even a basic accident scene, can be quite complex involving a range of factors, some of which may be:
  - 6.3.1 The physical environment such as the road and general surroundings
  - 6.3.2 The environmental factors such as the weather
  - 6.3.3 Mechanical factors such as the operation of the vehicle
  - 6.3.4 Human factors such as perception and reaction time of drivers in situations where they may be aged, drunk, or under the influence of narcotics
  - 6.3.5 Medical issues such as those where a driver may be physically disabled or Diabetic
- 6.4 A combination of experience and academic knowledge as to the appropriate and thorough attendance of the scene of accident is important; hereto the use of experts or specialists from the basic level of the investigation typically negates problems at a later stage through the investigation where the initial investigation was not done or was not done correctly.
- 6.5 Where possible experts called on should be requested to impart knowledge through the usual “skills transfer” by interaction of the members that are in a position that requires them to deal with aspects of accidents

**“Do not hesitate to ask a potential expert for his CV; have a chat with him / her, ask for an example report!”**

## 7 Compiling reports / Report writing:

### 7.1 Introduction:

- 7.1.1 Although no Pro forma exists for the compilation of a *report*<sup>2</sup>, there are certain requirements that are necessary from a legal, technical and logical aspect that guide the setup, layout and contents of a report. It is these legal, technical and logical aspects that this paper will consider and bring to your attention.
- 7.1.2 All too often we see particular attention being paid to the collection and consideration of the evidence, or the somewhat “hands-on” section of the report. However the art of compilation and presentation for the purpose of testimony thereon is where many specialists fall short. There are various reasons why the art of report compilation and presentation is usually lacking, such as the tedious nature of the compilation of such reports and therefore the expense related to the time taken, or the lack of literary skill or training.
- 7.1.3 It is important that we understand the need to compile reports that fulfil their specific requirements. This therefore suggests that specialised reports need to contain *the “Four C’s” of report writing*<sup>3</sup>, namely Clarity, Completeness, Conciseness and Correctness.

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<sup>2</sup> This may be a simple single issue report, a more detailed technical report, or a comprehensive report covering various levels and issues

<sup>3</sup> Bibliography reference no 7.1a – pg 4

- 7.1.3.1 *Clarity*: the report will be used by people who usually do not have your knowledge, so ensure that clarity is made by using the correct terminology and that where need be, this terminology is explained and/or write in the “layman’s” terms so that the point being made is clear.
- 7.1.3.2 *Completeness*: make sure that all possible available evidence is at hand and used, or at least reviewed for consideration as this will ensure that your report is as complete as reasonably possible.
- 7.1.3.3 *Conciseness*: Strike a balance and address the issues that need to be addressed and clarify them accordingly. Do not brief over evidence too lightly or delve too deeply into issues where this is not required.
- 7.1.3.4 *Correctness*: As a technical document, checking your entire document, including your findings, calculations, cross references, diagrams, placement of items, spelling, technical terms and grammar is crucial. This could be the difference between being of assistance to your client or destroying their case and causing unnecessary embarrassment to them and yourself.
- 7.1.4 In establishing these basic requirements as guidelines to report compilation and presentation, along with the re-iteration of the use of correct terms and names for various evidential factors referenced, we will not only assist our own profession in setting higher standards, but assist ourselves in creating an accepted standard among all of our clients.
- 7.1.5 Although reference has been made to reconstruction reports, it is generally understood that various “other” technical or specialised reports may be required that do not necessarily constitute a reconstruction report. As in the example of a report covering the issue of the likelihood of a vehicle having lost control through a puddle of water, where the resulting loss of control and damages incurred are not in dispute, simply the contribution of the presence of the water to the loss of control is being questioned. This may be referenced to as a cause analysis type report. Nonetheless this type of report remains of a *forensic*<sup>4</sup> nature.
- 7.1.6 It is usually evident that those experts or specialists that have attained some level of academic education, or are long standing practitioners, have a clearer insight as to the purpose, requirements, general layout and setup of specialised reports, either from training or simply from having seen or reviewed similar reports, documents or academic literature.
  - 7.1.6.1 By comparison, those experts or specialists that have a somewhat more hands-on background and are relatively inexperienced generally fall short in this department. Nonetheless; there is always room for improvement across the board.
  - 7.1.6.2 Experience generally allows one to realise their mistakes or short comings and with this notion in mind, we see that long standing experts or specialists have generally progressed their reports to acceptable or superior levels.

## 7.2 **Understanding the purpose of the report – its use:**

- 7.2.1 The nature of any expert report, or for that matter any specialized report is typically for use in litigation<sup>5</sup>, be it Criminal or Civil, or perhaps to a lesser extent in departmental hearings and the like. Nonetheless, this indicates that these reports are therefore of a forensic nature.
  - 7.2.1.1 The nature of just about any report compiled for a traffic accident and the subjects relating thereto, usually contain extensive technical jargon, specific references, calculations and opinions, typical of a forensic report.

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<sup>4</sup> See section 6 - Glossary – synonyms

<sup>5</sup> See section 6 - Glossary – synonyms

- 7.2.2 It is crucial that we understand the purpose of the report, as this defines not only the specific issues or content to be addressed therein but also the extent of the report. This therefore has an effect on the layout or format of the report. The purpose of the report can be two fold and is largely to be understood as follows:
- 7.2.2.1 For what type of action the report is to be used: Understanding that the client only wants to know if the tyre in question blew out pre accident for a *civil action*. Clearly allows the understanding that this report will generally be shorter and somewhat simpler than that to be used in a criminal matter where a full reconstruction report is required questioning the possibility of a wheel bearing failure having caused or contributed to the loss of control of a vehicle travelling at 120km/h for a multiple culpable homicide case.
  - 7.2.2.2 What the client is trying to determine: Reports are typically requested in order to establish or clarify a certain fact, it is not the norm for a client to request a very general report. As an example, we see an extract below of the specific requests set out in the instructing letter to the expert and from this it can be determined that what is actually being requested is a full reconstruction report.
  - 7.2.2.3 *Attend at the scene of accident with the witnesses and client and evaluate their sighting position, recollection of events in general and recollection of the physical evidence seen by them.*
  - 7.2.2.4 *Consider their evidence and compile the necessary diagrams and measurements*
  - 7.2.2.5 *Take photographs and video footage of the scene in general for litigation purposes*
  - 7.2.2.6 *Where possible all indications must be made as to the manner in which the accident occurred, the cause of the accident and any contributing factors.*
  - 7.2.2.7 A further example may be a somewhat more simple instruction and may read as follows:
    - 7.2.2.7.1 *Offer an opinion on whether the supplied tyre suffered a blow-out pre impact.*
- 7.2.3 Although all expert reports are to be impartial and as accurate as possible, it is nonetheless wiser that the context in which the report is to be used, its purpose with reference to the type of litigation being pursued, is known to the writer as there may well be fundamental differences that need to be included or considered when compiling the report. Although this may not always be the case. As an example of this:
- 7.2.3.1 Whereas in a criminal charge it may not be possible for you to conclusively prove a certain aspect “beyond a reasonable doubt”, in civil consideration you may well be able to indicate the likelihood of a certain aspect on a “balance of probability”.
  - 7.2.3.2 Further, any examination of vehicles, where a criminal charge is being pursued, may require that you obtain specific written access to the vehicle through the SAPS if the vehicle is held by them, whereas in a civil matter this may be permission from the owner of the vehicle, or perhaps not required at all.
- 7.2.4 It is important that when instruction is taken, that this instruction clearly sets out the specific requirements of the report. These instructions largely define the purpose of the report and act as a guide to the content, extent and to some point the layout of the report. The instructions also serve as a safety measure to the expert in validating his/her instruction and as such all instructions should be in writing.
- 7.2.4.1 It is for this reason that it is often prudent to request a meeting with the instructing client and discuss the matter with him/her before a written instruction is given, as there may well be extra issues that need to be addressed or highlighted by the expert in order to reach the indication or conclusion being sought.



