

An analysis of historical crash data between 09-2009 & 09-2016

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Content:

Figures:	3
Executive summary:	4
Key words & phrases:	4
Introduction & history:	5
The starting point:.....	7
The database requirements and specifics:.....	8
Purpose:	10
Moving forward:.....	10
Shortcomings:.....	11
The data:	12
1 - Accident Type:.....	12
2 - Driver age groups:	13
3 - Cause:	14
4 – Roadworthy vehicles:	15
5 - Colour:	16
6 - Driver deaths:.....	17
7 - Passenger deaths:	18
9 - Accidents per province:	20
10 - Road hierarchy:.....	21
11 - Time:.....	22
12 - Vehicle types:	23
13 - Geo-location hot-spots.....	24
General comments:.....	26
Reference material / Bibliography:.....	27
Addendums:.....	29
Peer review:	37

Figures:

Figure 1: (Geo-Plotting case positions)	6
Figure 2 (Data input examples on database).....	7
Figure 3 (Data input drop down selection examples on database)	9
Figure 4 (Accident type).....	13
Figure 5 (Driver age group).....	13
Figure 6 (Cause)	15
Figure 7 (Roadworthy)	15
Figure 8 (Colour of vehicle)	16
Figure 9 (Driver deaths)	17
Figure 10 (Passenger deaths).....	18
Figure 11 (License type).....	19
Figure 12 (Accidents per province)	20
Figure 13 (Road hierarchy).....	21
Figure 14 (Time).....	22
Figure 15 (Vehicle types)	23
Figure 16 (Geo-Locations - Overall)	24
Figure 17 (Geo-locating - highlighted section).....	24
Figure 18 (Geo-locating - highlighted section).....	25
Figure 19 (Geo-locating - highlighted section).....	25

Executive summary:

Road safety strategies need guidance based on fact. The key intention of this report is to highlight the development of a database that provides indisputable evidence and an analytical “bread crumb trail” that leads into sound decision-making.

The development and management of a crash database in private practice or for that matter for a governmental department at local, provincial or even national level, need not be an overly complex and frightful undertaking. The database briefly presented herein serving as an exact example. The development and use, or incorporation of a database from the private sector, where applicable, can serve to compliment and inform other data sets, such as those of national government.

Data sets in serious crash cases are not easily accessible, typically requiring a specific project or directed effort. The availability of such data is of critical importance to the assistance in reduction of the ongoing and deplorable crash rates on our roads.

The results presented herein, are a glimpse of the full complement of data already collated and with the potential to grow and be improved on in general and incorporated to other data sets.

As with any data analysis, the results and related comments are always subject to further analysis and likewise, alternative views. Nonetheless, the data and results are based on actual case analysis and therefore certainly present empirical data. The database at hand and the analysis therefrom, is arguably the only and currently most accurate empirical data analysis of the crash situation on South African roads where serious crash cases have been considered over the period. This should therefore warrant that the results set out should at least be given consideration in their guidance to all road safety strategies moving forward, as is the key intention.

There is no such thing as an intelligent, informed decision without information – Tom Peters

Key words & phrases:

Accident investigation data; Crash investigation data; Crash data record keeping; Crash database; Accident database; Traffic accident analysis; Traffic data; Traffic data analysis; Crash data analysis; Accident investigation; Crash investigation; Crash statistics; Accident statistics

Introduction & history:

Without stepping into any advanced level of academic discussion, one would assume that any reasonable individual should understand the importance of a comprehensive database to study and improve almost any subject matter.

This said, there remains some level of lack of interest, foresight or perhaps simply a case of “scared of the unknown” will to setup, populate and maintain a national database on all aspects of traffic accidents that is readily available. I do not think it is unreasonable to indicate this, the public in general and this includes the media, has no reliable and consistent point of access to traffic accident statistics throughout South Africa¹. There are shining examples out there, such as that of the eThekweni traffic studies department; this however is the exception rather than the norm.

Worldwide there are specific databases that exist in various countries that are typical national databases that are fed from the usual provincial and district levels. This is typically the “grass roots” level of traffic accident statistics formulated from what we know as a common Accident Report (AR) document.

Although it is noted that it is critically important that South Africa immediately establishes or improves on whatever basic national accident database system there may be (?); the database being addressed here is the type of database that is somewhat more specific than that of the typical Accident Report type database. Here I note the following excerpt, from a recent research paper entitled *Accident investigation procedures literature review report*² highlighting the exact issues noted above³:

The dire need for evidence-based research, in support of preventative actions against road traffic crashes along with increased efforts to understand the dynamics of road traffic crashes contributed towards the development of international guidelines on the kind of data needed for effective counteraction of traffic crashes (World Health Organization, 2010a, 2010b; Peden et al., 2004). These guidelines emphasise that efforts to counter road traffic crashes must be based on data that is relevant, accurate, timely and accessible. In addition, the data must not be difficult to capture, analyse and use (Peden et al., 2004; World Health Organization, 2010a, 2010b).

In 2001, Van der Sluis stated that the quality of data in South Africa is deficient in various respects. Röthe (2009) almost a decade later once again, confirmed this deficiency. Comprehensive, reliable, compatible and accessible road traffic crash data is lacking in South Africa. There are also severe skills shortages within the responsible government departments needed to gather and analyse data. Thus, it is essential to strengthen all mechanisms associated with road traffic crash data in South Africa.

In South Africa, data on road deaths are collected, stored, and analysed by a variety of agencies. These include the Road Transport Management Corporation (RTMC), Statistics South Africa (Stats SA), and the National Injury Mortality Surveillance System (NIMSS). The RTMC mainly collects and analyses data on road traffic fatalities. The data collected through the accident report (AR) forms (completed by the police) is used to inform national reports regarding the state of road safety in South Africa. The NIMSS project from the Medical Research Council/University of South Africa (UNISA)'s Crime, Violence and Injury Lead Programme makes use of mortality data from mainly metropolitan areas to estimate the burden that road traffic crashes place on the South African economy and development (Statistics South Africa, 2009).

Although there are many different databases internationally, by country, regions and even specific cities or areas, one of these international databases is the Germany In-depth Accident Study (GIDAS). This study effectively being a detailed study of traffic crash cases by a specific team that analyses a crash to full detail, well in excess of the standard Accident Report. The data collated from the standard Accident Report database, as well as these advanced study database systems feed into cooperative national and international databases of the *International Road Transport Union* and/or *Commission for Global Road Safety*, the *European Fatal Crash Data Base*, the *Fatal Accident Reporting System (FARS)*, and the *National Accident Sampling System (NASS)* & others. These databases all provide comprehensive crash data from basic Accident report data through advanced data that is regularly reference in extensive research.

¹ It is acknowledged that there is some effort being made in this respect, NDOT / RTMC reference material 23

² 15 September 2014 - Department: Transport Republic of South Africa BID NUMBER DOT/05/2013/ITP,

³ The reader is guided to read the relevant and local research paper entitled *An analytical study of vehicle defects and their contribution to road accidents*, S Moodley & D Allopi:

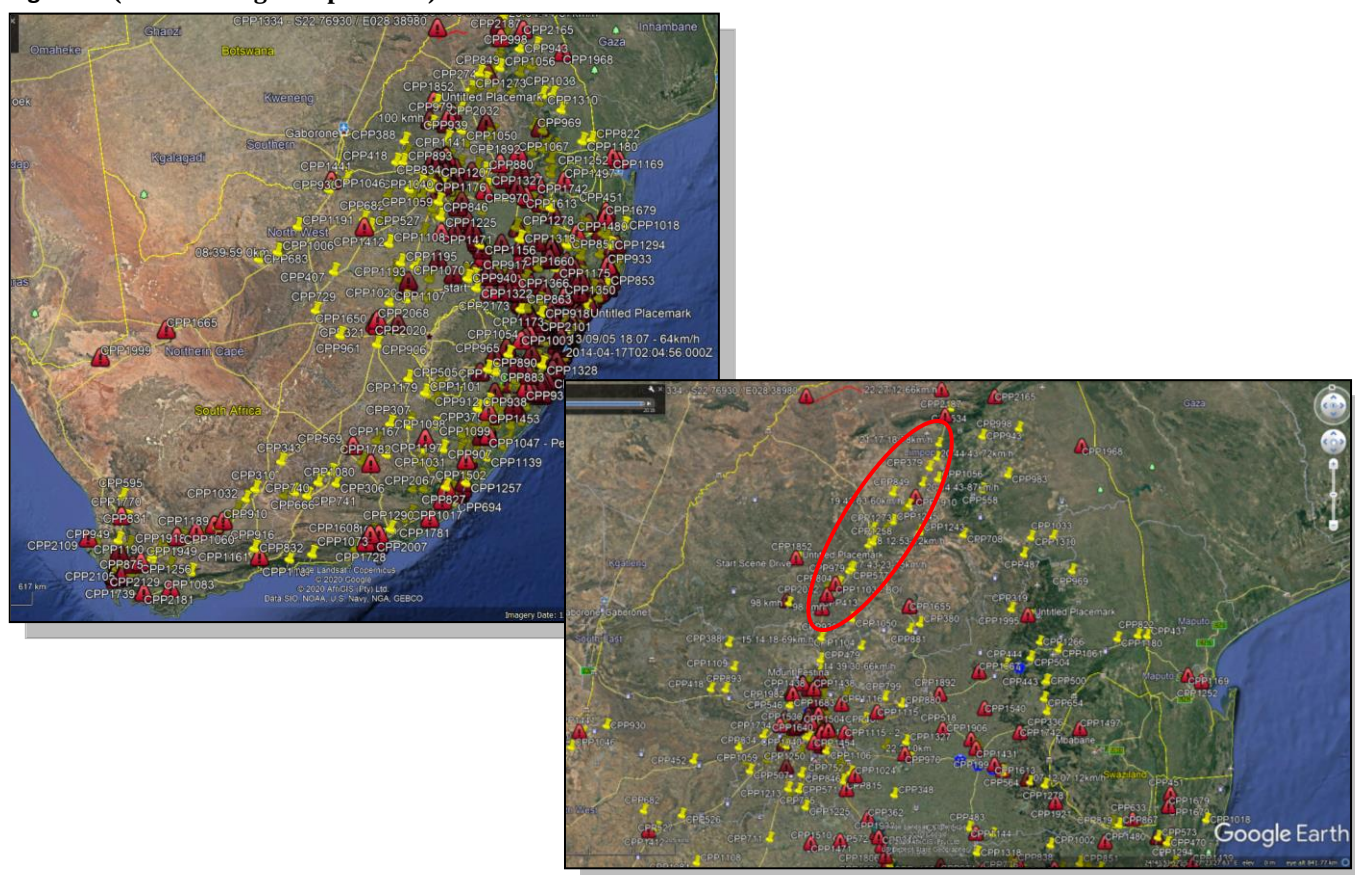
Accident Specialist was appointed, among others, as specialist contractors to the Road Traffic Management Corporation, during 2009, to undertake specific parameter Major Crash Investigations (MCI). These investigations would be in the vein of the GIDAS system investigations. The major intention was for the specialist to analyse the direct and indirect cause of the Major Crash cases around the country and use this to improve safety, this required the in-depth analysis of cases, where the lack of detail in the standard Accident Report could not achieve such an analysis.

It appears that the crash investigation project stemmed from the initial appointment of service providers to undertake certain Major Accident Investigations for the National Department of Transport on an Ad-hoc basis and subsequently as an official project in 2006. Thus, the subsequent project started in 2009 therefore being the second contract. As far as is known, to date the results of the initial contract MCI reports (2006), and likewise the more recent contract (2009) were and have not been populated into any comprehensive database⁴. With this noted, it had never been a consideration of Accident Specialist to have created a database beyond that of what would be classified as a usual case registration tracking database. It was always assumed that the necessary populating of some form of database from the reports submitted, the extensive details available and as set out in the reports would have been process. It is presumed that, not only the required recommendations set out in the comprehensive reports would be used to improve the situation on the road, but that a database resulting would guide further. Notably, in consideration of many major crash locations, research as to crash statistics for the location history could not be undertaken as no such statistics were available, or were simply not reliable either at any national, provincial or local database, if available.

