

# STANDARDISATION OF HEAVY VEHICLE CRASH INVESTIGATION PROCEDURES IN SOUTH AFRICA

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## ABSTRACT

South Africa's road safety rate ranks fourth worst in the world, however very little is done to correct the existing problem. Currently in South Africa and in the other parts of the continent and the world, only limited statistics are available regarding accidents involving heavy vehicles and even less is known about the real cause of these accidents. This paper reports on the findings of a study on the status of heavy vehicle accident investigation procedures in South Africa. This study involved a literature review of various heavy vehicle accidents procedures employed by various authorities from different countries, including identifying gaps in South Africa and other countries. Research indicates that there are many interlinked factors that contribute to a freight accident. Comprehensive road accident investigation procedures, will lead to the availability of reliable road accident data. This is crucial because effective road safety interventions require that contributory factors like road and traffic characteristics, vehicle parameters, and information about people involved in the accident be registered correctly in a proper data base. This will assist road engineers and transport planners during their intervention. To improve road safety it is recommended that standardisation in the training of the responsible investigating officials and proper definition of responsible officials for heavy vehicle accident investigations (SAPS officers, Metro police officers and traffic police officers) are implemented.

## 1. INTRODUCTION AND BACKGROUND

In the 2005 Freight and Logistics Strategy (Department of Transport, 2005), the Department of Transport recognised the need for reliable freight data. The Department again emphasised the need for reliable data in 2011 Road Freight Strategy (Department of Transport, 2011). Authorities need accurate and reliable road traffic crash data for planning and decision-making processes. Without road freight vehicle crash data, it is difficult to assess the current state of road freight transport safety in South Africa. Furthermore, it becomes difficult to prioritise and promote road safety. Without reliable crash data it is difficult to monitor or to evaluate road freight safety (Department of Transport, 2014).

Although no formal or standardised approach to heavy vehicle crash investigations currently exists in South Africa, the responsible authorities (South African Police Services, metropolitan police, traffic officials and Road Traffic Management Corporation) tend to follow similar procedures.

Authorities attend to a crash scene after being alerted of the crash. They then cordon off the crash scene. They are also responsible for identifying and limiting any environmental effects that can occur as a result of spillage of dangerous goods.

The investigation process starts with a review of the sequence of events. This includes the crash event (what led to the crash occurring). In this regard, the driver, victims, witnesses, the vehicle itself, as well as the road environment provide investigators with important information as to the reasons the crash occurred. The crash event is considered in terms of the impact, position of the vehicles, debris on the road and so forth. The post-crash event includes addressing the rehabilitation of an area if contaminated, managing witnesses, and in-depth analysis of the scene. The recording of this information is important and needs to be accurate and reliable in order to give evidence in court.

Although a minimum set of data elements are populated during an investigation, it is desirable that the investigation takes into account a wider number of elements that provide better understanding of the contributory factors to, and the causes of, heavy vehicle crashes. Data collected comprises of information about the driver, vehicle, road and road environment.

## **2. APPROACH**

The purpose of this paper is to report on crash investigation procedures that are currently employed in South Africa. In addition, road crash investigation procedures undertaken by other countries are reported with the intention of identifying international best practices that can be recommended for adoption in South Africa. Ultimately, comprehensive and standardised investigation procedures for improved policy development and intervention are proposed. It is envisaged that the paper will contribute to knowledge generation that will assist policy makers to create an enabling environment for the execution of crash accident investigation responsibilities.

To better understand the process of crash investigation and data collection a review of current practices was undertaken through the administration of interviews with key informants. Respondents included heavy vehicle (truck) operators; road traffic crash investigators (private and government entities); health and safety consultants; and stakeholders operating in the dangerous goods environment.

Questionnaires and interviews were also conducted with members of the Chemical and Allied Industry Association (CAIA). In addition, companies with fleets in excess of 5 000 vehicles were invited to participate in interviews regarding heavy vehicle crash investigation procedures.

A series of key questions that were probed relate to the process of data collection at the crash scene, the type and nature of forms used and the post-crash coding process. A review of existing practices in other parts of the world was undertaken in order to enhance the understanding in the field of crash investigations.

### 3. OVERVIEW OF THE SOUTH AFRICAN CRASH INVESTIGATION PROCEDURES

Data collected ranges from basic data contained in the Accident Report to comprehensive and technical data obtained from special reports compiled by professional crash investigation teams. Data collected during road traffic crash investigations are used by the Road Traffic Management Corporation (RTMC), insurance companies, and lawyers dealing with third party injury claims. In the occurrence of a fatal crash, the attending officer completes and sends a quick response form to the RTMC. Data elements relevant to the vehicle occupants, type of injuries, roadway, and safety systems are collected for each road traffic crash.