- 7.2.5 The writer of a report must understand that as an expert, regardless of the fact that he/she is employed by a *particular party*<sup>6</sup> in a dispute, such forensic reports and the evidence lead thereon has been requested by his instructing clients for the purpose of assisting the *decision makers*<sup>7</sup> in making the right decisions and therefore the expert is considered a “friend of the court”.

### **7.3 Understanding the requirements of the report – the content:**

- 7.3.1 Reference has been made to traffic accident reconstruction as the *Puzzle analogy*<sup>8</sup>, where the analysis of the accident is the understanding of each piece of evidence this being each piece of the puzzle and where they fit and in so doing, assembling a jigsaw puzzle.
- 7.3.1.1 It is the pieces of the Jigsaw that have been collected, or that need to be collected, deciphered or understood and assembled that allows us to view the final product. This is the content and results of the report.
- 7.3.1.2 The understanding of traffic accidents as a whole, consists of an extremely diverse field of knowledge, covering such subjects as environmental, medical, mechanical, mathematical, dynamics, photography and psychology to mention but a few. As such the extent of the content of a report, or the number of jigsaw pieces, may be quite vast in order to determine the final picture, result or conclusion.
- 7.3.2 Perhaps the actual technical content of the report is a completely separate issue as common sense would prevail in expecting that the expert or specialist would have a comprehensive knowledge of his/her particular field and therefore of the specific technical content of his/her report. Nonetheless, without delving too far into the issue of technical content, we need to briefly address this issue.
- 7.3.2.1 It is important that the technical content of the report be compiled with the notion that the end users do not understand the subject and content of the specific field of the report. Therefore the writer must, where necessary, explain the specifics of such things as the meaning of certain evidence and the manner in which he/she has calculated or deduced certain factors, or come to particular conclusions.
- 7.3.2.2 The report writer must make every attempt to be unambiguous when expressing his / herself and must state what he/she means and must not assume that the reader will simply understand or “get the gist of it”.
- 7.3.3 As it has been established that the purpose and requirements of the report are of a forensic nature, it is therefore important that the content of the report be accurate and clearly defined. For this reason, the writer must ensure that where required, the content of the report is fully set out. Here we specifically make reference to the explanation of evidence.
- 7.3.3.1 It does not help to simply write that based on the braking distance, the calculated speed of the vehicle is “X km/h”. It is important that the actual calculations be given and, where necessary that the parameters used in the calculation be indicated. For example, if there is an adjustment to be made for gradient or braking percentage, clarity is to be given on this.
- 7.3.3.2 As has been indicated in section 7.3.2.1 above, the reason for this is two-fold. It is to be assumed that the reader does not fully understand the contents, therefore it is logical that clarity must be given as to the parameters and adjustments made so that the reader can clearly see how the results are obtained. It is also important to remember that it is often likely that your work will be reviewed by the other parties’ expert.
- 7.3.4 Similar to the understanding of the purpose of the report, the content of the report is largely dictated by the requirements of the instructing client and we see that the extent of the content to be considered and included in the report is defined by the instruction supplied, as is the example of 2.2.2.

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<sup>6</sup> Either the party instituting the action or the party defending the action.

<sup>7</sup> Judge / Magistrate / arbitrator / mediator or the like.

<sup>8</sup> See reference material 7.1g section and page 50-5

- 7.3.4.1 However, the content of the report may need to extend beyond what is assumed and requested by the client. For this reason and once again similar to the understanding of the Purpose of the report at section 7.2.4.1, these requirements should be clarified with the client at the outset, or at the soonest knowledge thereof.
- 7.3.5 Although in litigation, the instructing parties will typically follow legal requirements and request your full Curriculum Vitae<sup>9</sup> or a Résumé<sup>10</sup> as they see fit, for inclusion with their notice of intention to call an expert witness, your report should nonetheless contain a brief Résumé.
  - 7.3.5.1 As with the definition of a Résumé, the contents thereof listed in the report must be concise and precise and serve only as a brief outline to the reader as to your specialised knowledge. Should they need to know specific details they will request and review your Curriculum Vitae.
  - 7.3.5.2 Qualifying oneself as an expert during litigation is usually done at the outset of trial, for this reason the writer's Résumé is included in the report and is usually positioned at the beginning of the report.
- 7.3.6 Be cautious not to repeat information during the report. It can be that a particular piece of evidence may be related to various factors however remain cautious not to constantly re-hash information and evidence already covered.
- 7.3.7 It is often wise to compile the entire content of the report in the "third person", as this lends to a sense of detachment, creating the feel of independence and objectivity.
  - 7.3.7.1 This would have the report written using such references or phrases as "The writer" or "The expert / specialist is of the opinion"

#### **7.4      Layout or setup of the reports – physical structure:**

- 7.4.1 The terms *compiling or writing* as used in this context includes the use of typing on a keyboard in the use of a word processing programs, such as the commonly used Microsoft office programs or others and will also include the general compilation of reports to the extent of inclusion of graphics, references and other inclusions in the report.
  - 7.4.1.1 No specific preference or requirement is made as to what word processing programs are to be used in the compilation of reports. However as the writer makes extensive use of Microsoft office – Word, Excel and Power Point Presentation and that this software seems to be in wide use, references herein are generally based around this package, however remains applicable to any software used as it is the final product that is to be considered.
- 7.4.2 There are different views or opinions on whether a report should be compiled in a *chronological or topical sequence*<sup>11</sup> and by this the writer refers to whether the report is compiled in the sequence of events as undertaken in the investigation or process of consideration of evidence, *Chronological*, or whether the report is compiled addressing specific subject matters at a time, *Topical*.
  - 7.4.2.1 Whichever method used, it is largely a matter of personal preference. However there is some merit in considering both approaches. In general, it will typically be found that most reports follow a basic chronological order, to a certain extent. This can be seen by the usual tendency of listing the table of contents in the order in which most of the investigations were undertaken. However, at certain points or sections within the report it is likely that it will be far more practical to address specific issues using a topical approach.

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<sup>9</sup> See section 6 - Glossary - Synonyms

<sup>10</sup> See section 6 - Glossary - Synonyms

<sup>11</sup> See reference material 7.1a – pg 6

- 7.4.2.1.1 As an example, it is somewhat logical that when reaching the point of analysing the specific technical evidence that may be at hand in detail, it would be somewhat easier to use a *Topical* approach and address the specifics of each piece of evidence under this particular section (in this manner).
- 7.4.2.2 Regardless of the sequence of issues addressed, it is perhaps most important that the specialist does not lose sight of the physical layout of the report, here the numbering, spacing, font and general shape and continuity of the document must be carefully considered, with the report conforming to *Clarity, Completeness, Conciseness and Correctness*.
- 7.4.3 Header and footer: Although not necessary, the use of the header and footer function, such as the header use in this document, has become somewhat common place in reports, especially where the ability to include these in a report through the use of the word processing program makes this a simple and effective process.
- 7.4.3.1 A header and footer allows the automatic insertion of such details that the author may want to have easily referenced throughout the document and much like the page numbering serves to confirm the ownership of the page to the document. Especially where the report may be disassembled for duplication.
- 7.4.4 Titles & headings: Titles and headings are used to distinguish the various main sections and sub sections, allowing an easier reference to particular issues or subjects. As can be seen throughout this document, the main section titles are in bold and underlined, with the sub section in Italic and underlined (see section 4.8).
- 7.4.4.1 The main section and sub-section heading should at all times, be carried onto the next page if either of these sections continues onto the next page. As an example, it can be seen that this has been done at the top of this page and the following page. This allows for easy reference to what section and subsection the reader is at without having to page back many pages and is especially useful where the report may be disassembled and copied.
- 7.4.4.2 The table of contents page, usually the first page, will generally display the main section titles or headings. Although this page may be compiled at the outset of the report, it is most common that once the report has been finalised, that the table of content page will be amended according to the titles and headings that have been used in the full report, as it is often required that these may change.
- 7.4.5 Numbering: We see from the layout of this document itself that there is accurate and thorough numbering of every page, paragraph and sub paragraph, allowing the reader to make specific reference to page, paragraph and sub paragraphs when referring to the document.
- 7.4.5.1 As reports are of a forensic nature, this accurate and comprehensive numbering of every detail is crucial. Logically, it becomes difficult for you as the specialist or for the reader to make reference to a specific page, section or paragraph if there are no numbers, or if the numbering is limited or inaccurate.
- 7.4.5.1.1 For obvious reasons, this numbering is particularly important when testifying on the report, such as when evidence is led thereon in chief or in cross examination.
- 7.4.5.2 This numbering should be by the use of Prime numbers<sup>12</sup> for page numbering, on every page and should start with and include the very first page, however not the cover.
- 7.4.5.3 Prime numbers should also be used for every main section.
- 7.4.5.4 Prime and sub-numbering<sup>13</sup> is used for sub sections or paragraphs.