It became obvious at a stage that the formulation and population of a specific database was ideal and would certainly assist in overall analysis. At a stage, the Accident Specialist basic case registration spreadsheet and some other specific detailing listed therein as we extrapolated in process and populated into the standard spreadsheet, was made available.

A brief example of this simple data populating included that of the precise graphic locating (Geo plotting) of each and every case attended, thereby an extremely “visual” and easy to identify system of concentrated areas of concern seen below. The Geo plotting of all crash locations has been extensively maintained by Accident Specialist and is reported on in a separate research⁵.

Figure 1: (Geo-Plotting case positions)



⁴ Once again, it is acknowledged that there is some effort being made in this respect, NDOT / RTMC reference material 23, nonetheless the advanced detail available in such cases does not appear to have been considered.

⁵ <https://www.accidentsspecialist.co.za/wp-content/uploads/2020/08/A-history-of-case-records-of-Accident-Specialist-June-2020.pdf>

It is with this basic background in mind that Accident Specialist took the initiative to begin building and populating a tailor made database.

The starting point:

As already alluded to, a rudimentary database was already in place, consisting largely of a case registration and basic details Microsoft Office Excel spreadsheet. This had grown to include certain key elements such as the GPS co-ordinates, the number of vehicles involved, and number of deceased and injured and other typically known data. Initial ideas at extending this into a comprehensive database in Microsoft Excel Spreadsheet format as it existed, were quickly thwarted primarily as:

Spreadsheets, as functional as they are, are somewhat restrictive in their search process and search refinement; are somewhat “spread out” by physical structure and is somewhat cumbersome in extrapolating specific data sets to appropriate data tables, among other somewhat restrictive factors.

Basic initial research and this included some consultation with industry specialist, quickly identified Access as an extremely practical platform to migrate to, particularly as this platform was inexpensive, extremely user friendly, well known and merged easily with alternative input formats and software, as may be required moving forward, and therefore was accepted.⁶

Research was also undertaken on possibly making use of existing database platforms and associated field software and therefore not having to “re-invent the wheel”. In fact there are many software packages that can be used to create a database, notably some that may in fact be better in some facets than Access. Nonetheless, there are very few actual databases and associated software specific programmes available internationally that would prove immediately usable at a reasonable cost and with little fettling. One of the few available is the software specifically developed for the GIDAS project, available through Unidato⁷, another being that of Report Beam⁸. Nonetheless, the combination of foreign currency exchange rates and inevitable adjustments to South African specific requirements, licensing and other key factors resulted in the decision being taken to simply slowly develop the now basic Access database at hand. Subsequent identification of the specific need to appoint a software developer presented the usual dilemma of appointing a “major concern” to undertake the development, or simply look to a “smaller concern” to slowly develop. This, “slowly develop” route was chosen primarily as no actual budget exists to undertake major development and likewise that no particular rush existed to create the database. Further, that this presented a somewhat more intimate opportunity to slowly develop and work with the growth of the database and learn from the process first hand. A local service provider was sourced and the basic development and migration of the data was set in place in a week⁹. The images below give a very brief section indication of some of the many input data screens.

Figure 2 (Data input examples on database)

The screenshot displays the Accident Specialist database input interface. It features several input fields for case details, vehicle information, and driver data. A summary table on the right provides an overview of the data entered.

Class of veh	Drivers
Bus	6
LDV	33
LMV	119
Minibus	52
Motorbike	4
Rigid Truck	3
SUV	14
Truck	6

⁶ Subsequent training also undertaken on Access to aid formation

⁷ <https://www.vufo.de/en/software/unidato/> - reference is also made to the International Traffic Safety Data and Analysis Group (www.irtad.net)

⁸ <https://www.reportbeam.com/>

⁹ Costing hereof borne by Accident Specialist

Although the current and newly developed database remains a “manual input” system and will likely remain largely so due to the nature of the data, some other software is considered. During the actual investigations¹⁰, it was evident that there is the opportunity to instantaneously populate a lot of the on-site vehicle and other information collected into compatible pre-made / setup software on a Laptop, tablet and even smart cellular phone, this data can then be quickly and directly loaded into the database. These types of “field” programmes are already in existence, as has already been alluded to by the formation of the database and software for the GIDAS programme, among others. Once again these are largely restricted in local use by the combination of exchange rate costs, licensing costs, maintenance and developing to specific requirements, network coverage and other factors.

There are many typical inspection reports, specifications, details and parameters of a crash investigation that have already been created in some document form (prose), spreadsheets or some sort of word processing format (typically Microsoft office – Excel or Word) and therefore can relatively quickly and cost effectively be “created” into a usable program at favourable costs by local developers if needed. Nonetheless, this field software is a “nice to have” not a “have to have” and at the stage of implementing the database was not placed into use.

With the database established, the ongoing population is relatively easy. However, the updating of the database to include further specific fields of data, either updated historically from the existing cases and reports, or moving forward for new cases, will require both a dedicated staff member and further input from the developer, and therefore expense.

The database requirements and specifics:

Somewhat logically, it is important that a database is found to serve a specific, or set of specific outcome requirements. The wider these requirements, the more difficult. This database concerns itself more so with the more detailed aspects of accidents, primarily as normal accident reporting details through the standard Accident Reports are (or at least should be) already available. In the process of Accident Specialist considering, implementing and refining the database, consultation with various contemporaries in various direct and indirectly related fields within the industry was undertaken. Other than in office debates between Accident Specialist staff, advice and guidance was sought from:

- 1) Mrs. Sandra Graham, ETA Coordinator: Road Safety, eThekweni Transport Authority
- 2) Mr. Luchas Steenkamp, Training Manager at TUV Rheinland Mobility & Training (Pty) Ltd
- 3) Mrs. Wilna Badendorst, Accident Investigation and Reconstruction expert at Forensic Road Crash Investigation Services (FRCIS)
- 4) Mr. Dean Meiring, Research Manager at Toyota South Africa, Durban factory
- 5) Mr. Paul Nordengen, a Civil Engineer who is a Research Group Leader: Asset Management from CSIR who specialises in heavy vehicle transport, overload control, bridge management and abnormal vehicle management systems
- 6) Mrs. Cielie Karow, from the Road Accident and Incident Investigation: Road Transport Regulation department at the National Department of Transport
- 7) Mr. G. Nel, ex RTMC statistician
- 8) Mr. A. De Sousa (Attorney)
- 9) Crispin Brien of Brien Consulting (database design and build)
- 10) Mr Leon Theron from Toyota South Africa
- 11) Dr. Malcom Mitchell, from the South African Roads Federation, KZN regional Coordinator.

Contact has been made with various other role players such as the Medical Research Council (MRC), Car and Part Manufacturers, various Universities and Technicon's, Statistics South Africa, various Fleet Management Agencies, Insurance companies, Brokers and many others. This was undertaken to get their input to the specific requirements of the database, and at the same time to determine their possible interest in access to the database. It would have been ideal to have attended at one of the international teams currently undertaking ongoing research and populating the information to create databases; however, this was largely not possible due to cost, time and likewise “permission” to view and consider the database and associated field software. Nonetheless, consideration of exactly this was undertaken as far as reasonably possible from the World Wide Web.

¹⁰ The possible ongoing inclusion of major cases considered

It quickly became evident that the specifically populated, detailed content of such a database is an almost “bottomless pit” of possibilities and requirements and that very clear decision need to be made as to the extent of the database. To this point it is re-iterated that this type of detailed database has clearly been identified as an absolutely critical database and should already have been populated by the relevant authorities perhaps at provincial level, certainly at National level.

In order to “speed up” the populating where possible, “click on” selections and “drop down” selections are utilised, with established terminology and reference typically being the selection options. This assists not only in bringing the database in line with international norms, but with selection criteria in searching being easier. The images below give a very brief section indication of some of the many input data screens drop-down selection option facilities.

Figure 3 (Data input drop down selection examples on database)

The figure consists of two screenshots of a database interface. The left screenshot shows a form with several drop-down menus for accident data. The 'Accident cause' menu is open, showing options like 'Human', 'Environment', 'Mechanical', 'Road Engineering', and 'Anomalous'. The 'Weather conditions' menu is also open, showing options like 'Clear', 'Overcast', 'Rain', 'Mist/fog', 'Hail', 'Dust', 'Fire/smoke', 'Snow', 'Severe wind', and 'Unknown'. The right screenshot shows a 'REPORTS' section with buttons for different accident types and categories, including 'Accident', 'Accident type', 'Cause', 'Colour', 'Drugs', 'Foreign Driver', 'Foreign passenger', 'Province', 'Time', 'Unroadworthy', 'Vehicle', 'Road Conditions', 'Weather', 'Wrong Side', 'Main Menu', 'Driver age groups', 'Roadworks', 'Road Hierarchy', 'Driver deaths', 'Passenger deaths', and 'Vehicles involved'.

Reference is made to some 3000 parameters of data per case being recorded in the GIDAS studies and available in their database. In comparison, as our database stands, pure volume of content is not the aim, nor possible for reasons already indicated and alluded to. Nonetheless, it is possible to extrapolate and populate further data from the investigative cases and reports into the database (many extra fields of entry). Alternatively, that interested researchers making use of the database can extrapolate this data themselves from the reports manually.

In the considered development of the database, extensive literature review was undertaken, although not all are listed, reference to the most relevant documents & references are made throughout. Consideration of aligning the database to the specific requirements of international standards and norms was undertaken through the review of the following key documents:

- SAE International paper SAE 870345. A database for crash avoidance research. M. L. Edwards (NHTSA)
- SAE International paper SAE J224. Surface Vehicle Standard. May 2011:Collision deformation classification
- SAE International paper SAE700132. Collision damage severity scale:
- SAE International paper SAE 870345. A database for crash avoidance research. M. L. Edwards (NHTSA) Consider in creating and improvement of the database.
- SAE International paper SAE 880072. Measuring Protocol for quantifying vehicle damage from an energy basis point of view. NS Tumbass & RA Smith:
- Research Traffic Accidents at T. U. Dresden Germany

It is notable that setting the database up to the absolute, or for that matter even close to that of the specifications set out in the reference material above, would be a mammoth task to say the least. This therefore would require at least a dedicated staff member, largely full time to extrapolate past data from reports and likewise to populate current & future data appropriately, not a financially viable option at this stage. Perhaps the two most important characteristics of a database that are to be kept in mind are:

Size – The database must be a sufficient size to permit meaningful analyses of the relationship between specific vehicle design characteristics and particular types of crashes.

Representativeness – The database must contain a large number of recently occurring crashes so that analyses of vehicle design characteristics can provide information relevant to the design of contemporary vehicles.”

With these specific comments noted, the database is more than sufficiently populated, (notable in excess of 650 crash cases between 2009 & 2016) to make extensive findings on a wide range of factors. Nonetheless, as with all databases, there will be certain specific factors that may be researched that result in there being insufficient specific data being available in this database. Nonetheless the ongoing efforts to populate the database, to maintain accurate data input and perhaps to improve on the number of data points entered will in all reasonability see the database improving.

A notable function of the database is the direct “hyper linking” of certain entries. As an example, the very basics are currently populated in respect of the specific location of the accident (GPS Positioning), in specific the scene in respect of the road and the general surroundings. Currently the database “hyperlinks” to both the specific scene by simply “clicking” on the active GPS position listed, immediately opening Google Earth and directing the user¹¹ immediately to the precise location. Similarly, by “clicking” on the listed indication of “Scene Images”, will automatically direct the user to the online folder containing the specific scene images so that these can be considered; likewise to the vehicle images, and to the actual completed report¹².