Figure 1 illustrates the roles that different government agencies play at the scene of a crash. If the crash is not fatal, the vehicles are removed from the scene and the driver reports the crash to the police for a case number (often for insurance claim purposes). In the event of a fatal crash, law enforcement and emergency service personnel attend to the crash. Metropolitan police officers and traffic officers safeguard the scene while SAPS officers collect information, complete the Accident Report form opens a case docket and gives evidence in court.

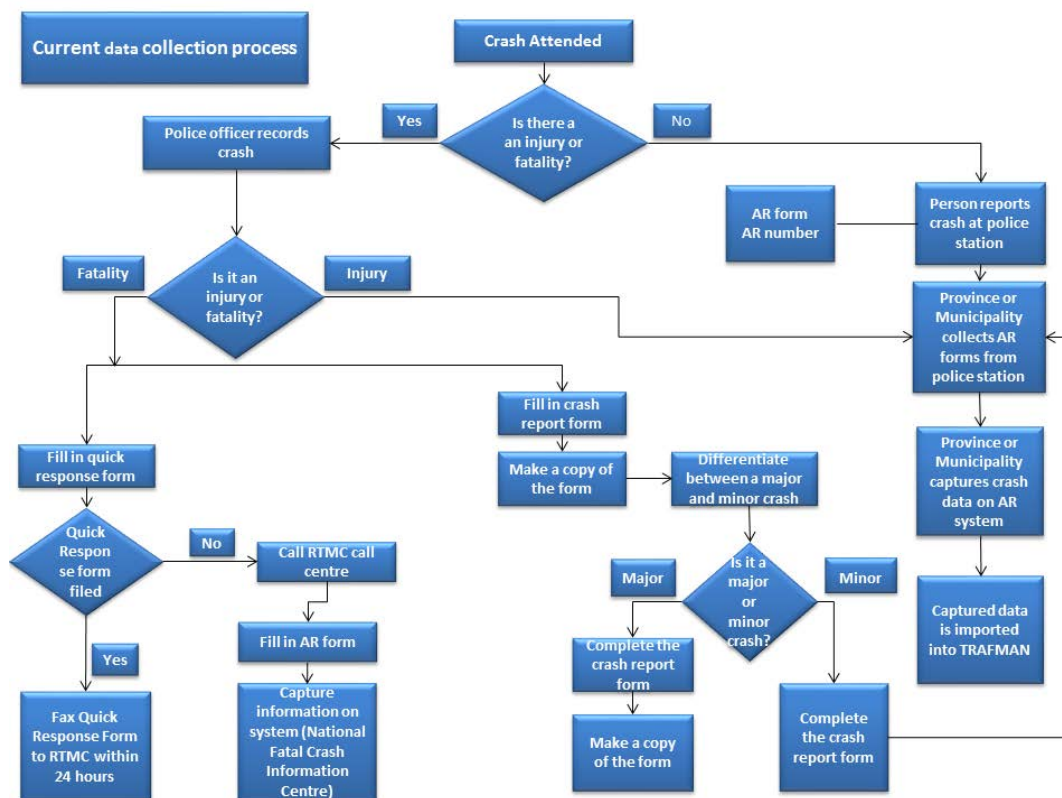


Figure 1: Current Data Collection Processes in South Africa (Mogotsi 2012)

### **3.1 Roles of different agencies when attending to a crash scene**

#### **3.1.1 Role of the South African Police Services**

The SAPS is mandated to conduct road traffic crash investigations in South Africa. The traffic and metropolitan police departments are responsible for managing or safeguarding the scene until SAPS are able to attend to the crash scene. Any road traffic crash that contains elements of negligence and/or recklessness, constitutes a road traffic crime. According to Steenkamp (2009), the SAPS are responsible for road traffic crash investigations as these crashes are considered road related crimes. Road crime (crash) investigations take place under the following circumstances and criteria:

- Where a person had been killed;
- Where serious injuries were sustained;
- Where a vehicle of a government department is involved;
- Where it appears that a serious offence has been committed; and
- Where a written complaint has been received.