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<sup>12</sup> These are numbers such as 1, 2, 3, 5, 6, and so on.

<sup>13</sup> This would be 1.1 or 1.2 or 2.1 and 2.2 and so on.



- 7.4.5.5 Sub-numbering or alpha numeric numbering<sup>14</sup> for further sub-paragraphs or sub sections can be used if required, examples of this style or use of sub-numbering is evident throughout this document.
- 7.4.5.6 Numbering also needs to extend chronologically to include any addendums and would require that every page of an addendum is numbered sequentially.
  - 7.4.5.6.1 An example of such addendums may include a separate album of photographs, diagrams, an affidavit or a reference research paper.
- 7.4.5.7 It is important that bullets are not used as “numbering” at any point in the report as they cannot easily be referenced to.
- 7.4.5.8 A paragraph or section that becomes divided by a page end must not be split in half, either re-format your document to pull the entire paragraph onto the same page, or move the entire paragraph onto the following page. This helps to avoid disjointed reading and easier reference to the paragraph or section and report as a whole.
- 7.4.6 Spelling; grammar & general English language: Although spelling, grammar and the use of correct English language<sup>15</sup> is important, it does not necessarily change the content of the report or the accuracy of the subject matter. However the lack of attention hereto is a clear indication of the effort expended by the writer on the report and very easily detracts from the factors that the writer is attempting to address.
  - 7.4.6.1 Spelling and grammar check is a function on every word processing program and although it is typically quite sound, do not rely utterly on this system as there may well remain flaws in your document if you do not review it correctly.
    - 7.4.6.1.1 As an example of common mistakes, we see that words such as unusual people’s names, such as Mr. Sudesh Salligram, may remain incorrectly spelt throughout the document if not checked manually. The words “Their” and “there” are often used incorrectly, full stops forgotten at the end of sentences and commas used in the incorrect place are other simple yet regular mistakes.
  - 7.4.6.2 Avoid colloquialism and slang, as an example the words “gonna” or “grouty”, “Drivin”, “ain’t” and “nothing” this is most definitely not acceptable for such reports.
- 7.4.7 Abbreviations: Abbreviations can be used and tend to be quite helpful in reducing the length of the report. The correct procedure in the use of abbreviations, such as those used for the names of people, places or specific things and terms that can be abbreviated, is to ensure that where these are used for the first time in the report, that they are used in full followed by the abbreviation, this then sets the understanding of the abbreviation through the rest of the report. Examples of this would be:
  - 7.4.7.1 “Principal Direction of force” as PDOF.
  - 7.4.7.2 “Mr James Trevor Johnston” as JTJ, or perhaps “Windermere Shopping Centre” as WSC.
- 7.4.8 Text size / spacing / italics / highlights / underline & colour: The use of these functions, as well as others throughout a report, are most useful and serve well to create an easily readable, well formatted report. They also serve to distinguish from certain main sections, sub sections or particularly important facts or references.
  - 7.4.8.1 Although somewhat logical, attention should be paid to the *sizing*, *spacing* and *style* of text throughout the document as the technical nature of the report very often leads to lengthy writings, therefore the use of correctly sized, spaced and styled text is important to the readability of the report.

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<sup>14</sup> This would be 1.1.1 or 2.2.5 or 1.1a and 2.2.4d and so on.

<sup>15</sup> Although most reports are compiled in English, the same understanding applies to any language used.

7.4.8.1.1 In general text should be no less than *size 10* and typically at *12*, as is this text. Text style to the effect of *Times New Roman*, as is this text, or *Arial* should be used as these are generally accepted as being both reader and layout friendly. Single or double spacing can be used between words, lines and paragraphs, so as to easily differentiate items; this document is set out with single spacing, however with double spacing used at the end and start of each main section.

7.4.8.1.2 As a further example, it is seen throughout this document that the main sections are in a text size slightly larger and are highlighted in bold. Similarly the sub sections are placed in italics and underlined.

7.4.8.2 The use of colour is not advised as copies are usually made of the report by clients in black and white and therefore colour is largely void, the use of colour in documents can substantially increase the cost of reports.

7.4.9 Technical terms: Much like the correct use of spelling, grammar and English language, perhaps one of the most important factors to remember is to ensure that the correct technical terms are used throughout the report. Making reference to a particular evidential factor by its incorrect name is a definite indication that the author has either not made the effort to review his/her report, or perhaps worst of all, may suggest that he/she does not know the correct term, or has misinterpreted the evidence. This can cause great embarrassment. A few examples hereof are:

- a) Yaw marks referenced to as braking marks.
- b) A Furrow being referenced to as a tyre mark
- c) A Spatter mark being referenced to as a soak patch
- d) Striations being referred to as stripes.

7.4.9.1 This lack or incorrect use of technical terms is a glaring blunder and should this be discovered, will surely lead to indignant opinions as to the reports accuracy and the writer's credibility.

7.4.10 Symbols: Special care should be taken with calculations included in the report, not only with the actual correct calculation thereof, but likewise with the symbols use. For the most part, the special symbols used in reports are available in the various word processing programs, such as "insert – symbol" in the Microsoft Office – Word program, therefore the use of these should not pose a problem. Symbols may include some of the following:

- a) ÷
- b) × or .
- c) ( ) or [ ]
- d) √
- e) μ

7.4.10.1 The use of correct symbols does not only include the actual use of correct symbols, as in the insertion of the "correct looking" symbol at the correct location, but to the correctly referenced symbol, such as incorrect use of "m" for momentum or km/h (kilometres per hour) where m/s (meters) should have been used.

7.4.11 Reference inserts: As can be seen at various points through this document, reference inserts can be quite useful.

7.4.11.1 Do not over-use this function, as this can be very distracting to the flow and readability of the report, resulting in the reader having constantly stop and make reference to the insert. Generally, the use of references should be kept to a minimum and there should not be more than four (4) inserts per page as this also reduces the useable page space.

7.4.11.2 Reference inserts are typically used to direct the reader to a particular reference material or addendum that may be of importance.

7.4.11.3 Generally, use of reference inserts need only be used once for a particular reference made in a report and, like abbreviations, must be used at the first instance of such a reference.

7.4.12 Graphics: Do not be afraid to use *Graphics*, such as diagrams, charts and photographic inserts among others as they can be powerful aids as they cut down on prose necessary to describe particular evidence. However most importantly they allow a far clearer and accurate description of evidence that may be somewhat difficult to describe in writing, “Pictures say a thousand words”, however use them judiciously.

7.4.12.1 In Microsoft Office – Word, the “insert” function used in conjunction with the “format / layout – tight” function, combined with the typical grab hand corner scaling function, creates a convenient and accurate method of placing graphics at almost any location and size throughout the report. This can also include CAD based drawings.

7.4.13 Cover and binding of the report: every report must have a cover and be bound appropriately. The cover usually serves as a quick reference to:

- a) The name of the matter at hand
- b) The name of the Author
- c) The reference number of the instructing client
- d) The reference number of the author
- e) The date of instruction and or completion of the report

7.4.13.1 The cover also serves to protect the important written contents of the report as these reports are usually quite extensively handled.

7.4.13.2 As most reports are typically for litigation purposes, someone has to read the report. Making the report physically easier to manipulate for reading, especially in sizeable and more complex reports, will assist in their appreciation of the efforts put into the content. As such, the binding of reports is important.