Purpose:

As already been mentioned “*Somewhat logically, it is important that a database is found to serve a specific, or set of specific outcome requirements*”. First and foremost, the key purpose of such a database has to be said to be the assistance to the country in a concerted effort to curb the carnage on the road by the identification of specific issues through ongoing research and database development. Although as has already been indicated, it was never the original intention to create a database, it would be short sighted not to state the obvious and indicate that the development of a specific database beyond that of the standard case recording database, has massive potential in many respects. Accident Specialist has developed the database to the current form and in doing so has created the ability to undertake an analysis.

Access to the specifically created database that has been populated is not intended to be proprietary to Accident Specialist, nor any single individual or entity. The database is being considered to be made freely available in the public domain through specific request and suitable arrangement.

Moving forward:

With the initial implementation of the database (Access), a subsequent update and improvement of the database was undertaken within the first month, with additions to specific fields of data captured. The further population of the database through the analysis of the further serious crash investigation reports is ongoing. The rather tedious nature thereof, as is a typical problem with data capturing, sees the task taking some time to complete with the requirement of manually reading through each case to extrapolate the require information.

Undoubtable, the most important items that should come out of the effort is to see the actual formulation and “finalisation”¹³ of the database to the point of usefulness, although an ongoing update and improvement. At the point of usefulness, the database contains direct access to the data resulting from the investigation of at least some 650 crash investigation cases throughout South Africa between 2009 and 2016.

Like most databases and with the case of the common platform of Access, the database can very easily be placed “online” and accessed easily. There are many examples where state and particular service provider databases are available online¹⁴, typically through at least a registration process, however most at some cost. The database is already situated on the writer’s server and accessible remotely to Accident Specialist, therefore the ongoing update of the database could easily be facilitated by any contributor from any location.

¹¹ This is currently available to Accident Specialist staff, but not to any other users at this stage – see further comments here to at *Moving Forward*

¹² This is a notable function in respect of the possible requirement of further analysis of cases by researchers

¹³ In reality there is no finalisation as the inclusion of new cases data over time sees the database growing.

¹⁴ <http://www.michigantrafficcrashfacts.org/> / https://www.dmv.virginia.gov/safety/#crash_data/ / <http://www-fars.nhtsa.dot.gov/Main/index.aspx>

It is envisaged that where access to the database will likely be required and made available through some arrangement, this will be very easily facilitated through online registration and coded access with the possibility of certain limits or restrictions.

Shortcomings:

At present, there is no specific data capturer employed to retrieve, read and populate the data from the past or future serious crash cases provided or sourced. Having been updated to include almost all further serious crash cases available, has already seen the database grow. On access to any further cases obtained or dealt with on an ad-hoc basis, the database will grow further.

This same limited access constraint, both number of cases and time to populate extra data fields, is prohibitive in timorous growth of the database. This may call for a tedious review of all the reports at a later date in efforts to include further data.

It is acknowledged that although all reasonable efforts are made to ensure that each case investigated is considered at acceptable levels of accuracy, there are almost always various factors such as work load constraints, financial constraints and others factors that could create some inaccuracy. This too includes inherent unknowns where perhaps a driver's licence code or some other data may simply have been negated from a case report. Similarly, in the process of selecting the data from the reports and inserting these into the database, unforeseen errors may occur (import errors). Typically, through the process of analysis, such err is facilitated through appropriately determined adjustment principals that may include Chauvenet's Criterion^{15, 16}

Although none of the staff of Accident Specialist, moreover the writer, are statisticians, one need not be a specialist to understand and make sense of at least a vast majority of the data populated¹⁷. Going forward it is hoped that by the very nature of the data that suitably qualified, experienced, analytical minds would make interesting and hopefully useful findings, no doubt some damming ones too.

Nonetheless, at this stage the database created and populated certainly provides an empirically supported and as far as is known, one of a kind and first data analysis for South Africa.

¹⁵ <https://www.statisticshowto.com/chauvenets-criterion>

¹⁶ Statistical correction is not applied here, and is beyond the intention of the data presented here

¹⁷ Note the writer's opening paragraph "*Introduction and History*"

The data:

In considering the current data set populated, with some 58 fields¹⁸, only twelve outputs are considered as a preliminary indication of capability and consideration, with these highlighted and commented on as follows:

1 - Accident Type: The *Accident Type* (**Figure 4**) criteria is categorised in conjunction with the typical accident type as listed in the South African Accident Report (AR) listing. The top four categories in hierarchal order as follows:

- 1 Head on (217)
- 2 Single vehicle loss of control (125)
- 3 Head rear (Rear end) (63)
- 4 Head on / Partial overlap (59)

This clearly highlights opposite direction crash types (both direct head on and partial overlap head on) are therefore the most prevalent, with vehicles “crossing over” into the opposing or oncoming path. Typically, this would suggest that no, insufficient or inappropriate separating barriers were in existence. Although not exclusively, this category of crash is reduced through the implementation of engineering remedies, primarily the appropriate separating barriers or facilities. Although it does appear that there has been some concerted effort to implement road edge (shoulder) “rumble strips”¹⁹, this needs to be compulsory and rolled out extensively.

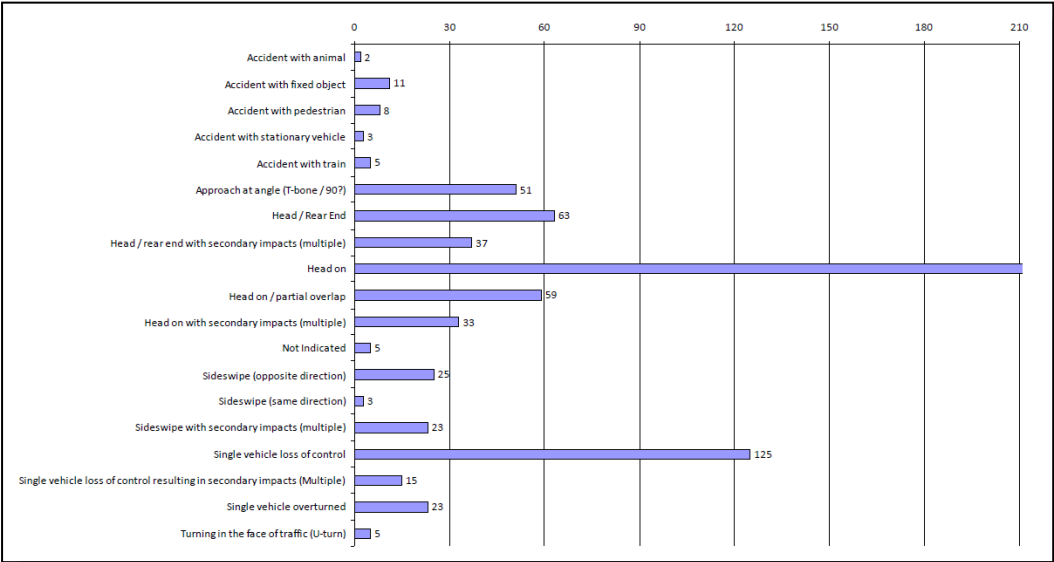
This type of crash is difficult to mitigate through enforcement, however enforcement of speed limits and fatigued driving would certainly be role players in reducing this type of crash, or at least the severity.

The single vehicle loss of control type crash, is typically a crash that has resulted from factors commonly referenced as excessive speed, allegations of tyre failure or Run-off-Road that could relate to falling asleep or distracted driving. This type of crash is somewhat more difficult to reduce, however issues of enforcement through monitoring speed and vehicle inspections would assist. From an engineering perspective, appropriate barrier implementation can assist to constrain and arrest vehicles, concerted effort to implement road edge (shoulder) “rumble strips”²⁰ needs to be compulsory and rolled out extensively.

The Head rear (rear end) type crash, is typically a crash that has resulted from factors commonly referenced as falling asleep or distracted driving. This type of crash is too, somewhat more difficult to reduce, however issues of enforcement through monitoring speed, vehicle inspections in respect of headlights and taillights. Enforcement of stopping of vehicles off of roads and use of the mandatory pre object warning triangle is also a key issue. From an engineering perspective, little can be implemented to reduce this type of crash, perhaps the appropriate implementation of facilities of off road and lay-bye areas would assist.

¹⁸ See Addendum
¹⁹ Typically raised “pimpled” painted line, or depressions into the road surface
²⁰ Typically raised “pimpled” painted line, or depressions into the road surface

Figure 4 (Accident type)



2 - Driver age groups:

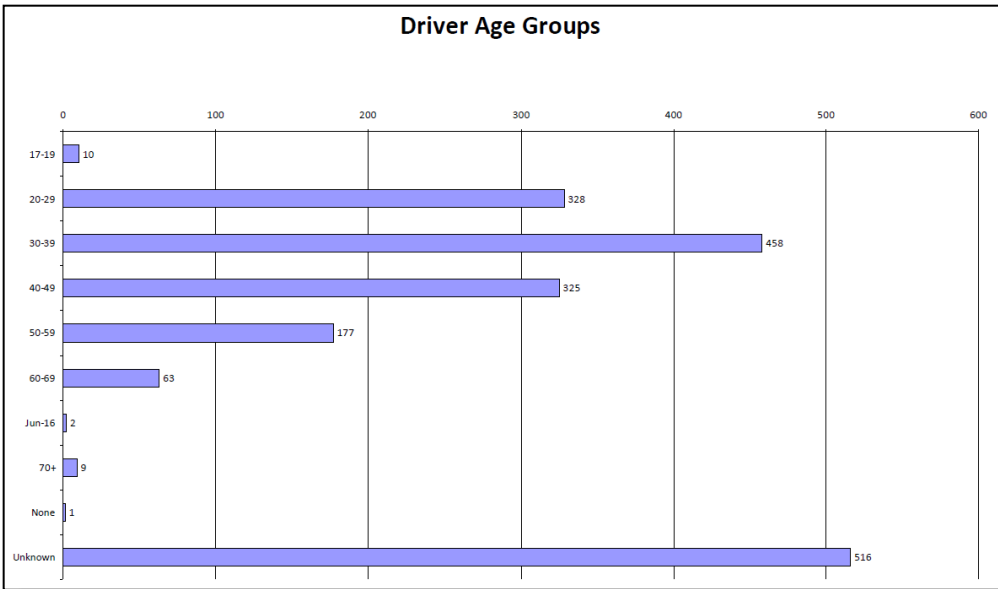
The *Driver age groups* (Figure 5) criteria is categorised in conjunction with the typical age group research range categorisation. The top four categories in hierarchal order as follows:

- 1 Unknown (516)
- 2 30 – 39 (458)
- 3 20 – 29 (328)
- 4 40 – 49 (325)

Although the *Unknown* is a substantial figure, this has largely resulted as drivers are either fatally injured and or that, at that stage of the investigation, no finalisation of the drivers age was established.

Nonetheless, the major category of 30-39 years is once again not an unusual determination, this generally in line with researched and established international norms as to age groups involved. The wider range of age group extending to include the very similar numbers of 20-29 (328) and 40-49 (325) and therefore the wider age category of 20-49 years. This encompasses the majority of the active working age of drivers and therefore is not unusual. This categorisation, especially at the lower “developmental” age group of 20 – 29, provides opportunity to target this age group for specific educational efforts.