A crash needs to be reported to the SAPS within 24 hours. SAPS officials complete the Accident Report form (AR form) and are responsible for the investigation of all “fatal” and “serious injuries” road traffic crashes. The attending officers inspect the scene, identifying relevant information to assist with their investigation and disregard factors not associated with the crash. The officer collects all evidence and records all information required for the completion of the AR form, including contributory factors (road, vehicle, road environment, and human factors).

For heavy vehicles, the on-scene investigation takes much longer (up to two days to complete). In terms of the vehicle, the national standard, SANS 10047 that relates to mechanical defects on the vehicle is used to assess whether or not the vehicle complies with the basic mechanical requirements (Lotter 1999). SAPS opens a criminal case docket and if needed, present evidence in court. SAPS usually have a severe lack of human resources to fulfil the crash investigation function.

#### **3.1.2 Role of Metropolitan Police and Traffic Departments**

Section 1 of the National Road Traffic Act, Act 93 of 1996 (NRTA) stipulates as follows: “In this Act, unless the context otherwise indicates – ‘traffic officer’ means a traffic officer appointed in terms of the laws of any Province and any member of the service as defined in Section 1 of the South African Police Service Act, 1995 (Act 68 of 1995) (the Police Act), and for the purposes of Chapter V, IX and X and sections 74 and 78 of this Act includes a peace officer (Prins, 2009).

In terms of the NRTA, a traffic officer has the power to arrest a person who violates traffic rules and regulations. However section 3 of the NRTA does not make provision for traffic officers to investigate crime, which means that traffic officers do not have powers to investigate traffic crashes as road traffic crimes (Prins, 2009). A crash in which injuries or fatalities have been sustained constitutes a road crime.

Metropolitan police officers, appointed under the Police Act and the NRTA, have legal powers to investigate road traffic crashes. SAPS indicated that although road traffic crash investigation is a function of SAPS, the Johannesburg Metropolitan

Police (JMPD) assists SAPS in the Johannesburg metropolitan area with on-scene investigations. According to the Limpopo Provincial Traffic Department and Ekurhuleni Metro Police Department (EMPD), the departments have in recent years sent traffic officers for crash scene investigation training.

### 3.1.3 Role of emergency service personnel

In the event of fatal road traffic crash, the law stipulates that emergency service personnel are not allowed to move the body of a deceased crash victim until the SAPS has completed their on-scene investigation. In the event of a fatal crash the Department of Health's (DoH) Pathology Department or members from SAPS assigned to the Pathology Department are responsible for removing the crash victim's body(ies). This can only be done once SAPS have completed their on-scene investigation. In a case of serious injury, Emergency Medical Services (EMS) personnel will remove the crash victim as soon as the victim is stabilised. The victim is then transported to the nearest hospital. In the event of serious injuries sustained, EMS personnel do not wait for the SAPS; they adhere to the platinum 10 minutes and golden hour principles in order to save lives.

### 3.1.4 Role of the Road Traffic Management Corporation

The Road Traffic Management Corporation (RTMC) outsources the investigation of crashes to specialist investigators in instances where:

- Five or more people have died;
- Crashes involving heavy goods or dangerous goods vehicles; and
- High profile crashes.

One of the processes followed in the event of a fatal road traffic crash, is the completion of the quick response form by SAPS. This quick response form is forwarded to the RTMC within 24 hours and based on this information and the criteria described above, investigation teams are assembled and despatched.

### 3.1.5 Role of freight operators

Fleet operators mostly conduct their own crash investigations for internal and third party claims. Operators either have their own in-house team of crash investigators or outsource the function to crash reconstruction specialists. Heavy vehicle crash investigations and reconstructions assist the investigator in criminal, civil (damage to property) as well as third party claims involving the company. Research indicates that bigger operators have the resources to conduct their own investigations, while smaller operators do not.

According to operators, general crash data collected is not shared with local, provincial, or national authorities to augment existing data. Only hazardous goods incidents are reported to the Department of Transport.

## **3.2 Limitations of existing crash investigation procedures in South Africa**

The Road Traffic Management Corporation deploys crash investigators (reconstruction) specialists to road traffic crash scenes. Currently, the investigations are limited to the most serious and/or high profile crashes in South Africa – often involving more than five fatalities, commercial vehicles, and/or public transport (Steenkamp 2009).

Van Rooyen (2004) states that law enforcement officials are not well equipped with crash investigation skills as the basic training in this subject is elementary. There are very few skilled persons for road traffic crash investigation in South Africa. This is problematic as law enforcement officials and experts who are involved in road traffic crash scene investigations need to be credible and reliable witnesses in court.