7.4.13.3 Reports are usually photocopied for distribution to the various parties, as such it is typically requested that reports are bound in such a manner that they can easily be disassembled. This is easiest with the use of:

- a) Split pins
- b) Paper Fasteners
- c) File fasteners
- d) Treasury tags
- e) Manilla spring clip folders
- f) Ring, lever arch or Bantex files

7.4.14 Draft version: It is not advisable that a final copy of a report is simply printed and submitted, a draft copy should be printed and scrutinised before submitting.

7.4.14.1 Usually a draft copy will allow the writer to review the report in hard copy, with any amendments being made followed by an “initial final version”. It is often wise to leave the report for a few hours, perhaps overnight before finally reviewing the report. This allows a clear mind and therefore relatively fresh review.

7.4.14.2 Very often having an independent person, such as a secretary, fellow specialist or even your spouse review the report is also wise, as this may highlight various items that the writer may have missed.

7.4.14.3 Although copies are usually stored on the writers hard drive and possibly even on a backup, it is always a good idea, printing a hard copy of the final product and place this in the file immediately as this often avoids the trouble of arriving at a pre-trial meeting or even at trial to find the original, or a copy thereof is not available and that your hard copy has not been printed.



7.4.15 Going on training for word processing programmes such as Microsoft Office – Word, Excel and PowerPoint Presentation, will go a long way in assisting you compile exceptionally professional reports. Such training is usually relatively cheap and is generally a single day for each level.

7.4.15.1 However, such programs are typically quite simple and can be self-taught by a combination of reference to their text books, help menu and assistance of others.

7.4.15.2 Attending training on such subjects as CAD or CDR is an attempt to broaden knowledge and become more professional. Likewise mastering such word processing programs and thereby report compilation, is a further process in achieving excellence.

7.4.15.3 It is well advisable that, over and above attending some level of word processing training, attending a basic legal training course as well as an English language and grammar refresher, will serve well to distinguish you as a consummate professional.

## **7.5     In General:**

7.5.1 As has been alluded to in section 1.1, the indications herein are not the “be all and end all” of report compilation, however serve as a guide and reminder to the compilation of professional reports.

7.5.2 It may seem to you as the writer of the report, that the contents of your report are plain English and easily understandable. This is generally not the case to the reader. It is not always simple to express a decisive opinion in writing, especially on technical issues, so that others will understand, or perhaps more correctly put, will understand as you may wish them to understand.

7.5.3 You as the report writer must make every attempt to be unambiguous when expressing yourself and must state what you mean and must not assume that the reader will simply understand or “get the gist of it”.

7.5.4 In the interest of professionalism, all experts or specialists should at some stage take the time to review their current report compilation procedures, report content and layout and perhaps take the time to have appropriate peer or professional review undertaken of their report.

7.5.4.1 Perhaps a review of an old report once a year or so, should have you thinking that your reports have progressed to a more professional level.

7.5.5 There is perhaps none more profound, motivating and stimulating achievement than the culmination of your learned, experienced and researched knowledge into a well thought out, structured and professionally accurate report that both you and your client can rely on to make an informed and, perhaps most importantly, appropriate decision.

7.5.5.1 However, bear in mind that likewise, there may be no more embarrassing and career destroying moment than being bullied and discredited based upon a wholly unprofessional report.

**8 Reference material:**

- 8.1 There are many books and papers that cover every finer detail of traffic accident investigation, reconstruction and cause analysis, these are easily sourced through the web. Any person or institute that deals with the many issues surrounding accidents should have a library, or at least the basic books and papers, and better still, should have a regular update of new books and papers.
- 8.2 There are many specialised Websites that cater for the subject matter, many of these sites have regular newsletters and technological notifications and invites to events, registering with and keeping abreast of these is ideal.
- 8.3 Accident Specialist prides itself on an exceptionally detailed library and makes regular effort at updating the library with new books and reference papers, the following listing is that of some of the books and papers held in our library, and that are of relevance to the field and therefore to you.

BOOK TITLE	AUTHORS AND / OR PUBLISHER/S	SERIAL / REFERENCE NO.
A-Z Road Transport - Terminology and related information		
AARTO: Administrative adjudication of road traffic offences: Training manual	RTMC	
A demonstration of the dynamic tests developed for NHTSA's NCAP Rollover rearing system: Phase VIII of NHTSA's light vehicle rollover research program	National Highway Traffic Safety Administration (NHTSA)	DOT HS 809 705
A format for successful accident reconstruction: Report writing	Institute Police Technology & Management - Florida	
A Fleetwatch Publication: RTQS Revisited by Max Braun in Partnership with MAN	Max Braun / Fleetwatch	
Accident Investigation, Reconstruction, Interpretation and the Law - 1999 (PROCEEDINGS)	AIRIL 99	
Advanced Accident Investigation Series: Lamp examination for on or off in traffic accidents by J Stannard Bajer and Thomas Lindquist. 1977 revised edition	The Traffic Institute, Northwestern University	
Advanced techniques in traffic crash investigation. David Brill	Institute Police Technology & Management - Florida	1-884566-57-X
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Color Atlas of Forensic Toolmark Identification. Nicholas Petraco	CRC Press: Taylor & Francis Group	
Commercial Motor Vehicle Crash Investigation - David E. Brill	Institute Police Technology & Management - Florida	1-884566-39-1
Complete Guide to A Four-Wheel Drive in SA	Andrew St.Pierre White	ISBN 0-620-21430-9
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Proceedings of the Sixth International Driving Symposium on Human factors in Driver Assessment, Training and Vehicle Design: An Analysis of driver reactions to tire failures simulated with the National Advanced Driving Simulator (NADS). Robert Rucoba, Lee Carr, Robert Liebbe, 7 Amanda Duran, Carr Engineering, Inc.pdf	PROCEEDINGS of the Sixth International Driving Symposium on Human Factors in Driver Assessment, Training and Vehicle Design	
SAE Technical paper series: Vehicle handling with tire tread separation. Charles P. Dickerson, Mark. Arndt, Stephen M. Arndt. Reprinted from: vehicle dynamics and simulation 1999 (SP-1445). International Congress and Exposition Detroit, Michigan March 1-4 1999.pdf	SAE International	1999-01-0120
<b>BUSES</b>		
The computer aided analysis of the bus accidents orientated to the numerical simulation of the injury of the human body. Xiao-Yun Zhang, Xian-Long Jin, Jie Shen School of Mechanical Engineering. Issue 5, Volume 10, May 2011.pdf	WSEAS Transactions on Computers	ISSN 1109-2750
Bus safety investigation report: Bus wheel separation. 8 February 2010.pdf	OTSI (Office of Transport Safety Investigations)	Investigation reference 004469
Bus safety investigation report: Bus rear wheel detached and collided with oncoming vehicle. 12 May 2009.pdf	OTSI (Office of Transport Safety Investigations)	Investigation reference 04440
<b>CRITICAL CURVE ISSUES</b>		
Analysis on vehicle no-sideslip single side skid equivalent frictional coefficient. Tongheng Yue, Qiang Guan, Qiang Zhao, Qindong Xia.pdf	Traffic College, Northeast Forestry University China / Traffic Accident Department, Traffic Police Bureau China	
Critical speed yaw analysis and testing presented by John Daily, Jackson Hole Scientific Investigations Inc.pdf	Jackson Hole Scientific Investigations Inc	
Evaluation of vehicle velocity predictions using the critical speed formula. Charles P. Dickerson, Mark W. Arndt, Stephen M. Arndt and Gregory A. Mowry. Reprinted from Accident Reconstruction: technology and animation V (SP-1083).pdf	SAE International	950137
Critical speed field testing of a passenger vehicle. Albert T. Baxter, James R. Mentzer.pdf	N.A.T.A.R.I.	
Procedures for setting curve advisory speed: Course notes - Appendix A. Horizontal Curve Signing Handbook, 2nd Edition	Texas Transportation Institute	Product 5-5439-01-P1
The language of tire marks (the skid and Yaw mark) by Max J. Scott.pdf		
Yaw spreadsheet - km/h required to sideslip.pdf	NUTI TAI Manual Vol 2 Topic 872	
<b>DANGEROUS GOODS</b>		
Danger warning diamond diagram.pdf		