Figure 5 (Driver age group)



3 - Cause:

The *Cause* (**Figure 6**) criteria is categorised in conjunction with the typical four research categorisation, with the four categories in hierarchical order as follows:

- 1 Human (69.8%)
- 2 Mechanical (23.9%)
- 3 Road (3.4%)
- 4 Environmental (2.8%)

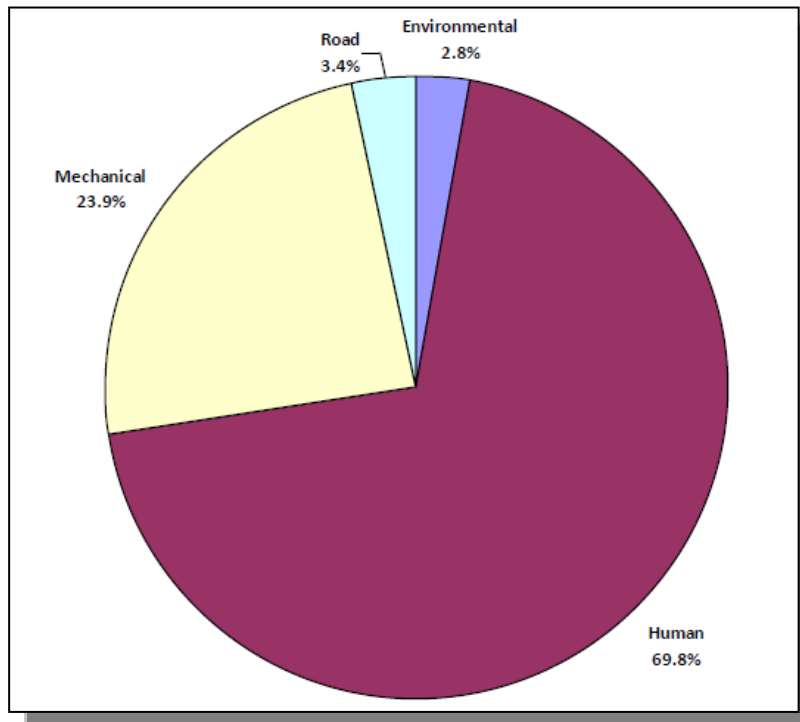
Reference to the *Human factor* as the direct cause of the crash has been well researched and documented in countless worldwide research papers as being the highest direct cause of crash cases. These results mirror international findings and are therefore not unexpected. Similarly, the extensive discussions on the parameters of just what Human Factors are, is extensively documented. Nonetheless, in respect of the direct relation of this particular database to the Human Factor reference as the direct cause, where a human factor is absolutely confirmed or is at least the highest probability of the crash, is made in reference to: Excessive speed, distracted driving, negligence such as overtaking over a blind rise or in a curve. Human factors are extremely difficult to directly and immediately mitigate, rather falling into long term education and attitude change through education and marketing efforts, combined with policing.

The indication of a *Mechanical* cause as the major cause or major contributing factor to the crash is too, a rather substantial determined factor in the cause of a crash in respect of this database. In respect of this data set, the Mechanical indication is determined either absolutely, or at least the major contributing factor. Mechanical factors are typically Tyre failure, brake failure, steering failure. The reduction of crash incidents from this cause, is almost exclusively the combination of policing in respect of appropriate vehicle inspections and responsibilities of drivers in respect of expected vehicle maintenance. It is strongly suggested that laws pertaining to vehicle roadworthy testing be amended, with current requirements only an annual licence renewal. It is strongly suggested that consideration be given to a three or five year compulsory re-inspection of vehicles through a roadworthy inspection test.

Road factors being the direct cause or a major contributory factor is too considered in respect of being determined as an absolute or strong balance of probabilities cause. Typically, a crash caused by a road factor is not a high factor as the vast majority of roads are in generally good condition. Nonetheless with deterioration of roads for various reasons, roads being a factor are typically seen as a result of potholes or similar physical anomalies. Although there is argument to striking potholes, to some extent also being a Human factor, as the driver was not paying attention, this is not argued in this database consideration, simply where a road factor has certainly been determined, it is indicated.

In similar vein, *Environmental* factors being the cause, have also been argued as being part of the Human factor negligence, typically as a driver should drive accordingly. Nonetheless, this is again not factored in this data and where environment, most notably misty or heavy rain conditions were noted, and therefore driver impairment the likely factor here from was prevalent, is indicated as such. Such factors are once again extremely difficult to mitigate, other than to educate and enforce speeds and vehicle maintenance.

Figure 6 (Cause)



4 – Roadworthy vehicles:

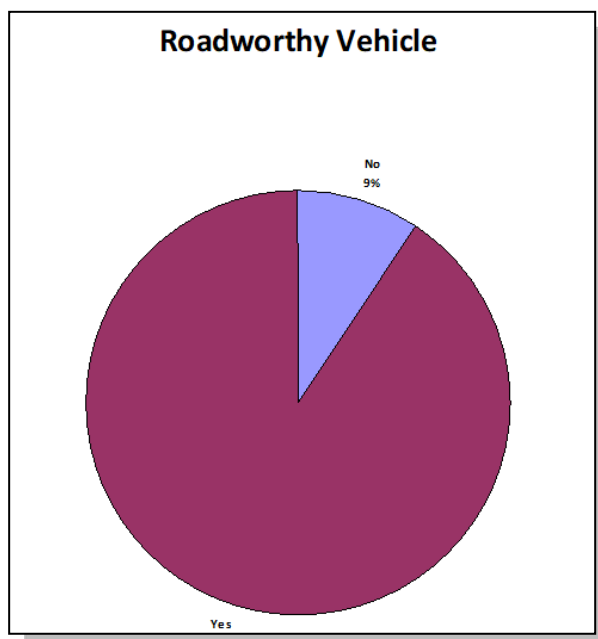
The *Roadworthy* (Figure 7) criteria is categorised simply in respect of all vehicles involved considered in general roadworthy condition or not.

- 1 Roadworthy (91%)
- 2 Un-roadworthy (9%)

This is a notable indication in reference to the *Mechanical* (23.9%) suggestion as already highlighted.

It is interesting to note that this study can provide specific insight to light motor vehicles (LMV / LDV / SUV), as these are generally not required to be re-inspected²¹.

Figure 7 (Roadworthy)



²¹ Reference is made to reference material 23 – Pg 17 et seq. – Un-roadworthy and Un-Licensed vehicles – distinguished difference from unlicensed or Un-roadworthy

5 - Colour:

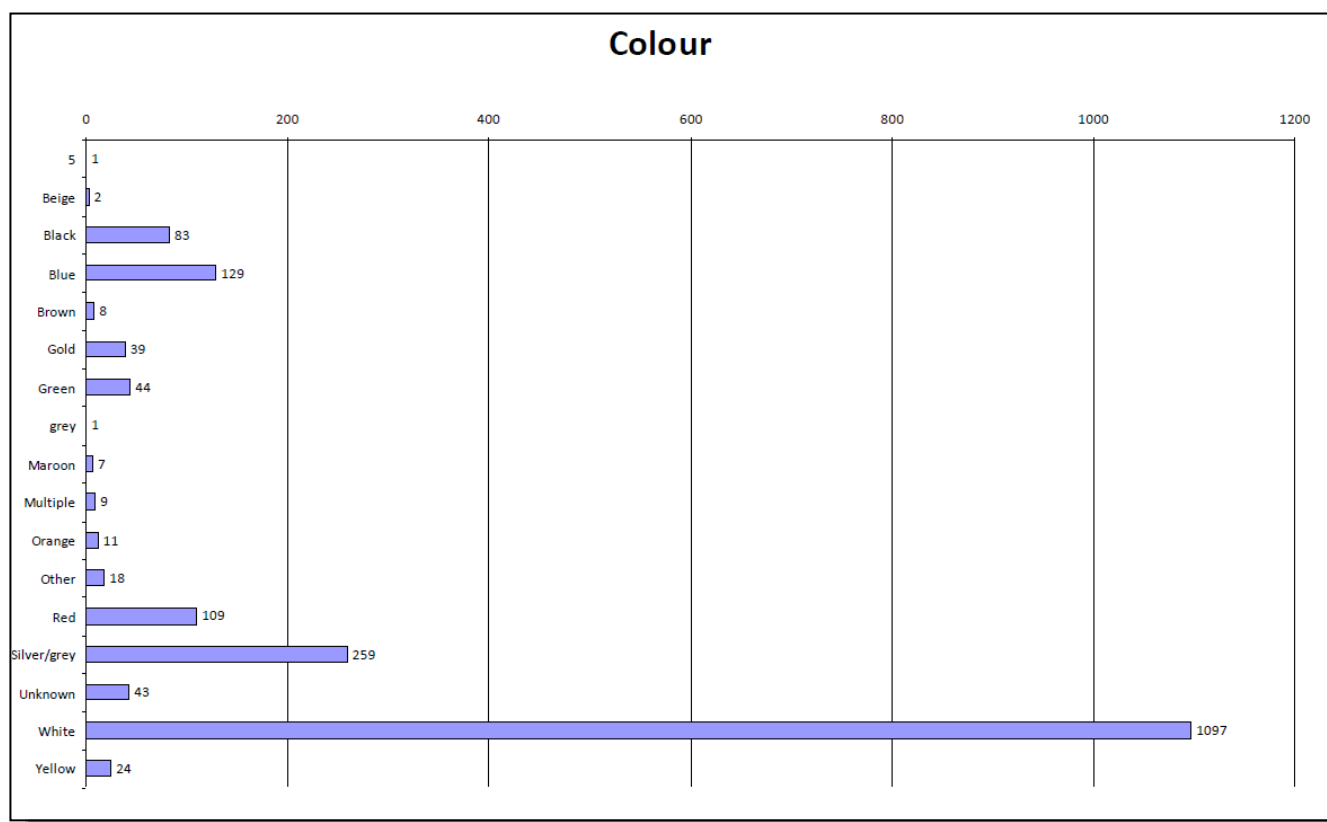
The *Colour* (**Figure 8**) criteria provides the top four categories in hierarchal order as follows:

- 1 White (1097)
- 2 Silver / Gray (259)
- 3 Blue (129)
- 4 Red (109)

Highest sales figures of white vehicles across all vehicle types and brands is typically recorded internationally, to include South Africa. Therefore, it is not unusual that the highest number of vehicles involved in a serious crash are white vehicles.

This is reasonably assumed to have very little effect on the direct cause of crash, nonetheless, may to some extent be a factor in night time crash cases where visibility is a factor, this may need to be considered against detailed statistical analysis of after hour crash numbers

Figure 8 (Colour of vehicle)



6 - Driver deaths: The *Driver deaths* (**Figure 9**) criteria is categorised in this data set in respect of the vehicle type involved. The top four categories in hierarchal order as follows:

- 1 Light Motor Vehicles (LMV) (344)
- 2 Light Delivery Vehicles (LDV) aka “Bakkies” (119)
- 3 Minibus (113)
- 4 SUV (35)

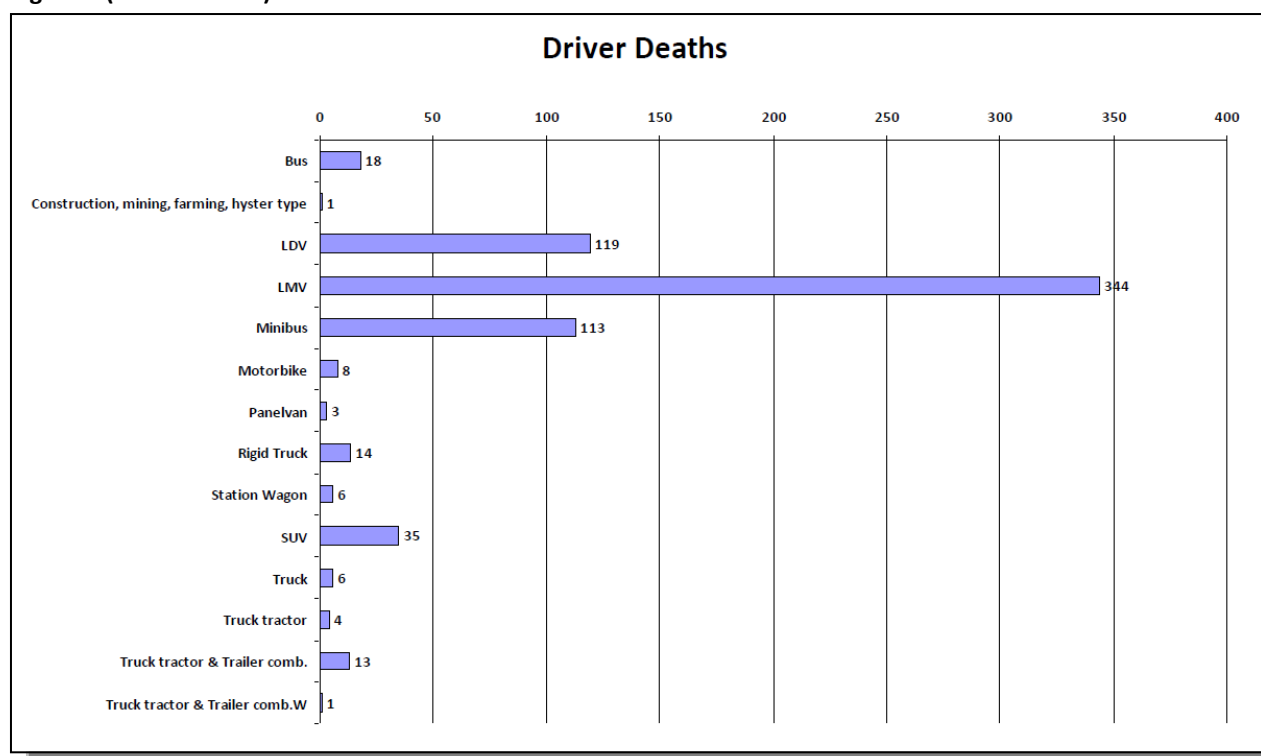
Light Motor Vehicle reflecting the highest number of driver deaths, is not unusual when two key factors of these stats are considered, notably:

