# SYSTEMATIC RATING OF ACCIDENT PRONE T – INTERSECTIONS ON NATIONAL HIGHWAYS

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**DECLARATION OF THE CANDIDATE AND SUPERVISOR**

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## ABSTRACT

Road Traffic accidents and the resulting deaths have now emerged as a major safety and public problem. In this study intersection geometry of roads were considered to rate accident prone T – Intersection locations in national highways.

The only source of accident data in Sri Lanka is available with the Traffic Police. Availability of accident data is vital for identifying accident prone locations in the traditional data analysis process. However, insufficient data for statistical analysis and changes to the geometry of the intersection with improvement are major drawback of analyzing the available data. In this study, a method is introduced to find and rate the accident prone T – Intersections with respect to road geometry without depending on traffic police accident data. The parameters of road geometry such as road width, vertical profile and type of movement and combination of these: are considered as main influence elements and identified vulnerable factors of each element. The lane width was classified as single lane, two lanes and multi-lane and approach road profile was divided into flat, medium and adverse. The turning movement types were classified into four types: M1, M2.M3 & M4 based on centre median configuration for traffic movement at the junction. Then the relative contribution of the elements to the accident prone T – Intersections were determined by using Analytical Hierarchy Process (AHP) with a rating system. The ratings of each element were suggested by experts of Roads and Traffic Engineering. Expert ratings were subjected to consistency testing and AHP determines the weightage of each element. It was found that road width is the most critical element of the road geometry and followed by vertical profile and turning movement type. The intersections that did not comply with the model were further studied and the causes for lower or higher number of accidents in those locations were identified.

Most vulnerable accident prone T-intersections had the combination of flat gradient of approach road, single lane width and open centre median in the major road of the intersection.

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## LIST OF ABBREVIATIONS

AHP - Analytic Hierarchy Process

PDO - Property Damage Only

F - Flat

R - Rolling

M - Mountainous

AADT - Average Annual Daily Traffic

RDA - Road Development Authority

CR - Consistency Ratio

RW - Road Width

VP - Vertical Profile

CM - Centre Median

TOM - Type of Movement

LHS - Left Hand Side

RHS - Right Hand Side

$\lambda_{max}$ - Maximum Eigen value

CI - Consistency Index

## LIST OF APPENDIX

# 1 INTRODUCTION

## 1.1 General

Road traffic accidents and accidents resulting in deaths have now emerged as one of the major safety and public problems in urban areas all over the world. The combination of rapid urbanization and motorization has made the problem even severe for the developing cities of Asia. Colombo, the capital of Sri Lanka is no exception. It demonstrates the burden and seriousness of the problem and emphasizes the need for strict and comprehensive measures to prevent the unwanted and unnecessary loss of lives. In urban areas, the traffic roadway system context is more complex where a mixed road user environment prevails and greater perceptual and cognitive demands are placed on the road users.

(Sabreena., et al,2014) The particular concerns are the urban intersection, particularly the T-intersections that are problematic locations and have been identified as among the most hazardous locations on roads, which account for a substantial portion of traffic accidents. The hazardous locations are the presence of signals, guide signs for street names, indication of upcoming turn lanes, conflict traffic and exclusive left and right turns.

The only source of accident data in Sri Lanka is available with the Traffic Police. Availability of accident data is vital in identifying accident prone locations in the traditional data analysis process. However, insufficient data for statistical analysis and changes to the geometry of the intersection with improvement is a major drawback of analyzing the available data. This study attempted to investigate the intersection accidents (especially T-intersections) occurring at one of the busiest and major highway of Colombo city in between William junction to Maliban junction. This approach could applicably offer decision making units for identifying accident prone T-intersections and their prioritization.

## 1.2 Problems and Research Objective

### 1.2.1 Problems Observed

These days' accidents are rapidly on the increase in Sri Lanka. Therefore; accident prone locations and/or stretches have to be identified. This might help agencies to take remedial action to resolve the problem.

### 1.2.2 Objective of the Study

The objectives of the research are to;

- Introduce systematic ratings of accident prone T-Intersections along National Highways by using Analytic Hierarchy Process (AHP) with the help of expertise in highway design, road safety and traffic management.
- Find out root causes of accidents and provide recommendations to resolve the problems.

### 1.2.3 Scope

A case study was carried out in the road section of A002 Road (Colombo – Galle – Hambantota - Wellawaya Road) from William junction to Maliban junction. During the study period, this section was not taken for any geometrical improvement. The main elements considered for this study were road width, vertical profile of approach road and type of movement. Also, this was compared with accident data, which was collected from Traffic Police. Further survey was conducted with Traffic Engineering experts to identify the accidents prone locations and provide systematic ratings to accidents prone locations by using Analytic Hierarchy Process (AHP).

# 2 LITERATURE REVIEW

An accident refers to an incident which occurs on public roads (not on private property or in a car park) where the driver or another person is involved and/or damage to property or to the driven vehicle had been caused. In fact, simple definition of an accident is a collision of one or more vehicles due to unexpected sequence of activities.

Intersection accidents occur due to failure in the traffic system which is the interaction of the characteristics of some basic elements such as road users, the vehicles and the roadway environment. In safety research on an international standpoint, many studies have shown that roadway intersections are critical sites that require more attention. (Chunjiao., et al, 2014) reported that 40% of motor vehicle accidents in US are at intersections or are deemed intersection related. During their study period, fatal crashes at traffic signal increased by 19% whereas the number of all other fatal crashes increased by 6%. They found that the main factor contributing to multiple – vehicle crashes at intersections, as well as those involving pedestrians, is non – compliance with traffic control devices, such as stop signs and traffic signals.