The National Road Traffic Act 93 of 96: Chapter VIII of the Regulations: Transportation of dangerous goods and substances by road.pdf	Foresight Publications	
Dangerous goods digest: The orange book of Southern Africa. August 2008. Updating service no. 11.pdf	Foresight Publications	
UCSB Environmental health and safety emergency response guidelines. Revised March 1, 2005.pdf		
Nitric Oxide: 1311. November 1998. CAS No: 10102-43-9. RTECS No: QX0525000. UN No. 1660.pdf	IPCS (International Programme on Chemical Safety)	
Land transportation emergency response guideline for petroleum spills. December 2008.pdf	Canadian Petroleum Products Institute	
Material safety data sheet: Nitrogen. April 2001.pdf	Afrox	
SABS Standards Bulletin. May 2008.pdf	SABS	
Gas Focus Vol. 4 No. 1 Sept. 2008.pdf	South Africa Compressed Gases Association	
<b>EJECTION</b>		
Factors related to the likelihood of a passenger vehicle occupant being ejected in a fatal crash. Technical Report. December 2009.pdf	US Department of Transportation National Highway Traffic safety Administration	DOT HS 811 209
Occupant ejection trajectories in rollover crashes: Full-scale testing and real world cases.pdf	SAE International	SAE2008-01-0166
<b>EYESIGHT</b>		
Sensitivity analysis of headlamp parameters affecting visibility and glare. December 2008.pdf	US Department of Transportation National Highway Traffic safety Administration	DOT HS 811 055
Clear vision.doc	SAOA (SA Optometric Association)	
Driving with low vision by Hazel Sacharowitz.doc		
Eye diseases that affect drivers.doc		
Eye protection and road safety: introduction to the eye care and road safety.doc		
Importance of vision: Road safety and the importance of clear vision.doc		
Performance assessment of vehicle headlamps: Progress of the Joint CIE TC4-45/GTB Front Lighting Working Group Activity. 14 March 2007.pdf	SAE	
Road safety and health: Learn about your health eyesight.doc		
Early indication of eyesight problems in drivers. September 2006.pdf	Autonews	
Vision and driving.doc	About Vision	
<b>FIRE</b>		
UK Aluminium Industry Information Sheet: Aluminium and fire. Information Sheet 3. July 2004.pdf	ALFED (Aluminium Federation Ltd.)	
Aluminium and fire - in fiery mines and has hazardous circumstances. Extract from ASSA's "Introduction to aluminium" - June 2004.pdf	ASSA (Aluminium Federation South Africa)	
Bolted Joint Design.pdf	F.E.D.S. (Fastenal Engineering & Design Support)	
Auto arson detection, training key #213. International association of Chiefs of Police -- Professional Standards Division. 1974.pdf	Inter Fire Online	
Effect of high temperature exposure on the mechanical properties of cold expanded open holes in 7050-T7451 aluminium alloy.pdf	Australian Government Department of Defence	DSTO-TN-0844
Fire arson investigation manual: Chemistry and physics of fire behaviour.pdf		
A Field guide to incident management: 23. Incident indicators. May / June 2000.pdf	National Fire and Rescue Magazine	
Forensic Science Series: Fire investigation.pdf	CRC Press	ISBN 0-415-24891-4
Fire occurrence in frontal crashes based on NASS / CDS.pdf	SAE 2008 World Congress / MVFRI (Motor Vehicle Fire Research Institute)	
Recording of fire incident data: Field notes. 906-5.pdf		
TNO Building and Construction Research: TNO Report: Heating of Aluminium exposed to fire. September 7, 2005.pdf	TNO	
Recent MVFRI research in crash-induced vehicle fire safety. February 2007.pdf	MVFRI (Motor Vehicle Fire Research Institute)	
Research programs in crash-induced fire safety. February 2005.pdf	MVFRI (Motor Vehicle Fire Research Institute)	
Under hood temperature measurements of four vehicles. 2004-09-07.pdf	Biokinetics and Associates Ltd.	Report No. R04-13 V01
Assessment of thermocouple attachment methods for measuring vehicle exhaust temperatures. 2006-07-19.pdf	Biokinetics and Associates Ltd.	Report No. R06-23 b
Susceptibility of unprotected steel bolted connections to embrittlement after a fire.pdf	Queen Mary, University of London	
CSM Internal order no. EC14003. CSM report no. 13570R. Progress report no. 7 (final report. Stainless steel in fire. February 2008.pdf	Centro Sviluppo Materiali S.p.A. (CSM)	
Unlocking the vehicle fire investigation.pdf		
Topical Fire Report Series: Volum 9, issue 1 / September 2008. heavy vehicle fires.pdf	U. S. Department of Homeland Security / FEMA	
Vehicle fires: A practical approach by Mike Higgins.pdf	K-Chem Laboratories	
U. S. Vehicle fire trends and patterns. July 2008.pdf	National Fire Protection Association (NFPA)	
Why do some cars burst into flames. Fire: When gas leaks during a crash, sparks can cause explosion. 10/21/2006.pdf	Press Telegram	
<b>FORMULAS</b>		



Proceedings of the Institution of Mechanical Engineers, Part D: Journal of Automobile Engineering: The formula commonly used to calculate velocity change in vehicle collisions. 1998.pdf	Sage Publications	DOI: 10.1243/0954407981525803
An analytical assessment of the critical speed formula by Raymond M. Brach.PDF	SAE	SAE970957
SAE Technical paper series: Determination of vehicle velocities and collision location by means of Monte Carlo Simulation Method. Reprinted from: Accident reconstruction 2006 (SP-1999).pdf	SAE	2006-01-0907 / ISBN 0-7680-1722-X
Determining vehicle speeds from skid marks by James O. Harris.pdf		
<b>HIGH SPEED CAMERAS</b>		
Fastec Trouble Shooter: Portable high-speed digital video camera.pdf	Fastec Imaging	
<b>LIGHTING</b>		
Roadway lighting design manual. May 2004.pdf	Department of Transportation Minnesota	
<b>RAILROAD / TRAIN ACCIDENTS</b>		
Mass transit rail accident investigation: Railroad accident investigator's handbook. February 1993.pdf	Transportation Safety Institute and the Transportation Systems Centre sponsored by Federal Transit Administration Office of Safety	
Train driving.pdf		
<b>VEHICLE RECOVERY PROCEDURES</b>		
Gwent Police Vehicle Recovery Procedures. June 2011.pdf	Heddlu Gwent Police	
The South African national Road Agency Ltd: Road incident management system.pdf	The South African National Roads Agency Ltd.	
Guidelines for safe use of vehicle recovery straps (snatch straps).pdf		
Traffic training college brochure.doc	Traffic Training College	
<b>SABS / SANS</b>		
SANS 10047:2009: The testing of motor vehicles for roadworthiness.pdf	South African Bureau of Standards	
SANS 10216: Vehicle test station requirements.pdf	South African Bureau of Standards	
SANS 1047:2006 Edition 2.2: Motor vehicle safety specification: Interior fittings (passenger cars) (Incorporating EEC Directive 74/60 'Interior fittings of motor vehicles: and the amending EEC Directive 78/632, with modifications).pdf	South African Bureau of Standards	0-626-18090-2
SANS 1193:2008 Edition 2: Toughened safety glass for vehicles.pdf	South African Bureau of Standards	978-0-626-21566-8
SABS 1207 Edition 1.4 1998: Specification: Braking (Incorporating EEC Directive 71/320 covering braking devices of motor vehicles and their trailers, the amending EEC Directives 74/132, 75/524 and 79/489 and parts of ECE Regulation 13, with modifications).pdf	South African Bureau of Standards	0-626-13459-5
SANS 1430: 2007: Motor vehicle safety specification: Anchorages for restraining devices in motor vehicles (Incorporating EEC Directive 76/115 'Anchorages for motor vehicle safety belts' and the amending EEC Directives 81/575 and 82/318, with modifications).pdf	South African Bureau of Standards	978-0-626-19967-8
SANS 1563:2005 Edition 1.1: The strength of large passenger vehicle superstructures (roll-over protection) (incorporating E/ECE/324 Addendum 65: Regulation 66, 'Uniform provision concerning the approval of large passenger vehicles with regard to the strength of their superstructure', with modifications).pdf	South African Bureau of Standards	0-626-16880-5
SANS 3000-4:2001 Edition 1: RSR 004:2011 Edition 1: Railway safety management: Part 4: Human factors management.pdf	South African Bureau of Standards	978-0-626-25341-7
<b>SHIPPING CONTAINERS</b>		
Dry Cargo container specifications.jpg		
CMA CGM Group Container Fleet.pdf	CMA CGM	
Shipping container construction.gif		
Shipping container specs.gif		
<b>LOCKS</b>		
Twistlock: Standard type: Retractable and non-retractable short retracted length. Model 1101-3137-R / Model 1101-3137-NR.pdf	Chassis King	
United States Patent: CAM action twist lock assembly for freight containers. Nov. 3, 1992.pdf		Patent number 5,160,224
<b>ROAD MARKS / EVIDENCE</b>		
Skid to stop spreadsheet.pdf		
<b>DVDS</b>		
History: Dead Reckoning: Blood Splatter		GRD2506
History: Dead Reckoning: Left at the scene		GRD2504
History: Dead Reckoning: Body searches		GRD2503
History: Dead Reckoning: DNA's Debut		GRD2505
History: Dead Reckoning: Body Clues		GRD2502
History: Dead Reckoning: Trackings in blood		GRD2507