- * Light Motor Vehicles are the highest category of vehicles involved in this data set (Data set 12)
- * Opposite direction head on and partial overlap crash types are the most prevalent. (Data set 1)

Similarly, the two following highest values for Light Delivery Vehicle deaths (119) and Minibus type vehicle (113), follow. These vehicles inherently carrying a high number of passengers, it is therefore not unusual to see high number passenger deaths associated with these vehicles.

The reduction in driver deaths (in fact all occupants) is likely to see the biggest reduction through reduction of opposite direction head on and partial overlap head on type crash scenario, as has already been discussed. Nonetheless, enforcement of seatbelt use and speed reduction are key factors.

Figure 9 (Driver deaths)



7 - Passenger deaths:

The Passenger deaths (**Figure 10**) criteria is categorised in this data set in respect of the vehicle type involved. The top four categories in hierarchal order as follows:

- 1 Minibus (1103)
- 2 Light Motor Vehicle (LMV) (968)
- 3 Light Delivery Vehicle (LDV) (612)
- 4 Bus (378)

Seatbelt use by passengers in South Africa is suggested in some research as being very low (Highly likely so in respect of the writers on consideration). To this extent, it is not uncommon to see high passenger death rates in all vehicle types in serious crash cases. Notably, high passenger death rates in Minibus and LDV type vehicles is also suggested as not being uncommon as there are:

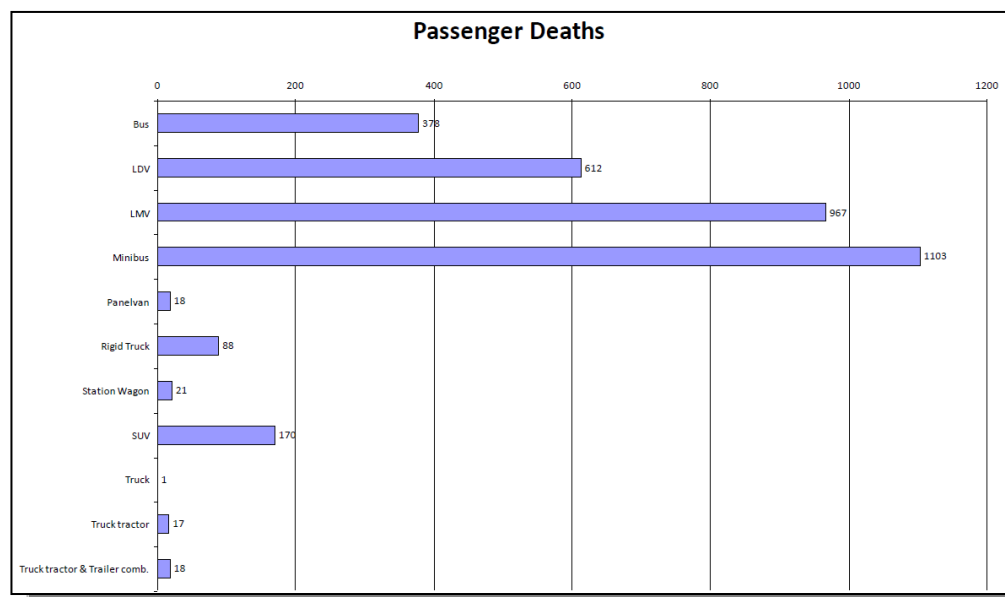
- Inherently a high number of passengers in a minibus and LDV vehicle and therefore somewhat disproportionately higher.
- The nature of the combined use of and ergonomics of the seats of a minibus vehicle and their seatbelts, not conducive to simple use.
- There are generally no seats and seatbelts in the load-bed of an LDV, likewise it generally an open / exposed position, that tools & equipment are not uncommon loads carried in the same loading.

Strict enforcement of laws regarding seatbelt use, primarily the enforcement of fining drivers to ensure that they insist that passengers wear seatbelts, is the primary factor in death rate reduction. This is especially so for situations where preventing ejection is crucial.

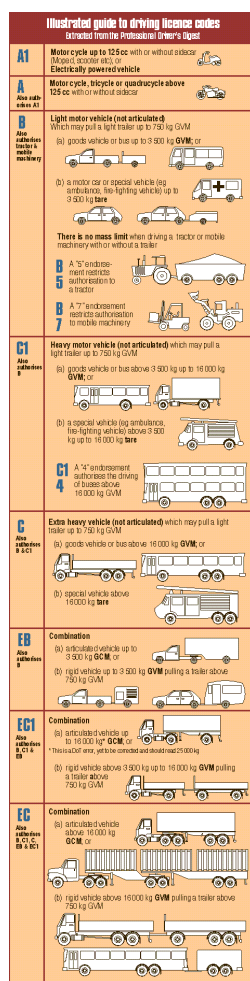
Although legislation has been amended to somewhat control LDV load bin passengers, this is in the writer's opinion wholly inadequate given the high prevalence of LDV involvement and load bin passenger death rates. This legislation should be changed to wholly exclude passengers in a load bin.

Nonetheless, as has been highlighted, implementation of engineering changes to drastically reduce the highest number of serious crash scenarios (head on / partial overlap), too will reduce the number of passenger deaths. Enforcement of seatbelt use, overloading is crucial.

Figure 10 (Passenger deaths)



8 - Licence type: The Licence type (Figure 11)



- 1 Unknown (518)
- 2 C1 (411)
- 3 EC (299)
- 4 EB (208)

Although the *Unknown* is a substantial figure, this has largely resulted as drivers are either fatally injured and or that, at that stage of the investigation, no finalisation of the driver's licence category was established.

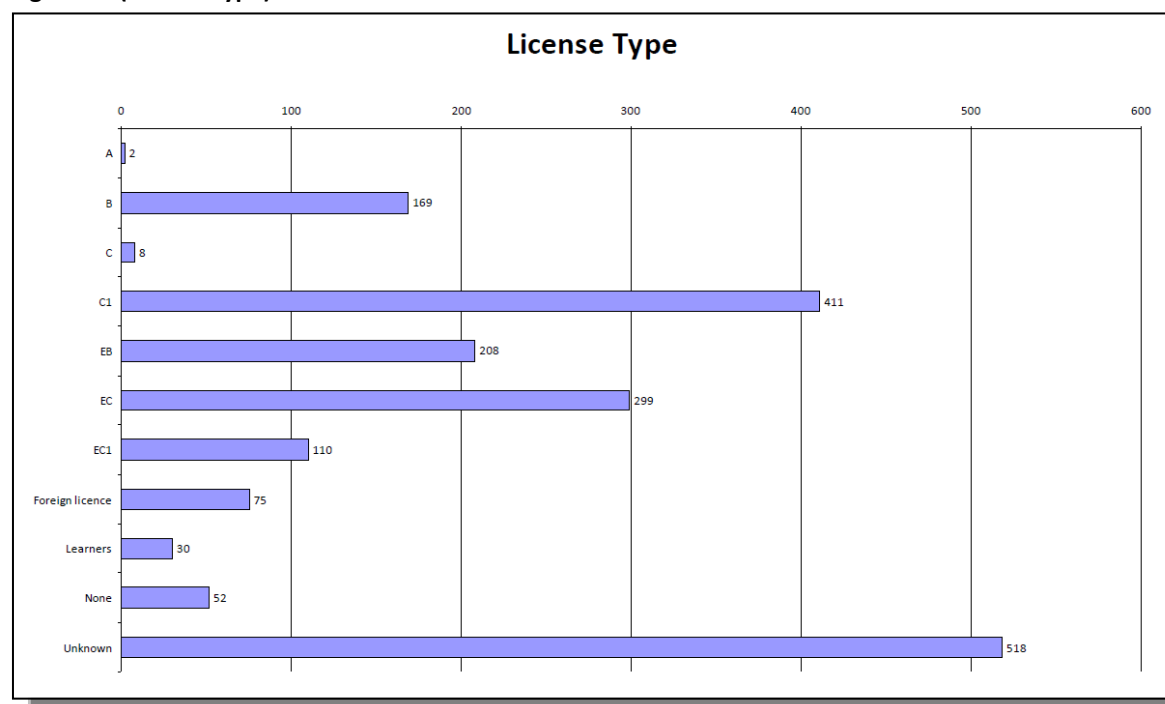
Nonetheless, the major category of C1 is once again not an unusual determination, this generally in line with researched and established international norms as to licence categories involved. The wider range of the C1 licence category also contributed to due to the known choice of this selection of licensing due to a difference in drivers licence test procedure requirements²².

It is perhaps not unusual to see a high level of both EB & EC as these categories cover bus, all commercial and the vast majority of Professional Driver categories.

Of particular interest is that of NO – None (52) drivers' licence and in relation, Learners licence (30) category licence crash involvement, at very high levels.

It has already been highlighted in research that inherent corruption and generally poor levels of driver training and driver test standards abound, this needs to be urgently addressed. To this end, the clamping down on fraudulent driver's licence activities and the vast improvement in drivers licence training and testing is a key factor in improving driver standards on the road. This is particularly notable against the finding of Human Factors consistently being the major cause of crash cases.