Currently there is no specific standard or minimum level of qualification that exists for a crash investigator. Ribbens et al., (2010) state that in terms of qualification and skill, there are as many variations in the crash analysis domain as there are in the medical field. Skills range from basic photography and narrative skills to advanced 3D computer visualization, mechanical engineering, and even psychology.

Similarly, there are very few road traffic crash investigators and crash reconstruction specialists in the public sector of South Africa. The RTMC and SAPS are addressing this gap through training and education of local and provincial law enforcement officials. This notion is emphasized by Van Rooyen (2012) who furthermore highlights the severe lack of resources to fulfil the investigation function also mentioning that in 2004 there were only 34 specialised crash investigators in Gauteng. However, SAPS and RTMC crash investigation units indicated there are not adequate numbers of new learners.

In addition, Van Rooyen (2012) identified a number of gaps in the procedures followed to investigate road crashes in South Africa, namely:

- Training and procedural guidelines are non-existent and not standardised;
- Lack of professionally trained police experts;
- Provincial traffic officers generally do not attend to or record accident scenes;
- Training opportunities are almost non-existent; and
- Inefficient standard operating procedures.

According to (Joubert and Tanta, 2006) there are no accredited investigation courses to empower police officers with investigation skills. The investigating procedures followed in South Africa are not standardised.

### **3.3 Crash investigation procedures undertaken by heavy vehicle operators**

#### **3.3.1 Reporting of crash**

Heavy vehicle drivers indicated that currently they do not report specific types of crashes or injuries to authorities. In the occurrence of a crash, the drivers report the incident to their supervisors, who then inform the SAPS. Once an attending law enforcement officer is on the scene, the officer fills out the AR form and follows the reporting procedures as described above.

#### **3.3.2 On-the-scene crash investigations**

According to interviews with larger operators in South Africa (fleets of 5 000 vehicles or more), investigations of normal crashes (non-dangerous goods crashes) include a review of root causes, including the role of the road environment, the human factor, and the vehicle factor contributing to the heavy vehicle crash.

Fifty seven per cent of participating operators indicated that they have internal teams investigating crashes. Twenty-nine per cent appoint a crash investigator or crash reconstruction specialist, depending on the severity of the road traffic crash. Some companies only involve external investigators in the event of a fatality.

An important point highlighted by operators was that currently the law in South Africa does not make provision for specific procedures to secure a heavy vehicle crash scene. Operators indicated that the drivers involved in a crash could be instrumental in safeguarding and managing the crash scene. This view has however been contested by government authorities involved in the crash investigations as the legal implication of having civilians or the public involved in scene management could have negative consequences such as the contamination of the scene and the loss of evidence.

### 3.3.3 Sketches and photographs

Sixty-seven per cent of operators indicated they take photographs of the road traffic crash scene including the following detail:

- Overall scene of the crash;
- Resting positions of vehicle(s), pedestrian(s), and cyclist(s) after the crash;
- Damages to vehicle(s) involved in the crash;
- Actual point of impact of the crash;
- Tyre/skid and scuff marks;
- Position of debris e.g. broken glass, vehicle parts, etc.;
- Road and roadside geometry and road signs; and
- The approach path of each vehicle.

Sixty-seven per cent of operators draw a sketch plan of the crash scene but only 52% require a detailed scale plan of the crash scene to be drawn. Sketches and scale plans augment information especially in instances where the case goes to court.

### 3.3.4 Clearing the scene

Fifty percent of operators that participated in this study have a contract with a dedicated truck recovery service. Operators estimated it does not take the vehicle recovery services longer than 30 minutes to reach breakdowns. The recovery services are contracted along the routes that the heavy vehicle operators frequently drive.

## 3.4 South African procedures involving dangerous goods

Procedures for safeguarding a crash scene involving dangerous goods in South Africa include:

- Erection of warning signs to warn oncoming traffic;
- Appointment of persons to warn and regulate oncoming traffic;
- Establishing of different zones (warning zone, direction change zone, buffer zone, work zone, collision zone and parking zone) by placement of cones to change the direction of oncoming traffic; and
- Removal of unwanted persons and vehicles from the scene that can potentially contribute to the destroying of important evidence or may result in secondary crashes.

Each vehicle transporting dangerous goods is required to have a transport emergency card which stipulates what type of hazardous goods are being transported and in the event of an incident, what should be done to safely secure the area.

A standardised and systematic process for crash investigations involving hazardous goods in South Africa has been proposed by Lötter and Blackburn (1999). The process follows a checklist approach, starting from the moment the incident occurs, until the scene is clear.