## 8.4 Web sites: (Local and international resources)

VEHICLE COMPANIES:	MAGAZINES, BOOKS, PAPERS:
<a href="http://www.toyota.co.za">www.toyota.co.za</a>	<a href="http://www.collisionpublishing.com">www.collisionpublishing.com</a>
<a href="http://www.bmw.co.za">www.bmw.co.za</a>	<a href="http://www.cartoday.com">www.cartoday.com</a>
<a href="http://www.mercedesbenz.co.za">www.mercedesbenz.co.za</a>	<a href="http://www.topcar.co.za">www.topcar.co.za</a>
<a href="http://www.ford.co.za">www.ford.co.za</a>	<a href="http://www.fleetwatch.co.za">www.fleetwatch.co.za</a>
<a href="http://www.vw.co.za">www.vw.co.za</a>	<a href="http://www.speedandsound.co.za">www.speedandsound.co.za</a>
<a href="http://www.deltamotorcorp.co.za">www.deltamotorcorp.co.za</a>	<a href="http://www.collisionpublishing.com">www.collisionpublishing.com</a>
<a href="http://www.mitsubishi.co.za">www.mitsubishi.co.za</a>	<a href="http://www.accidentreconstruction.com/bookstore">www.accidentreconstruction.com/bookstore</a>
<a href="http://www.cmh.co.za">www.cmh.co.za</a>	<a href="http://www.autotrader.co.za">www.autotrader.co.za</a>
<a href="http://www.tatasa.co.za">www.tatasa.co.za</a>	<a href="http://www.motorbooks.co.za">www.motorbooks.co.za</a>
<a href="http://www.tata.com">www.tata.com</a>	<a href="http://www.autobooks.co.za">www.autobooks.co.za</a>
<a href="http://www.subaru.com">www.subaru.com</a>	<a href="http://www.autosource.co.za/Seller.php?USER=mm">http://www.autosource.co.za/Seller.php?USER=mm</a> (Mead & McGrouther books)
<a href="http://www.peugeot.com">www.peugeot.com</a>	
<a href="http://www.renault.com">www.renault.com</a>	<b>GOVERNMENT SITES:</b>
<a href="http://www.honda.com">www.honda.com</a>	
<a href="http://www.proton.com">www.proton.com</a>	<a href="http://www.transport.gov.za">www.transport.gov.za</a>
<a href="http://www.porsche.co.za">www.porsche.co.za</a>	<a href="http://www.ntl.bts.gov">www.ntl.bts.gov</a>
<a href="http://www.ferrariworld.com">www.ferrariworld.com</a>	<a href="http://www.kzntransport.gov.za">www.kzntransport.gov.za</a>
<a href="http://www.alfaromeo.co.za">www.alfaromeo.co.za</a>	<a href="http://www.durban.gov.za">www.durban.gov.za</a>
<a href="http://www.audi.com">www.audi.com</a>	<a href="http://www.raf.co.za">www.raf.co.za</a>
<a href="http://www.chevrolet.com">www.chevrolet.com</a>	<a href="http://think.direct.gov.uk">http://think.direct.gov.uk</a>
<a href="http://www.landrover.co.za">www.landrover.co.za</a>	<a href="http://www.roadsafety.nt.gov.au">www.roadsafety.nt.gov.au</a>
<a href="http://www.fiat.co.za">www.fiat.co.za</a>	<a href="http://www.nts.gov">www.nts.gov</a>
<a href="http://www.volvo.com">www.volvo.com</a>	<a href="http://www.nhtsa.dot.gov/">www.nhtsa.dot.gov/</a>
<a href="http://www.hummer.com">www.hummer.com</a>	<a href="http://www.iihs.org">www.iihs.org</a>
<a href="http://www.saab.co.za">www.saab.co.za</a>	<a href="http://www.trl.co.uk">www.trl.co.uk</a>
<a href="http://www.isuzu.co.za">www.isuzu.co.za</a>	<a href="http://www.justice.gov.za">www.justice.gov.za</a>
<a href="http://www.lamborghini.com">www.lamborghini.com</a>	<a href="http://www.ecsa.co.za">www.ecsa.co.za</a>
<a href="http://www.suzukisa.co.za">www.suzukisa.co.za</a>	<a href="http://www.caa.co.za">www.caa.co.za</a>
<a href="http://www.daihatsu.com">www.daihatsu.com</a>	
<a href="http://www.jaguar.co.za">www.jaguar.co.za</a>	<b>ACCIDENT INVEST. RECON. &amp; RESEARCH:</b>
<a href="http://www.jeep.co.za">www.jeep.co.za</a>	
	<a href="http://www.accidentreconstruction.com">www.accidentreconstruction.com</a>
<b>MOTORCYCLE COMPANIES / SPECS:</b>	<a href="http://www.collisionresearch.com">www.collisionresearch.com</a>
	<a href="http://www.accidentinvestigation.com">www.accidentinvestigation.com</a>
<a href="http://www.motorcyclespecs.co.za">www.motorcyclespecs.co.za</a>	<a href="http://www.accidentscience.com">www.accidentscience.com</a>
<a href="http://www.aprilia.com">www.aprilia.com</a>	<a href="http://www.crimeandcrashmaps.com">www.crimeandcrashmaps.com</a>
<a href="http://www.honda.co.za/main.aspx?ID=1">www.honda.co.za/main.aspx?ID=1</a>	<a href="http://www.tairs.force9.co.uk">www.tairs.force9.co.uk</a>
<a href="http://www.bimota.it">www.bimota.it</a>	<a href="http://www.crime-scene-investigator.net">www.crime-scene-investigator.net</a>
<a href="http://www.yamaha.co.za">www.yamaha.co.za</a>	<a href="http://www.ukccis.org">www.ukccis.org</a>
	<a href="http://www.vv.se/templates/page2_2_13172.aspx?epslanguage=EN">www.vv.se/templates/page2_2_13172.aspx?epslanguage=EN</a>
<a href="http://www.suzukisa.co.za">www.suzukisa.co.za</a>	<a href="http://www.rta.nsw.gov.au/roadsafety/index.html">www.rta.nsw.gov.au/roadsafety/index.html</a>
<a href="http://www.kawasakisa.co.za">www.kawasakisa.co.za</a>	<a href="http://www.jari.or.jp/english/">www.jari.or.jp/english/</a>
<a href="http://www.harley-davidson.com">www.harley-davidson.com</a>	
<a href="http://www.ducati.co.za">www.ducati.co.za</a>	<a href="http://www.autoliv.com">www.autoliv.com</a>