Figure 11 (License type)



²² Reference material 22 – No Parallel parking test required

9 - Accidents per province:

The *Accidents per province* (Figure 12) criteria is categorised in conjunction with the standard nine provinces of the country, as is listed as facility on all accident records. The top five provinces in hierarchal order as follows:

- 1 Kwa Zulu Natal (KZN) (23.2%)
- 2 Eastern Cape (15.7%)
- 3 Gauteng (14.4%)
- 4 Mpumalanga (11.8%)
- 5 Free State (10.8%)

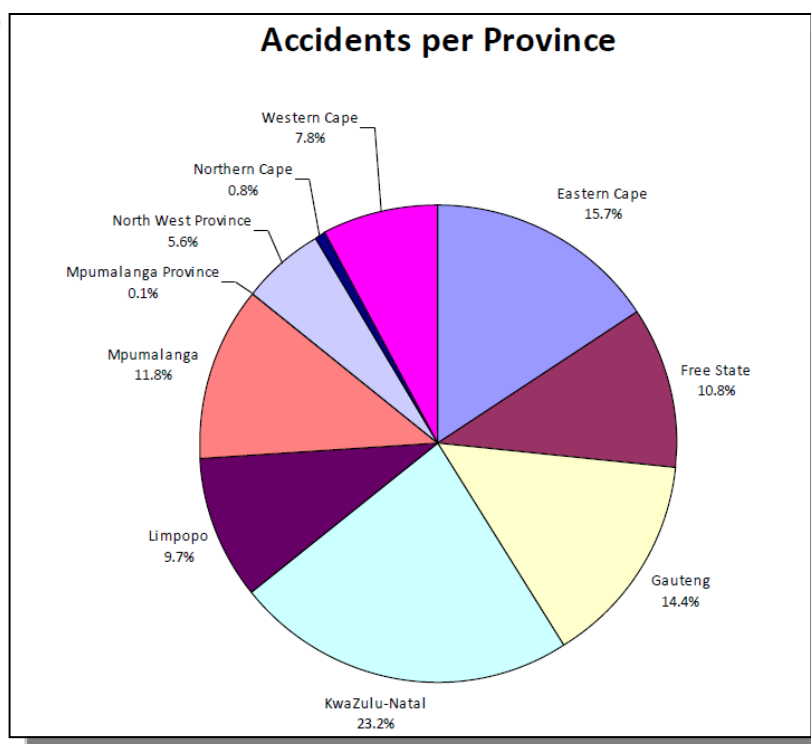
KZN is not geographically one of the major provinces in respect of area, listing only as seventh on the list, at 7.7% of the total. However, KZN is second on the list in respect of population, at around 11 Million²³ population. KZN notably the second most prominent province in respect of vehicle population, Gauteng leading and Western Cape third²⁴. Notably, KZN hosts one of the major network routes, being the National Route N3, direct access to the busiest port, to this extent, it is not unusual to see KZN ranking at the top in respect of highest number of accidents.

Unusually so, Eastern Cape ranking second on the listing, certainly needs careful consideration as the Eastern Cape ranks last in the rest of GDP per capita, only fourth on the population listing at around 6.5 million, and is second on the list in respect of geographical size.

Gauteng, not unexpected in respect of being a high crash rate province, notably in respect of Gauteng being the “financial capital”, highest concentration population at around 14.6 million, and central node. Nonetheless, Gauteng the smallest geographical area.

These results noted, therefore suggest that the major available resources and interventions should be concentrated between the top listed provinces.

Figure 12 (Accidents per province)



²³ Stats SA - 2018

²⁴ Reference material 23 – Pg 11 - KZN approx. 1.5 – 1.6 mil / Gauteng approx. 4.5 – 4.6 mil / Western Cape approx. 1.8 – 1.9 mil

10 - Road hierarchy:

The *Road hierarchy* (**Figure 13**) criteria is categorised in conjunction with the typical age group range categorisation. The top four categories in hierarchal order as follows:

- 1 Freeway (52%)
- 2 Arterial (33%)
- 3 Local (12%)
- 4 Collector / Dist. (3%)

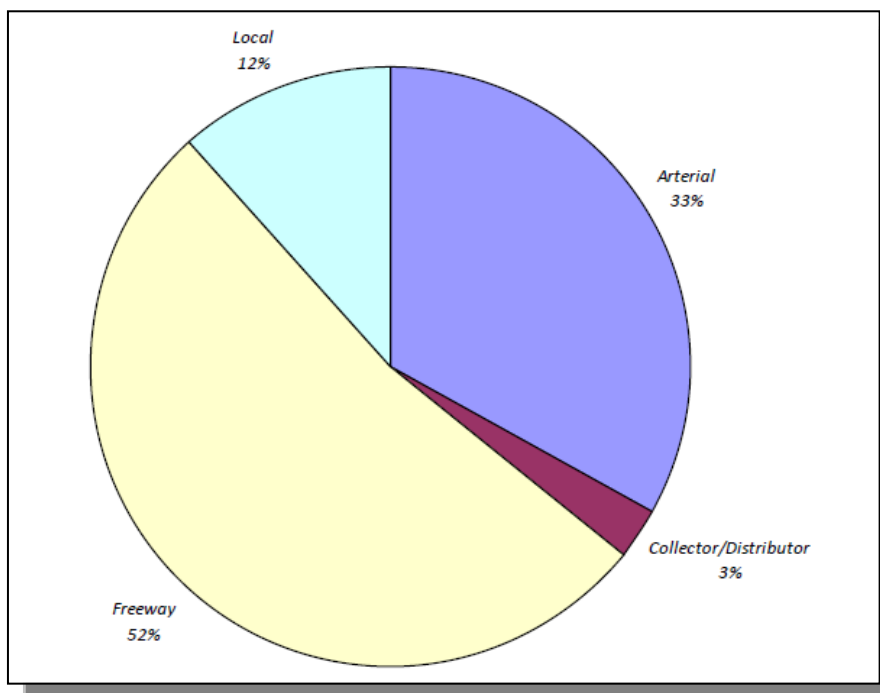
It is perhaps not unusual to see results of highest number of serious crash cases on Freeways, notably the higher speeds. Similarly, the same consideration for Arterial roads.

It is these same roads that would typically facilitate centre median separation where possible, noted against the results that highlight the prolific number of opposite direction head on and partial head on type accidents.

Where possible, all such roads should be considered from an engineering perspective to be suitably amended to see the separation of alternate direction traffic flow with the use of barriers.

As already highlighted, resources in respect of policing and the like, should therefore be centred around the two major road categories.

Figure 13 (Road hierarchy)



11 - Time: The Time (**Figure 14**) criteria is categorised in conjunction with the typical two hour time range set out in various research and publication references. The top four categories in hierarchal order as follows:

- 1 18:00 – 20:00 (100)
- 2 16:00 – 18:00 (95)
- 3 06:00 - 08:00 (74)
- 4 14:00 – 16:00 (68)

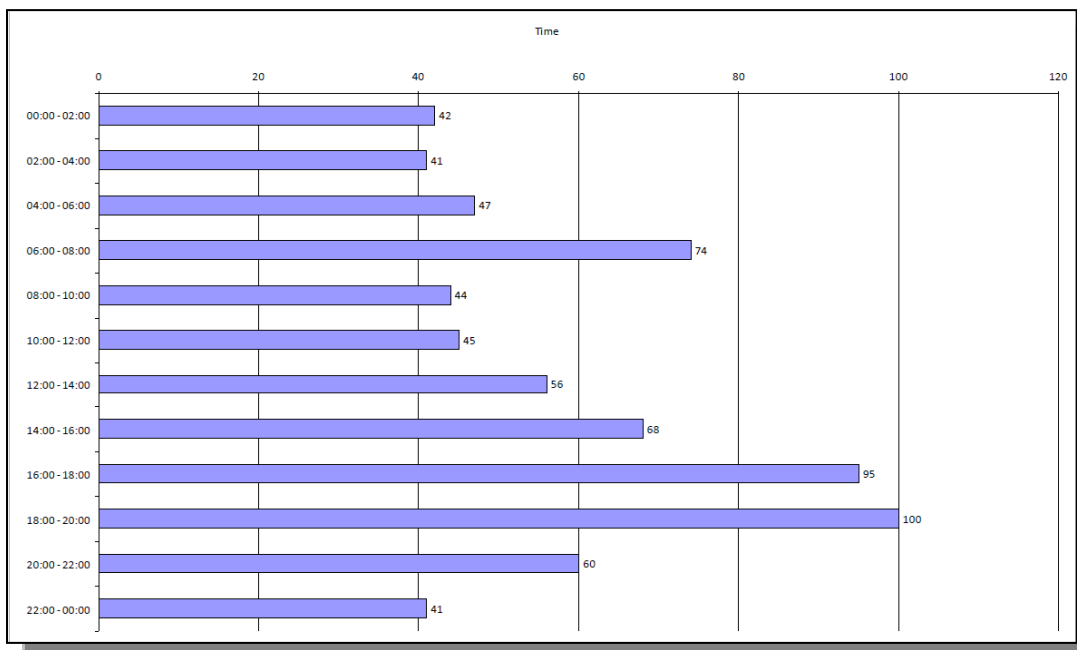
Similar to various research, early morning (Dawn) and later afternoon (Dusk to early evening), are consistently shown as the high-risk time periods, this data concurs²⁵. Most notably, the highest risk times between 18:00 – 20:00 (100), however the wider range of 16:00 – 20:00. It is postulated in various references that the factors of fatigue, busy roads and deadlines are the key drivers to this time range being the highest serious accident time frames.

In respect of engineering, the careful consideration of lighting, self-energised cat-eyes as well as road edge warning rumble strips, are all engineering factors that should be carefully considered. These would particularly assist with such time frame issues of visibility (change in lighting), sun-blind, as well as fatigue.

This noted, whatever monitoring and enforcement measures are considered across the board, should be targeted primarily at the high-risk times.

It is notable that historically, most shift change times in various policing (to include control room monitoring facilities), medical & rescue service stagger shift changes in this precise time range (Typically 16:00 – 20:00). This creates an inherent “window” in reduced policing, enforcement and or delay in assistance.

Figure 14 (Time)



²⁵ Appreciated that this varies somewhat by season

12 - Vehicle types:

The *Vehicle types* (**Figure 15**) criteria is categorised in conjunction with the typical age group range categorisation. The top four categories in hierarchal order as follows:

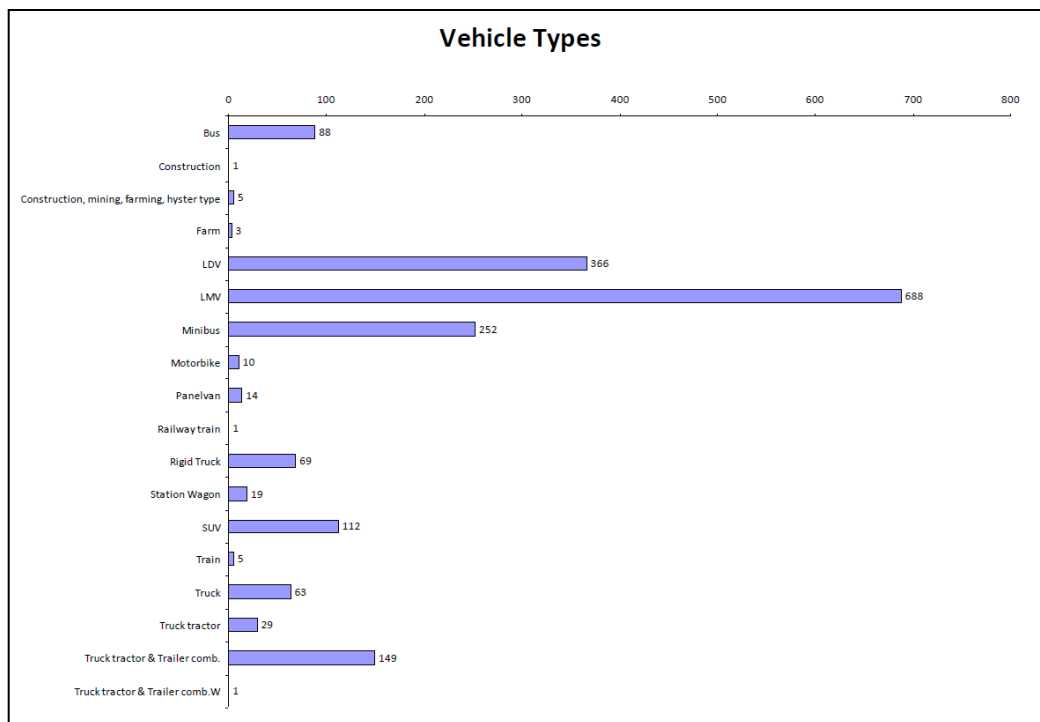
- 1 LMV (688)
- 2 LDV (366) aka “Bakkies”
- 3 Minibus (252)
- 4 Truck tractor and trailer - Commercial (149)

Much is alluded to Minibus Taxi type vehicles and likewise Commercial trucks being the major culprits as to serious crash cases. This is very clearly not so, with Light Motor Vehicles (LMV) being the forerunner and Light Delivery Vehicles (LDV).

This noted, enforcement across the board should see some level of priority provided to the main categories of LMV, LDV and Minibus type vehicles.