South Africa also conforms to the United Nations regulations for dangerous goods. In the event of a hazardous goods crash, the United Nations developed mechanisms for the harmonization of hazard classification criteria and hazard communication tools (Globally Harmonized System of Classification and Labelling of Chemicals). It also set conditions for the transportation of dangerous goods (TDG) for all modes of transport (Lötter and Blackburn, 1999).

Chapter VIII of the NRTA replaced the hazardous chemicals regulations promulgated under the Hazardous Substances Act of 1973, which controlled the transportation of dangerous substances by road tanker since 1987 and by implication shifted control from the Department of Health to the Department of Transport.

A crash may involve one or more of the following three main hazards: toxicity, fire/explosion, and pollution/damage to the environment. Those handling hazardous substances need to be aware of the properties and hazards of various classes of chemicals as well as the correct handling procedures.

### 3.5 Crash investigation data collection procedures

Collection of crash data from different authorities highlights the fragmentation that currently exists in terms of heavy vehicle crash typologies, data collection, and so forth. The data from the toll concessionaires were probably the most complete, however, descriptions of crashes as well as the type of vehicle involved in the crash, differed significantly. Table 1 provides an overview of the sources of crash data obtained for this study.

AUTHORITY	YEARS INCLUDED	REFERENCE TO HEAVY VEHICLE CRASH/VEHICLE TYPE
Buffalo City Metropolitan Municipality	2000-2014	Yes
Nelson Mandela Bay Metropolitan Municipality	2012-2014	No
Tshwane Metropolitan Municipality	2003-2014	No
Cape Town Metropolitan Municipality	2001-2014	Yes
EThekweni Metropolitan Municipality	2010-2013	Yes
Johannesburg Metropolitan Municipality	2013 - 2014	Yes
Mangaung Metro Traffic	2004-2013	Yes



Department		
Limpopo Provincial Traffic Police	2008-2014	No typology of crash types. Have to find reference to heavy vehicles in the description of the crash.
Mpumalanga Provincial Department of Safety, Security and Liaison	2012-2014 (selected months)	Yes
Eastern Cape Provincial Department of Transport, Safety and Liaison	none	No data to review
Northern Cape Provincial Department of Transport, Safety and Liaison	2009-2014	No
Western Cape Provincial Department of Transport and Public Works	2001-2014	Yes
Gauteng SAPS	2014	No
KZN SAPS mortuary reports	2014	No
Bakwena Toll Concessionaire	2008-2014	No typology of crash types. Have to find reference to heavy vehicles in the description of the crash
N3TC	2009-2011	Yes

**Table 1: Databases and provision for capturing of heavy vehicle data**

#### **4. INTERNATIONAL CRASH INVESTIGATIONS – COMPARISONS**

Globally the methodology followed in heavy vehicle crash investigations is similar. The investigation considers contributing factors (role of the road environment, the human factor, and the vehicle factor) and follows a process where police collect basic information regarding the events that preceded the crash. Interviews with witnesses and drivers are essential. Information is collected from drivers and witnesses and recorded in a crash report form. Information collected includes details related to (1) the location of the crash, (2) contributory factors, and (3) injuries sustained. Internationally, police and associate law enforcement services (metropolitan police officers as well as traffic officers) are responsible for the reporting and recording of basic crash information.

#### 4.1 Comparison between South Africa and developed countries

Table 2 below provides a comparison of heavy vehicle crash reporting, data collection and investigation practices between South Africa and developed countries.

TABLE 2: COMPARISON BETWEEN SOUTH AFRICAN AND INTERNATIONAL CRASH INVESTIGATIONS PROCEDURES				
	South Africa	European Union	Australia	USA
<b>On the scene investigation</b>	<ul style="list-style-type: none"> <li>• Scene investigation checklist</li> <li>• Secure scene</li> <li>• Locate witnesses</li> <li>• Screen scene for clues, evidence, trace marks on the road surface and locate blood splatter and debris</li> <li>• Complete overview of the crash scene, identify dangerous goods, identify point of impact</li> <li>• Take ground samples in the event of dangerous goods crashes in order to determine environmental damage and rehabilitation procedures</li> <li>• Legal requirement for the company whose vehicle involved in the crash to rehabilitate the environment after</li> </ul>	<ul style="list-style-type: none"> <li>• Collect basic information about the vehicle, driver and road environment.</li> <li>• Investigators attending the crash scene as soon as possible to start their investigation.</li> <li>• Collects statements and evidence from drivers, witnesses and other people involved in the crash</li> </ul>	<ul style="list-style-type: none"> <li>• The officer that received the crash report attends the crash scene</li> <li>• If the caller was involved in the crash, members should advise the caller to exchange the information</li> <li>• Secure evidence</li> </ul>	<ul style="list-style-type: none"> <li>• Scene investigation checklist</li> <li>• Safeguard the scene</li> <li>• Locate witnesses</li> <li>• Screen scene for clues, evidence, trace marks on the road surface or locate blood splatter and debris</li> <li>• Additional information collected: acceleration, skid and gap marks are also measured and tyre thread prints</li> </ul>