<a href="http://www.bmwmotorrad.co.za">www.bmwmotorrad.co.za</a>	<a href="http://www.iihs.org/">www.iihs.org/</a>
<a href="http://www.proaction.co.za">www.proaction.co.za</a>	
<a href="http://www.triumphmotorcycles.co.za">www.triumphmotorcycles.co.za</a>	<b>AQUAPLANING ISSUES:</b>
<a href="http://www.dropbears.com/bikelinks/Makes/">http://www.dropbears.com/bikelinks/Makes/</a>	
<a href="http://www.cagiva.it">www.cagiva.it</a>	<a href="http://www.smartmotorist.com/rai/rai.htm">www.smartmotorist.com/rai/rai.htm</a>
<a href="http://www.vespa.co.za">www.vespa.co.za</a>	<a href="http://www.pirellip7.com/p7/knowhow-p7-aquaplaning.html">www.pirellip7.com/p7/knowhow-p7-aquaplaning.html</a>
	<a href="http://www.talktalk.co.uk/reference/encyclopaedia/hutchinson/m0006552.html">www.talktalk.co.uk/reference/encyclopaedia/hutchinson/m0006552.html</a>
<b>GENERAL RESEARCH:</b>	<a href="http://www.control.isy.liu.se/student/exjobb/xfiles/3409.pdf">www.control.isy.liu.se/student/exjobb/xfiles/3409.pdf</a>
	<a href="http://www.madsci.org/posts/archives/jun99/927780763.Eg.r.html">www.madsci.org/posts/archives/jun99/927780763.Eg.r.html</a>
<a href="http://www.hotstuffworks.com">www.hotstuffworks.com</a>	<a href="http://rip.trb.org/browse/perprj.asp?i=6923&amp;n=H.%20Aastroem">rip.trb.org/browse/perprj.asp?i=6923&amp;n=H.%20Aastroem</a>
<a href="http://www.hars.com/news.htm">www.hars.com/news.htm</a>	<a href="http://www.asphaltindustryalliance.com/safety.htm">www.asphaltindustryalliance.com/safety.htm</a>
<a href="http://www.aaafoundation.org">www.aaafoundation.org</a>	
<a href="http://www.autoweb.com">www.autoweb.com</a>	<b>ACCIDENT INVESTIGATION &amp; RECON PROGRAMS, EQUIPM. &amp; PRODUCTS</b>
<a href="http://www.arrivealive.co.za">www.arrivealive.co.za</a>	
<a href="http://www.grsroadsafety.org">www.grsroadsafety.org</a>	<a href="http://www.factualdiagrams.com">www.factualdiagrams.com</a>
<a href="http://www.general.monash.edu.au/MUARC">www.general.monash.edu.au/MUARC</a>	<a href="http://www.4n6xpri.com">www.4n6xpri.com</a>
<a href="http://www.drivealive.org.za">www.drivealive.org.za</a>	<a href="http://www.cadzone.com/default.htm">www.cadzone.com/default.htm</a>
<a href="http://www.smarteye.se">www.smarteye.se</a>	<a href="http://www.cgntesting.com">www.cgntesting.com</a>
<a href="http://www.autosafety.org">www.autosafety.org</a>	<a href="http://www.collisionfs.com">www.collisionfs.com</a>
<a href="http://www.naacam.co.za">www.naacam.co.za</a>	<a href="http://www.cdr-system.com">www.cdr-system.com</a>
<a href="http://www.policeone.com">www.policeone.com</a>	<a href="http://www.crashteam.com">www.crashteam.com</a>
<a href="http://www.acts.co.za">www.acts.co.za</a>	<a href="http://www.photomodeler.com/index.htm">www.photomodeler.com/index.htm</a>
<a href="http://www.underridenetwork.org">www.underridenetwork.org</a>	<a href="http://www.kineticenergypress.com">www.kineticenergypress.com</a>
	<a href="http://www.lasertech.com">www.lasertech.com</a>
<b>WEATHER SERVICES:</b>	<a href="http://www.optron.com">www.optron.com</a>
	<a href="http://www.mapscenes.com">www.mapscenes.com</a>
<a href="http://www.weathersa.co.za">www.weathersa.co.za</a>	<a href="http://www.rec-tec.com">www.rec-tec.com</a>
	<a href="http://www.trancite.com">www.trancite.com</a>
<b>UNIVERSITIES / TECHNICALS / INSTITUTES:</b>	<a href="http://www.rudydegger.com/wecare-products/index.asp">www.rudydegger.com/wecare-products/index.asp</a>
	<a href="http://www.msoftware.co.za">www.msoftware.co.za</a>
<a href="http://www.tut.ac.za">www.tut.ac.za</a>	<a href="http://www.visualstatement.com">www.visualstatement.com</a>
<a href="http://www.techtransfer.berkeley.edu">www.techtransfer.berkeley.edu</a>	
<a href="http://www.monash.edu.au/muarc">www.monash.edu.au/muarc</a>	<b>VEHICLE FIRES:</b>
<a href="http://www.raru.adelaide.edu.au">www.raru.adelaide.edu.au</a>	
<a href="http://www.itai.org">www.itai.org</a>	<a href="http://www.interfire.org">www.interfire.org</a>
<a href="http://www.iihs.org">www.iihs.org</a>	<a href="http://www.mvfri.org">www.mvfri.org</a>
<a href="http://www.ukzn.ac.za">www.ukzn.ac.za</a>	
<a href="http://www.sae.org">www.sae.org</a>	<b>TYRE MANUFACTURERS:</b>
<a href="http://www.ncac.gwu.edu">www.ncac.gwu.edu</a>	
<a href="http://www.mrc.ac.za">www.mrc.ac.za</a>	<a href="http://www.pirelli.co.za">www.pirelli.co.za</a>
<a href="http://www.sabs.co.za">www.sabs.co.za</a>	<a href="http://www.bridgestone.co.za">www.bridgestone.co.za</a>
<a href="http://www.sarf.co.za">www.sarf.co.za</a>	<a href="http://www.michelin.co.za">www.michelin.co.za</a>
<a href="http://www.aa.co.za">www.aa.co.za</a>	<a href="http://www.goodyear.com">www.goodyear.com</a>
<a href="http://www.ipm.org">www.ipm.org</a>	<a href="http://www.dunlop.co.za">www.dunlop.co.za</a>
<a href="http://www.csir.co.za">www.csir.co.za</a>	<a href="http://www.yokohama.co.za">www.yokohama.co.za</a>
<a href="http://www.nafe.org">www.nafe.org</a>	<a href="http://www.continental.co.za">www.continental.co.za</a>