It is notable that SUV type vehicles provides a relatively high number of serious crash case involvements²⁶. It is assumed at this stage that this is as a result of two key factors of the general proliferation of these vehicle types and likewise the relatively high centre of mass.

Figure 15 (Vehicle types)



²⁶ Not the correlation to driver deaths and SUV involvement

13 - Geo-location hot-spots

The Geo-locating (**Figure 16**) criteria is set out in Google Earth, plotted in location through GPS position recordings of each scene. The top three concentration locations described in prose as follows, highlighted in Figure 16:

- 1 N1 between Worcester & Beaufort West
- 2 N3 between Mooi River & Warden
- 3 N1 between Bela-Bela & Louis Trichardt

Figure 16 (Geo-Locations - Overall)

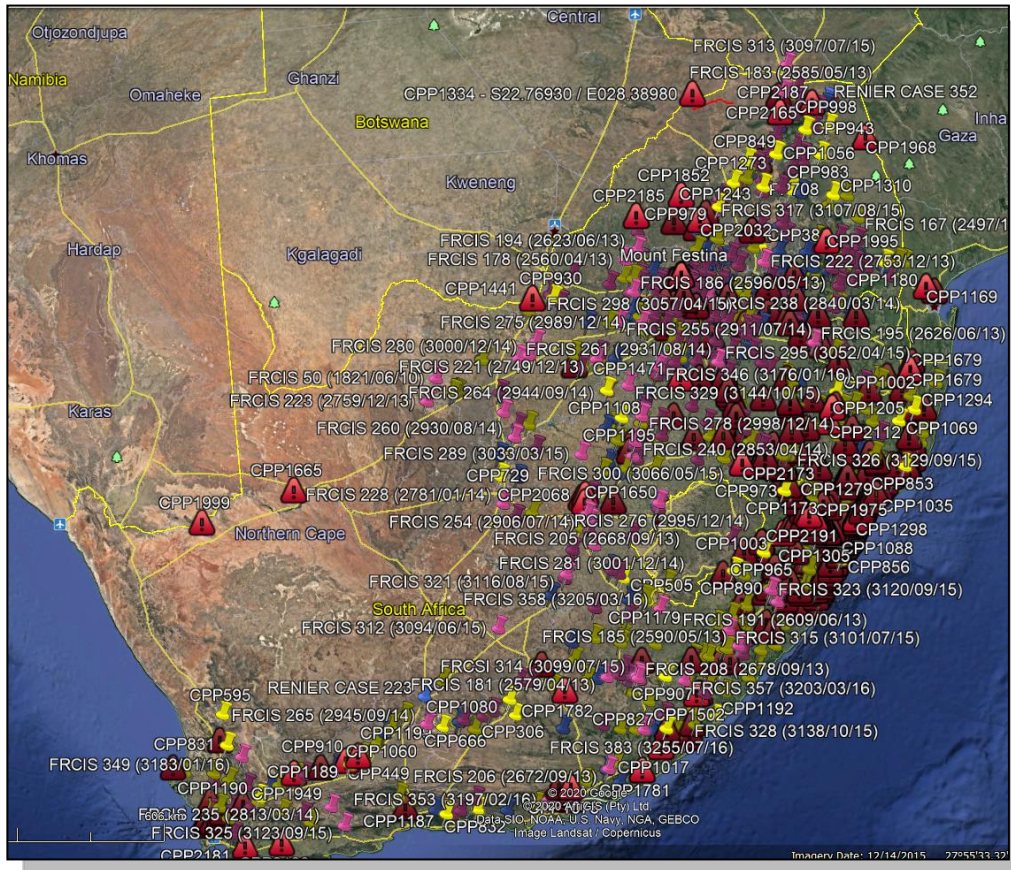
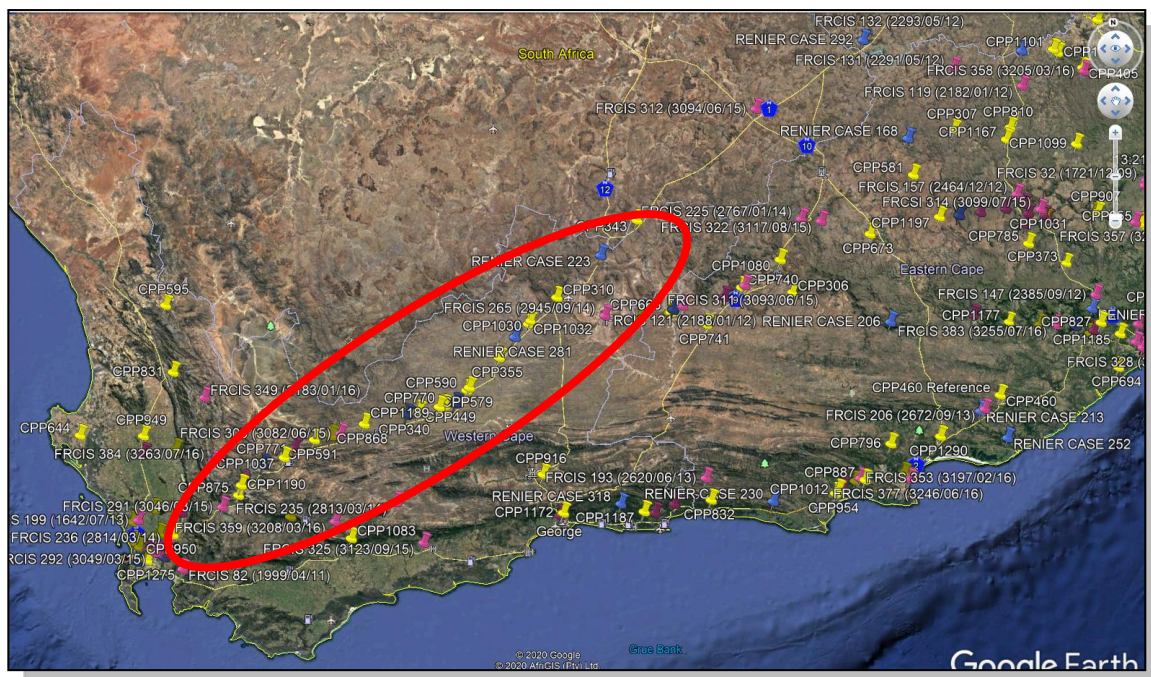


Figure 17 (Geo-locating - highlighted section)



[illegible][illegible]

General comments:

The data considered in very brief synopsis, the following are the major areas of concern and the direct or major contributing factors to serious crash cases over the period:

- 1 Human factors
- 2 Opposite direction, head on & partial head on type crash
- 3 Light motor vehicles and light delivery vehicle involvement
- 4 16:00 – 20:00 time frames
- 5 Freeways
- 6 KZN, Gauteng and Eastern Cape areas
- 7 20 – 39 years age groups

The results of such database studies needs to be brought to the direct attention of grass-roots level enforcement, to include their direct management, and not only communicated at senior level or simply published and forgotten.

The writer's overview comments provided in consideration of the data, serve as a basic guideline in the use of the extensive data populated in the database to improve the current situation of crash rates, with particular emphasis in reducing severe crash cases that typically result in fatalities. This noted, and as has been alluded to throughout, further and perhaps intensive analysis of the extensive data would result in further or even alternate recommendation. It is the key intention and hoped that the database will grow and will allow greater analysis, likewise the possible incorporation of/or into other data sets.

It should be noted that the identification and reference to the direct and indirect (or major contributory cause) of the crash in respect of the crash cases referenced in this database, not unlike other advanced level crash investigation reports considered in other database sets, is reliant on the findings listed in the relevant report. It is accepted that the findings indicated are correct, or at least are as true a reflection or comment as could be made at that stage of the particular case investigation.

One of the issues, perhaps not at first identifiable to the academic reader, but notable in considered overview of the extensive research and general documents perused in consideration of an appropriate database, is the inherent "need" by academia to place descriptions in prose. This is important, however is so often much easier understood by the lay-man (Very often the decision makers that need to be addressed and convinced!) with the use of diagrams or even better, images. To this end, the database is not limited in written description, but is linked "in the background" as has been explained, to extensive data in the form of images of the specific data, such as that of images of the road and surroundings, the vehicles themselves and specific evidence of the case. Similarly, the reference to concentration of locations on Google Earth (Mapping) imagery, against that of the written description of a road name, is patent.

As far as reasonably possible, as would be expected of the majority of data sets, the database is sensitised on the basis of not including such personal data as names, ID numbers, telephone numbers, addresses, registration, victim faces or other sensitive information.

For those interested in the possible use or further development of the database itself in respect of its functioning and use, or the specific data gleaned therefrom as already contained, are invited to make contact with Accident Specialist and make suitable arrangements.

Reference material / Bibliography:

- 1 A European Fatal Crash Database: Andrew Morris*, Steven Reed*, Helen Fagerlind**, Karolina Bjorkman**, Michael Jaensch**, Dietmar Otte**, Gilles Vallet**, Lindsay Cant**, Gabriele Giustiniani**, Kalle Parkkari**, Ernst Verschragen**, Boudewijn Hoogvelt** * Vehicle Safety Research Centre, Ergonomics and Safety Research Institute, Holywell Way, Loughborough LE11 3UZ, UK www.esri.org.uk ** SafetyNet WP5 Consortium <http://www.erso.eu>
- 2 Creation of an in-depth road traffic crash database for india: the Coimbatore rural district case study: Jeya Padmanaban Greg Stadter JP Research, Inc. USA Ravishankar Rajaraman Swastik Narayan Bharat Ramesh JP Research India, Pvt. Ltd. India Paper Number 11-0100
- 3 Department: Transport, Republic of South Africa - The impact of road freight accidents on south africa's roads cost of South African road freight accidents report: 09 November 2014 Department: Transport Republic of Transport BID NUMBER DOT/05/2013/ITP Prepared by: Barry Standish / Antony Boting / John White - 09 November 2014
- 4 Accident investigation procedures literature review report: 15 September 2014 Department: Transport, Republic of South Africa BID NUMBER DOT/05/2013/ITP
- 5 A Database for Crash Avoidance Research: Mark Lee Edwards National Highway Traffic Safety Administration SAE 870345
- 6 3rd International, Conference on ESAR, Expert Symposium on Accident Research: Title: Building the European Road Safety Observatory / Integrated Project, Thematic Priority 6.2 "Sustainable Surface Transport" Deliverable D4.2 Database Transparency Project co-financed by the European Commission, Directorate-General Transport and Energy sn_inrets_wp4_d4.2_final_03/02/2006 Page 1 Contract No: TREN-04-FP6TR-S12.395465/506723 Project Co-ordinator: Professor Pete Thomas
- 7 SafetyNet Workshop, March 27th 2007, Brussels / Independent In-depth Road Accident Investigation in the EU Jesus Monclus / Lars-Göran Löwenadler / Reinhold Maier / Jean-Paul Repussard (EC, Secretary) EC Expert Group on Accidentes in the Transport Sector / Road Sector Working Group – ROSAT Independent and Transparent Accident Investigation Recommendations - A point of view from the industry Laboratoire d'Accidentologie, de Biomecanique et d'Etudes du Comportement Humain PSA RENAULT, France
- 8 Case Study: Research of Traffic Accidents at TU Dresden, GERMANY SOFTWARE SOLUTION FROM: Trans4mation IT GmbH / [http:// www.trans4mation.de](http://www.trans4mation.de) CUSTOMER CONTACT: e-Mail: unfallforschung@mailbox.tu-dresden.de <http://www.verkehrsunfallforschung.de>
- 9 Crossroads software - traffic collision database system / www.crossroadssoftware.com
- 10 A Scientific Study - "ETAC" - European Truck Accident Causation
- 11 www.irtad.net - International road traffic and accident database
- 12 www.aps.us - Report Beam, Field Based Reporting System
- 13 <http://www.rfa.co.za/rfa/index.php>
- 14 <http://internationaltransportforum.org/home.html>
- 15 http://ec.europa.eu/transport/road_safety/specialist/index_en.htm
- 16 <http://www.grsroadsafety.org/> - Global road safety partnership
- 17 <http://www.crossroadssoftware.com/products.htm>
- 18 http://www.filebuzz.com/findsoftware/Accident_Database/1.html
- 19 <http://www.trafficcountdata.com/>
- 20 <https://www.mycollisionreport.com/SelectReport.aspx>