	dangerous goods crash			
<b>Safeguarding the scene</b>	<ul style="list-style-type: none"> <li>Erection of warning signs to warn oncoming traffic</li> <li>Appointment of persons to warn and regulate oncoming traffic</li> <li>Establishment of different zones (warning zone, direction change zone, buffer, work zone, collision zone and parking zone) by placement of cones the direction of oncoming traffic</li> <li>Removal of unwanted persons and vehicles from the scene that can potentially contribute to the destruction of crucial evidence or may result in secondary crashes</li> </ul>	<ul style="list-style-type: none"> <li>Safety at the scene of road traffic crash is primarily the responsibility of the Incident Commander</li> <li>The Incident Commander must appoint a Safety Officer</li> <li>Scene safety begins on route to the incident</li> <li>Golden-hour approach removes victims from crash as quickly as possible/EMS attends to injured immediately</li> <li>Position appliances and signs</li> <li>Risk and hazard assessment</li> <li>Traffic control</li> </ul>	<ul style="list-style-type: none"> <li>Identify location of killed or injured</li> <li>Ensure primary and secondary safeguarding of the scene</li> <li>Determine if additional EMS services are needed</li> <li>Address disruptions too traffic flow, ensure EMS accessibility to crash, determine dangerous goods composition and advise appropriate a actions</li> <li>Depending on the severity of the crash a multi-agency response team may be deployed</li> <li>Multi-agency team could include fire-fighters, medical and emergency care personnel as well as law enforcement officials</li> </ul>	<ul style="list-style-type: none"> <li>Traffic incident management protocol</li> <li>Law enforcement officials secure the scene, manage traffic control, and initiate crash investigations</li> <li>Fire personnel block lane to safeguard responder and affected motorists</li> <li>Handle hazardous material spills when needed</li> <li>EMS attends to serious injuries</li> </ul>

<b>Immediate investigations</b>	<ul style="list-style-type: none"> <li>• Investigating officer takes statements about the crash</li> <li>• The complete statement describes the scene: what was found and includes all relevant information</li> <li>• All witnesses' observation included in the statements</li> <li>• Observations on the scene of the crash determine the standard the evidence submitted to the court</li> </ul>	<ul style="list-style-type: none"> <li>• Collect secondary information from victims at the hospital</li> <li>• Collect information about the environment, driver and vehicle through secondary sources such as government databases</li> </ul>		
<b>In-depth analysis</b>	<ul style="list-style-type: none"> <li>• Photographs and a sketch of the crash scene capture</li> <li>• Approach path of each vehicle</li> <li>• Skid marks and their rest positions</li> <li>• Road and roadside geometry and road signs</li> <li>• Detailed level of crash investigation data collected by: Private investigators, reconstruction specialists and assessors, SAPS, metropolitan and traffic officers</li> </ul>	<ul style="list-style-type: none"> <li>• Second investigation aids in understanding the context of the crash and making sure how it occurred</li> <li>• Investigative team consist of driver, vehicle and environmental experts</li> </ul>	<ul style="list-style-type: none"> <li>• Special and in depth investigations outsourced to consultants</li> <li>• The Federal Police Accident Squad makes use of an expert database for assistance with special and in depth investigations</li> </ul>	<ul style="list-style-type: none"> <li>• The investigative team is composed of an automotive engineer, civil engineer, a motor carrier specialist, a crash worthiness engineer and human factor specialist</li> <li>• The National Transportation Safety Board is responsible for investigating large heavy vehicles crashes</li> <li>•</li> </ul>