<a href="http://www.umtri.umich.edu">www.umtri.umich.edu</a>	<a href="http://www.coopertires.com">www.coopertires.com</a>
<a href="http://www.trb.org">www.trb.org</a>	<a href="http://www.bfgoodrichtires.com">www.bfgoodrichtires.com</a>
<a href="http://www.collisionfs.com/training.php">www.collisionfs.com/training.php</a>	<a href="http://www.falken.co.jp">www.falken.co.jp</a>
<a href="http://www.collisionsafety.net">www.collisionsafety.net</a>	<a href="http://www.hankooktire-eu.com">www.hankooktire-eu.com</a>
<a href="http://nucps.northwestern.edu">nucps.northwestern.edu</a>	<a href="http://www.kelly-springfield.com">www.kelly-springfield.com</a>
<a href="http://www.srrtraining.com">www.srrtraining.com</a>	<a href="http://www.kumhotyre.co.uk">www.kumhotyre.co.uk</a>
<a href="http://www.rudydegger.com/accident-reconstruction-classes/index.asp">www.rudydegger.com/accident-reconstruction-classes/index.asp</a>	<a href="http://www.maxxis.com">www.maxxis.com</a>
<a href="http://www.ucr.edu/academics/extension.html">www.ucr.edu/academics/extension.html</a>	<a href="http://www.metzeler.com">www.metzeler.com</a>
<a href="http://www.losmedanos.edu">www.losmedanos.edu</a>	<a href="http://www.nankang.com.tw">www.nankang.com.tw</a>
<a href="http://www.soe.org.uk/">www.soe.org.uk/</a>	<a href="http://www.nittotire.com">www.nittotire.com</a>
<a href="http://www.carcrash.org/">www.carcrash.org/</a>	<a href="http://www.uniroyal.com">www.uniroyal.com</a>
<a href="http://www.fpsa.co.za">www.fpsa.co.za</a>	<a href="http://www.toyo.com">www.toyo.com</a>
	<a href="http://www.rma.org">www.rma.org</a> <a href="#">rubber manufacturers association</a>
<b>ORGANISATIONS:</b>	
<a href="http://www.irap.org">www.irap.org</a>	
<a href="http://www.teta.org.za">www.teta.org.za</a>	
<a href="http://www.aidc.co.za">www.aidc.co.za</a>	
<a href="http://www.iaea-online.org">www.iaea-online.org</a>	
<a href="http://www.isasi.org">www.isasi.org</a>	
<a href="http://www.flightsafety.org">www.flightsafety.org</a>	
<a href="http://www.n3tc.co.za">www.n3tc.co.za</a>	
<a href="http://www.interfire.org">www.interfire.org</a>	
<a href="http://www.fpsa.co.za">www.fpsa.co.za</a> (Fire Protection Association of Southern Africa)	
<a href="http://www.teta.org.za">www.teta.org.za</a> (Transport Education & Training Authority)	
<a href="http://www.sanas.co.za">www.sanas.co.za</a> (South African National Accreditation System)	
<a href="http://www.kznta.co.za">www.kznta.co.za</a> (KZN Towing Association)	
<a href="http://www.satra.co.za">www.satra.co.za</a> (South African Towing & Recovery Association)	
<a href="http://www.saicb.co.za">www.saicb.co.za</a> (South African Insurance Crime Bureau)	
<a href="http://www.upm.edu.my">www.upm.edu.my</a> (Road safety Research Centre - University of Pietra Malaysia)	
<a href="http://www.justice.gov.za">www.justice.gov.za</a> (Department of Justice and Constitutional Development South Africa)	

Day end / course end

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**Day 3 – Day review questionnaire:**

- 1 Name at least 3 technical follow ups?
- 2 Name the four basic levels of an accident process?
- 3 Name at least 3 investigative aids?
- 4 Reconstruction is the effort to determine \_\_\_\_\_?
- 5 Cause analysis is the result of what 3 initial processes?
- 6 In vehicle track or monitoring systems may track, record or measure many factors, name any three?
- 7 When requesting a tracking report for a crash, be sure to request the second by second GPS positioning section of the crash, True or False
- 8 When consulting with experts, you should, ask about their academic qualifications, their experience, and for an example of their work, True or False?
- 9 What does the term “Forensics” mean?
- 10 Compiling reports that are to be of forensic use, should have you numbering every paragraph and reference, True or False?
- 11 What are the four “C`s” of report writing?
- 12 In general, reports should not be more than four sub levels of paragraphs and numbering, True or False?.
- 13 Reference inserts and reference material should never be listed in a report, True or False?

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**Attendee's name:** \_\_\_\_\_

**Date completed:** \_\_\_\_\_

**Signature:** \_\_\_\_\_



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**“Wherever he steps, whatever he touches, whatever he leaves, even unconsciously, will serve as a silent witness against him. Not only his fingerprints or his footprints, but his hair, the fibers from his clothes, the glass he breaks, the tool mark he leaves, the paint he scratches, the blood or semen he deposits or collects.**

**All of these and more, bear mute witness against him. This is evidence that does not forget. It is not confused by the excitement of the moment. It is not absent because human witnesses are. It is factual evidence. Physical evidence cannot be wrong, it cannot perjure itself, it cannot be wholly absent. Only human failure to find it, study and understand it, can diminish its value.”**

*Dr. Edmond Locard*

**Traffic accident investigation and reconstruction is the effort to determine, from whatever information is available, how an accident occurred, reconstruction is not determining why an accident occurred. Cause analysis is the effort to determine, from whatever information is available, including the results of accident reconstruction, why the accident occurred. Quantity and Quality of information is the most important element in traffic accident reconstruction. With enough good information, the facts speak for themselves and there is need for only the simplest inferences. On the other hand, information may be so scarce and so unreliable that practically no solid facts on which to base conclusions are available. Likewise, limitations affecting successful cause analysis, like those affecting accident reconstruction are numerous.**

*TAR V2-L.B. Fricke North Western Univ. Traffic Institute*

Mr. R. N. Fletcher: B.Sc. (Mech.Eng) M.B.L., DMS ([robletcher@wirelessza.co.za](mailto:robletcher@wirelessza.co.za))

“I confidently recommend this manual as a practical on-site working document which deals with an austere subject clearly and accurately.”

---

Mrs. J. Westermeyer: BA, HDE, HONS, MA ([jenny.westermeyer@gmail.com](mailto:jenny.westermeyer@gmail.com))

“A consummately prepared aid that delivers a clear and concise body of information. It is not only very well referenced and accurately laid-out, but sparks a sense on interest regarding the content and subject matter.”

---

Mr G. Goddard: BA. LLB (Advocate - SC) ([glenglen@law.co.za](mailto:glenglen@law.co.za))

“An excellent compendium of what a potential witness needs to consider and how forensic information should be recovered and presented.”

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## Course and lecturer evaluation form:

Please be as kind as to answer the following questions and/or to give any feedback that you may feel will help us improve the training, you may leave your name if you wish, or not, and likewise you are not compelled to complete this if you don't want to.

Attendees name: (Optional) \_\_\_\_\_

Date: \_\_\_\_\_

Course name: \_\_\_\_\_

Presenter/s: \_\_\_\_\_

Please tick "✓". 4 = very good 3 = good 2 = fair 1 = unsatisfactory 0 = poor

Item		4	3	2	1	0
Effective use of visual aids	Clear and interesting?					
Interaction with audience	Enough eye contact?					
Signalling	Clear beginning and ending?					
Clarity of voice and pronunciation	Clear and loud? Correct pronunciation? Good use of vocabulary?					
Preparation	Well prepare?					
Information	Relevant information given? Creative? Any interesting ideas?					
Organization and structuring of presentation	Well organized?					
Food						
Training & Reference manual	Quality thereof?					
	Total:					

Any other comment?

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Signed: (Optional) \_\_\_\_\_

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**Further training offered by Accident Specialist: [www.accidentsspecialist.co.za](http://www.accidentsspecialist.co.za):**

- 1      **Understanding and investigation of accidents** (3 day academic training)
  - 2      **Understanding and investigation of accidents** (3 day academic and 2 days practical training)
  - 3      **Measuring with the use of Vernier's, Micrometres and other equipment for vehicle inspections** (1 Day)
  - 4      **My vehicle and I – Just what do I know** (2 hours)
  - 5      **Commercial vehicle driver basic education** (General safety, laws, professionalism & the like – 1.5 hours)
  - 6      **Report writing** (1 day full time)
  - 7      **Basic tyre knowledge** (1 day full time)
  - 8      **Introduction to & analysis of In Vehicle Monitoring (IVM)** (1 day full time)
- 

We would love to hear from you

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  - +27 (0) 31 309 1209
- **FAX:** +27 (0) 86 613 8407
- **Cell:** +27 (0) 83 326 3998
- **Administration & reception:**      Melissa      -      [admin102@accidentsspecialist.co.za](mailto:admin102@accidentsspecialist.co.za)  
   Amy-Leigh      -      [admin101@accidentsspecialist.co.za](mailto:admin101@accidentsspecialist.co.za)

Address:

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- GPS Co-ordinates: 29° 50.278'S / 31° 1.292'E - [View in Google Maps](#)
- **Postal Address:** PO Box 47220, Durban, 4023