- 21 Accident Specialist 21-years, Case history 1999-2020, with Google Earth Visuals:
<https://www.accidentspecialist.co.za/wp-content/uploads/2020/08/A-history-of-case-records-of-accident-Specialist-June-2020.pdf>
- 22 C1 Drivers licence: - <https://www.getyourdrivers.co.za/the-test/cars-and-trucks/yard-test-cars-trucks/4/>
- 23 RTMC - Road Traffic Report Calendar 1st Jan – 31st December 2016
https://www.rtmc.co.za/images/rtmc/docs/traffic_reports/calendar/Calender%202016%20report.pdf
<https://www.rtmc.co.za/index.php/publications/reports/traffic-reports>

Addendums:

List of all entry parameters in database therefore available search parameters

Case details tab:

- 1) Our reference (type in – **hyperlinks** to .pdf file of entire report)
- 2) Database (drop down):
 - a. Accident Specialist
 - b. Alternative service provider 1 - case report
 - c. Alternative service provider 2 - case report
 - d. Alternative service provider 3 - case report
 - e. RAF (to possibly add and consider major cases?)
 - f. Private clients (to possibly add and consider other private cases?)
 - g. Other (Can specify cases considered from other sources?)
- 3) Case Year (type in)
- 4) Client Reference (type in)
- 5) Client (drop down – list all out clients)
- 6) Instructing person (type in)
- 7) Date received (Calendar)
- 8) Time of accident (type in – 24hr)
- 9) Consultant (drop down – lists AS consultants / investigators)
- 10) Location (Type in – hyperlinks to photos of scene)
- 11) GPS coordinates (type in – **hyperlinks** to Google earth)
- 12) Province
 - Eastern Cape
 - Free State
 - Gauteng
 - KwaZulu-Natal
 - Limpopo
 - Mpumalanga
 - Northern Cape
 - North West
 - Western Cape
- 13) No. of vehicles involved (type in)
- 14) Pedestrian or cyclist involved (tick box)
- 15) No. of persons involved (type in)

- 16) No. of fatalities (type in)
- 17) No. of injuries (type in)
- 18) No. of drivers fatal (type in)
- 19) No. of vehicles < 3500kg (type in)
- 20) No. of vehicles > 3500kg (type in)
- 21) Status (drop down)
- a. Pending
 - b. Complete
 - c. No work done
 - d. Assisted on case
 - e. Archived
 - f. Emailed advice
 - g. Awaiting instruction
- 22) Due date (calendar input)
- 23) Date sent (calendar input)
- 24) Invoice no. (type in)
- 25) Payment received (calendar input)
- 26) Extension letter (tick box)
- 27) Extension date (calendar input)
- 28) SAPS station name (type in)
- 29) SAPS Case no & AR no. (type in)
- 30) Accident type (drop down):
- a. Head / rear end
 - b. Head / rear end with secondary impacts (multiple vehicle)
 - c. Head on
 - d. Head on / partial overlap
 - e. Head on with secondary impacts (multiple vehicle)
 - f. Sideswipe (opposite direction)
 - g. Sideswipe (same direction)
 - h. Sideswipe with secondary impacts (multiple vehicle)
 - i. Approach at an angle (T-bone / 90 degree)
 - j. Turning in the face of traffic (U-turn)
 - k. Single vehicle loss of control
 - l. Single vehicle overturned
 - m. Accident with animal
 - n. Accident with pedestrian
 - o. Accident with train
 - p. Accident with fixed object
 - q. Accident with stationary vehicle
- 31) Cause of accident (type in)
- 32) Ensuing fire (tick box – yes / no)
- 33) Testified (tick box – yes / no)
- 34) Case outcome (type in)

35) Problems with case / investigation (type in)

36) Accident cause:

a. Human (drop down)

- i. Fatigue
- ii. Diabetes
- iii. Stroke
- iv. Heart Attack
- v. Alcohol
- vi. Drugs
- vii. Speed
- viii. Vision (eyes)
- ix. Unlicensed
- x. Prosthetic
- xi. Overtaking when unsafe to do so
- xii. Overtaking on solid barrier line
- xiii. Unable to control vehicle
- xiv. Travelling contra-flow / moved into oncoming traffic lane
- xv. Travelled through red light
- xvi. Unable to avoid obstruction / obstacle
- xvii. Poor upkeep / maintaining vehicle

b. Environment

- i. Mist
- ii. Rain
- iii. Snow
- iv. Ice
- v. Wind

c. Mechanical

- i. Tyres
- ii. Wheels
- iii. Bolts / Nuts
- iv. Brakes
- v. Engine failure
- vi. Gearbox failure
- vii. Steering failure
- viii. Suspension failure
- ix. Lights
- x. Unroadworthy (general)

d. Road engineering

- i. Potholes
- ii. Sink holes
- iii. Blind rise
- iv. Blind corner
- v. Obstruction
- vi. Road works
- vii. Collapse of road edge
- viii. Presence of animals

e. Anomalous (type in)

Vehicles involved tab:

37) Vehicle class (drop down):

- a. Bicycle
- b. Motorbike
- c. LMV
- d. SUV
- e. LDV
- f. Minibus
- g. Rigid Truck
- h. Truck tractor
- i. Truck tractor and trailer comb.
- j. Bus
- k. Train
- l. Construction, mining, farming, Hyster type

38) Make (drop down – lists every single make of vehicle from A – Z)

39) Model (type in – **Hyperlink** to specific vehicle photographs)

40) Roadworthy (tick box)

41) VIN no. (type in)

42) Engine no. (type in)

43) Trailer (tick box)

44) Cargo weight (type in)

45) Cargo description (type in)

46) Driver seatbelt (drop down):

- a. Worn
- b. Not worn
- c. Unknown

47) Front passenger seatbelt (drop down):

- a. Worn
- b. Not worn
- c. Unknown

48) Vehicle colour (drop down):

- a. Black
- b. White
- c. Red
- d. Silver / grey
- e. Blue
- f. Green
- g. Yellow
- h. Gold

49) Vehicle damage (drop down):

- a. Right front
- b. Right mid-front
- c. Right mid-back
- d. Back right
- e. Back centre
- f. Back left
- g. Left mid-back
- h. Left mid-front
- i. Left front

- j. Front centre
- k. Bonnet
- l. Roof
- m. Boot
- n. Multiple
- o. Caught fire
- p. Rolled
- q. Damage undercarriage
- r. Damage no detail
- s. No damage
- t. Windscreen / windows

50) Insured (drop down):

- a. Insured
- b. Uninsured
- c. Unknown

51) In vehicle monitoring (drop down):

- a. Drive Cam
- b. In board camera
- c. Geotab
- d. Tachograph
- e. Tracking system
- f. Other

52) Airbags (tick box)

53) Airbags deployed (tick box)

54) Tyre details (table):

a. Position (drop down):

- i. Front Right
- ii. Front Left
- iii. Front
- iv. Back
- v. Rear Right
- vi. Rear Right 1
- vii. Rear Right 2
- viii. Rear Right 3
- ix. Rear Right 4
- x. Rear Right 5
- xi. Rear Right 6
- xii. Rear Right 7
- xiii. Rear Right 8
- xiv. Rear Right 9
- xv. Rear Right 10
- xvi. Rear Right 11
- xvii. Rear Right 12
- xviii. Rear Left
- xix. Rear Left 1
- xx. Rear Left 2
- xxi. Rear Left 3
- xxii. Rear Left 4
- xxiii. Rear Left 5
- xxiv. Rear Left 6
- xxv. Rear Left 7
- xxvi. Rear Left 8
- xxvii. Rear Left 9
- xxviii. Rear Left 10

- xxix. Rear Left 11
- xxx. Rear Left 12

b. Tyre Make (drop down – lists all tyre makes from A – Z)

c. Retread (drop down):

- i. Yes
- ii. No

d. Tyre size (drop down – lists all tyre sizes)

e. Manufacturer date (calendar input)

f. Inflated / Deflated (drop down):

- i. Inflated
- ii. Deflated
- iii. Burst tyre / sudden deflation
- iv. Burnt out

g. Tread depth:

- i. Inner (number value)
- ii. Centre (number value)
- iii. Outer (number value)

h. Condition (drop down):

- i. Good
- ii. Fair
- iii. Poor
- iv. Illegal
- v. Burnt out

i. Notes (type in)

55) Driver details:

a. Ethnicity (drop down):

- i. Asian
- ii. Black
- iii. Coloured
- iv. White
- v. Other

b. Gender (drop down):

- i. Male
- ii. Female

c. Age (drop down):

- i. 6-16
- ii. 17-19
- iii. 20-29
- iv. 30-39
- v. 40-49

- vi. 50-59
- vii. 60-69
- viii. 70+
- ix. Unknown

d. Licence type (drop down):

- i. A
- ii. A1
- iii. B
- iv. C
- v. C1
- vi. EB
- vii. EC
- viii. EC1
- ix. Learners
- x. None
- xi. Unknown

e. Licence expiry (calendar input)

f. Medical (drop down):

- i. Diabetes
- ii. High blood pressure
- iii. Low blood pressure
- iv. Heart problems
- v. Epilepsy
- vi. Wear glasses / contacts when driving
- vii. Prosthesis
- viii. None
- ix. Unknown

g. Injuries (drop down):

- i. Fatal
- ii. Serious
- iii. Slight
- iv. None

h. Suspected of alcohol / drugs (Tick box)

i. Tested for alcohol / drugs (tick box)

j. Foreign national (tick box)

56) Passengers:

a. Gender (drop down):

- i. Male
- ii. Female
- iii. Child
- iv. Adult

b. Injuries (drop down):

- i. Fatal
- ii. Serious
- iii. Slight
- iv. None
- v. Unknown

c. Age (drop down):

- i. 6-16
- ii. 17-19
- iii. 20-29
- iv. 30-39
- v. 40-49
- vi. 50-59
- vii. 60-69
- viii. 70+

d. Foreign national (tick box)

Road / Environment tab

57) Road hierarchy (drop down):

- a. Freeway
- b. Arterial
- c. Collector / Distributor
- d. Local

58) Speed Limit (drop down)

5	10	15	20	25	30
40	50	60	70	80	90
100	110	120			

59) Road surface (drop down & type in for notes):

- a. Concrete
- b. Tarmac
- c. Gravel
- d. Dirt
- e. Other

60) Surface condition (drop down & type in for notes):

- a. Dry
- b. Wet
- c. Wet in areas
- d. Ice
- e. Snow
- f. Loose gravel or sand
- g. Slippery
- h. Water standing / moving
- i. Other

61) Number of lanes (drop down):

- a. 1
- b. 2
- c. 3
- d. 4
- e. 5
- f. 6

62) Traffic control type (drop down):

- a. Robot
- b. Stop sign
- c. Yield sign

- d. Officer
- e. Officer & robot
- f. Uncontrolled
- g. Not at a junction or crossing
- h. All robots out of order
- i. Some robots out of order
- j. Flashing robots
- k. Boom
- l. Pedestrian crossing
- m. Roadworks signage

63) Lit (tick box & drop down):

- a. If lit:
 - i. Streetlight
 - ii. Ambient
 - iii. Both

64) Weather conditions (drop down):

- a. Clear
- b. Overcast
- c. Rain
- d. Mist / fog
- e. Hail
- f. Dust
- g. Fire / smoke
- h. Snow
- i. Severe wind
- j. Unknown

Note: Some 600 cases are stored – reference in this database, starting at 2006 to present.

Peer review:

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