	<ul style="list-style-type: none"> <li>• RTMC and Private investigators</li> </ul>			
<b>Clearing the scene</b>	<ul style="list-style-type: none"> <li>• Towing and recovery along with clearing of scene commences after all patients have been removed, points marked off and photographed and all evidence collected</li> </ul>			<ul style="list-style-type: none"> <li>• Towing and recovery personnel, public works employees and transportation maintenance crew clear the scene</li> </ul>
<b>Standardisation of investigation procedures</b>	<ul style="list-style-type: none"> <li>• Authorities follow the same procedures</li> <li>• There is no specific standardised approach to investigations</li> <li>• Operators follow different procedures depending on the: <ul style="list-style-type: none"> <li>○ Type of goods</li> <li>○ Client requirements</li> <li>○ Severity of crashes</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Currently the development of a specific scientific and international benchmarked methodology for investigation of heavy vehicle crashes is being completed</li> </ul>	Currently the development of a specific scientific and international benchmarked methodology for investigation of heavy vehicle crashes is being prepared	The Model Minimum Uniform Crash Criteria Guideline (MMUCC) is the minimum set of uniform variables required to describe crashes across the USA

#### 4.2 Comparison between South Africa and BRICS countries

Similar to South Africa, there are no dedicated databases that deal specifically with heavy vehicle crashes in Brazil or China (Blower and Woodfoorree, 2012). Table 3 provides comparison with the status of heavy vehicle crashes and where possible procedures for investigations between South Africa and the BRIC countries (Brazil, Russia, India and China

<b>TABLE 3: HEAVY VEHICLE CRASH INVESTIGATION COMPARISON BETWEEN SOUTH AFRICA AND BRIC COUNTRIES</b>					
	<b>South Africa</b>	<b>Brazil</b>	<b>Russia</b>	<b>India</b>	<b>China</b>
<b>Responsible for heavy vehicle crash investigations</b>	<ul style="list-style-type: none"> <li>• South African Police along with Metropolitan and traffic department officials are responsible for investigating heavy vehicle crashes.</li> <li>• Fatal crashes are captured by the RTMC within 24 hours of the incident.</li> <li>• Operators indicated that their drivers report a crash to their supervisor, and the supervisor reports the crash to South African authorities.</li> </ul>	<ul style="list-style-type: none"> <li>• The levels of jurisdiction depend on the agency that has responsibility for the road system.</li> <li>• There is no central national crash data system that covers all truck crashes.</li> </ul>	<ul style="list-style-type: none"> <li>• City or state police is responsible for the investigation of major heavy vehicle crashes.</li> </ul>	Police is responsible for investigations	<ul style="list-style-type: none"> <li>• The Ministry of Public Security maintains and compiles crash records.</li> <li>• Ministry of Public Security deals with traffic accidents; but also with other aspects of national security.</li> <li>• <input type="checkbox"/> Very few transport agencies have traffic safety departments</li> </ul>
<b>Data collection</b>	<ul style="list-style-type: none"> <li>• Data is collected by SAPS, metropolitan police or traffic</li> </ul>	<ul style="list-style-type: none"> <li>• Data are collected at federal, state, and municipal jurisdictional</li> </ul>	No information available	<ul style="list-style-type: none"> <li>• Police collects data on-scene. This information pertaining to the</li> </ul>	<ul style="list-style-type: none"> <li>• Traffic safety matters falls under the jurisdiction of the</li> </ul>

	<p>officials.</p> <ul style="list-style-type: none"> <li>• Lack a central database for collation of heavy vehicle crash data</li> </ul>	<p>levels</p> <ul style="list-style-type: none"> <li>• Crash data reside within multiple agencies.</li> </ul>		<p>vehicles, environment, causes of crash as well as injuries sustained.</p>	<p>police.</p>
<p><b>Role of police officers in crash investigations</b></p>	<ul style="list-style-type: none"> <li>• The attending officer collects human factor, vehicle and other environmental information from the scene.</li> <li>• The attending officer interviews drivers, witnesses etc.</li> <li>• Opens docket and responsible for investigating crashes</li> <li>• Give evidence in court.</li> </ul>	<ul style="list-style-type: none"> <li>• Only on-scene fatalities are counted by Ministry of Security.</li> <li>• Ministry of Health includes fatalities that occur within a fixed period after the crash.</li> <li>• Primary insurance organisation count number of traffic fatalities for which insurance compensation is paid.</li> <li>• Lack of a uniform, national crash data system impedes systematic data analysis to identify and address the most significant traffic safety issues.</li> </ul>	<p>No information available</p>	<ul style="list-style-type: none"> <li>• Police investigators collect basic as well as advanced information regarding crashes.</li> <li>• Police investigators collect on-scene information, photographs and scaled drawings of the crash scenes, used for further investigations.</li> </ul>	<ul style="list-style-type: none"> <li>• Expertise to collect and analyse traffic safety data is undeveloped.</li> </ul>

<b>Role of crash investigators or teams</b>	<ul style="list-style-type: none"> <li>• RTMC – appoints investigation team in the event of more than five vehicles involved or if a fatal crash occurred.</li> <li>• Fleet operators appoint crash investigators/ constructionists depending on the severity of the crash</li> <li>• Some fleet operators have “in-house” teams or employ or outsource the function</li> </ul>	No information available	No information available	<ul style="list-style-type: none"> <li>• Crash scene investigation is conducted by the police and include on –scene investigations that include on scene measurements, photographs and diagrams to be used for future reference.</li> <li>• Vehicle inspections are also conducted</li> </ul>	No information available
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### **4.3 International experience: Data elements**

The United States of America (USA) has developed the Model Minimum Uniform Crash Criteria Guideline (MMUCC). The purpose of the MMUCC is to generate information that can be used to address highway safety across the USA. A minimum set of uniform variables are collected in order to describe crashes. The MMUCC considers a range of data elements. Each of the data elements are accompanied by a definition, a set of specific attributes (i.e., the information the element should identify), and a rationale for the inclusion of that element in data collection or reporting. The MMUCC does not provide a standard reporting format for recording data, nor does it provide a standard for the coding values of each element (MMUCC, 2008). However, it recommends that identification of various data elements happen at the scene of a crash. The MMUCC recommends identification of additional data elements through linkage to driver history information, hospital or other injury data, and roadway inventory data. The MMUCC organises constituent data elements into four major groups that take into account the major aspects associated with a crash. These four major groups are as follows:

- Crash-related;
- Person-related;
- Vehicle-related and;
- Road-related elements

In Europe, there has been a move to start collecting crash data electronically. On-scene information is captured with electronic devices such as smart phones. Applications are developed specifically for smart phones. These applications support on-site data entry and capturing of information. Information captured electronically, and immediately, is submitted to a central database.

## **5. CONCLUSIONS AND RECOMMENDATIONS**

The lack of heavy vehicle road safety data is a serious challenge for road safety management in South Africa. Authorities need accurate and reliable crash data for planning and decision-making processes as well as for the development of countermeasures for road traffic crashes. Private sector companies seem to keep good records of crashes. This data, if shared, can contribute to the establishment of a national freight vehicles crash databank.

The manner in which heavy vehicle crashes are reported is inconsistent. In order to address this, the following measures are recommended:

- Standardised approaches to collect heavy vehicle crash information should be developed;
- This standardised approach should be followed in every heavy crash and detailed information about the heavy vehicle crash should be documented;
- Databases need to make provision for the inclusion of heavy vehicles as a vehicle type, and description of the crash then provides information related to the involvement of heavy vehicles;
- Collect data regarding contributory factors such as fatigue, distraction, and other contributory factors pertaining to behaviour is mostly missing. This complicates making conclusions regarding causes of crashes;

- Identification of specific data elements is essential for freight crash investigations, as the data elements will form the basis of future report forms, databases, and reporting systems; and
- If detailed data can be collected, it is recommended that consideration be given to the publishing of an annual freight safety report such as the one published in Australia.

The lack of standardised approach is one of the major limitations in heavy vehicle crash investigations, not only in South Africa but across the world. In some developed countries and regions such as Australia and the European Union, there is a drive to harmonise crash investigations, especially heavy vehicle crash investigation procedures and data collection. In South Africa, there is a need to for a standardised approach along with a framework that distinguishes between the investigations of major and minor crashes.

Currently there no specific standard or minimum level of qualification that exists for a “crash investigator” in South Africa:

- Heavy vehicle crash investigations need prioritisation as there is a need for dedicated funding and training for traffic officers, metro police, and police officers.
- As this is a specialised field qualifications and accreditation programmes could be considered.
- Create a career path through proper training and education providing new learners with the opportunity to progress from a basic course to an advanced level.
- The training of investigators need to be comprehensive, build on an appropriate theoretical background and allow for gaining the necessary practical experience under the supervision of peers.

Good practices in the form of private sector initiatives for managing heavy vehicle safety are available. The cost of compliance however might be high and not all operators will be able to afford for example accreditation with the Safety and Quality Assessment System (SQAS) or Road Transport Management System (RTMS). Similarly, in-vehicle technologies might be expensive and could increase the cost of doing business.

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