(Sayed., et al, 1999) indicated that more than 50% of the accidents occurring in urban corridors, accident frequency and severity remained relatively high despite the implementation of various geometric and traffic counter measures. In a study of urban intersection accidents in Riyadh, among the major causes for severe accidents, excess speed ranked first, followed by driving the wrong way and failing to yield. On the other hand, major cause for property damage alone (PDO) is accidents caused due to failing to yield, excessive speed and following too close.

(Sandra, 2013) developed APMs for Road segments and urban intersection with three or four legs and with or without traffic signal in Denmark. The estimated accident prediction models for road links were capable of describing more than 60% of the systematic variation while the models for junctions had lower values.

The significant variables found in the study were: speed limit, road width, number of exits per km, number of minor side roads per km, parking and land use. Based on the fatality analysis reporting system(FARS) and national automotive sampling system – general estimate system (NASS-GES) data 40% of the estimated (5,338,000) crashes during 2011 in the USA were intersection related. Of those intersection crashes, about 36% occurred at signalized intersection, furthermore signalized intersection also tends to experience more severe crashes. Injury crashes accounted for 33.2% of reported signalized intersection crashes, compared to 25.2% for non-signalized intersection crashes.

(Sandra, 2013) studied the pedestrian safety at intersections, considering different types of conflicts between road users. Four different ways for estimating hourly flows and right turning vehicles were explored. The author concluded left-turning vehicles caused higher risks for pedestrians than right-turning vehicles. At low vehicular flows right turns and semi protected left turns seemed to be equally safe for pedestrians. Risk increased with increasing vehicular flow and decreased with increasing pedestrian flows.

(Ward & George, 2005) In their studies, three most important perceived causes were: insufficient knowledge of traffic rules; dangerous parking and drug or alcohol consumption.

## 2.1 Design Controls & Criteria

Design Controls are the constraints that are imposed on a practical design apart from its technical counterpart. It is very vital for the designer to have a deep understanding on all the characteristics of the road including traffic and economic constraints to come up with a design which is technically feasible and economically viable.

Following are the main elements of highway geometrics.

- Gradients
- Horizontal Curves
- Vertical Curves
- Super elevations
- Cross fall

- Road width
- Sight Distance

The basic design controls and criteria, which govern the geometric features of the highway, are as follows;

- Topography
- Traffic Volume
- Speed
- Safety
- Economic consideration.
- Environmental consideration

### 2.1.1 Design Speed

Design speed is defined as: "a speed selected to establish specific minimum geometric design elements for a particular section of highway". These design elements include vertical and horizontal alignment, and sight distance. Other features such as widths of pavement and shoulders, horizontal clearances, etc., are generally not directly related to design speed.

The choice of design speed is influenced principally by the character of terrain, economic considerations, environmental factors, type and anticipated volume of traffic volume, functional classification of the highway, and whether the area is rural or urban. A highway in level or rolling terrain justifies a higher design speed than one in mountainous terrain. Scenic values are also a consideration in the selection of a design speed.

The road alignment shall be designed in a manner ensuring the standards of curvature, visibility, super elevation etc. provided for a Design Speed which shall be consistent with the anticipated vehicle speed on the road. A relatively straight alignment in a flat terrain will generate higher speeds than a more sinuous alignment located in a hilly terrain and thus incur lower speeds. This is common amongst dense land use constraints too. Therefore, there is always an inherent economic trade-off between the construction and environmental costs of alternative alignments of different Design Speeds.

Following are the 4 general conditions that a driver depends to select his speed.

- Physical characteristics of the highway
- Weather Condition
- Presence of other vehicles
- Speed limitations

Among the constraints that affect the design speed, following hold paramount importance;

- Type of road traffic
- Terrain type
- Environment

Table 2.1 shows the design speeds related to road classification, terrain and the design volume (Road Development Authority, 1998).

Table 2.1 : Relationship of the Design Speed Related With the Road Classification, Terrain and the Design Volume

| Type of Road | Road Class | Terrain | Design Volume PCU/day | Deign Speed (k/mph) | |
|---|---|---|---|---|---|
| | | | | Rural | Urban |
| $R_5$ | D,E | F | <300 | 50 | 40 |
| | | R | | 40 | 40 |
| | | M | | 30 | 30 |
| $R_4$ | C,D | F | 300-18,000 | 60 | 50 |
| | | R | | 50 | 50 |
| | | M | | 40 | 40 |
| $R_3$ | A,B | F | 18,000-25,000 | 70 | 60 |
| | | R | | 60 | 60 |
| | | M | | 50 | 50 |
| $R_2$ | A,B | F | 25,000-40,000 | 80 | 70 |
| | | R | | 70 | 70 |
| | | M | | 60 | 60 |
| $R_1$ | A | F | 40,000-72,000 | 80 | 70 |
| | | R | | 70 | 60 |
| $R_0$ | A | F | 72,000-108,000 | 80 | 70 |

*Source: Geometric Design Standards of Roads. Road Development Authority, 1998*

### 2.1.2 Width of Traffic Lanes and Shoulders

#### 2.1.2.1 General

Width of traffic lane influences the safety, comfort of driving and Level of Service of the road under concern. Vehicles are conveniently and freely driven in a broad width, with the increase of lane width. However, broader lane widths can result in congestion due to undisciplined driver behavior. The width of carriageway is determined in terms of the number of traffic lanes and width of a traffic lane. Number of lanes to be provided depends upon the present and future anticipated traffic volume. Shoulder is the portion traveled adjoining to the outer edge of the traffic lane. Wider shoulder will be provided for emergency stops for the vehicles.

#### 2.1.2.2 Factors Affecting the Lane Width

Following factors are taken into account when calculating the lane widths

- Traffic

The volume and composition of traffic are the major factors which determine the width of traffic lanes. Average Annual Daily Traffic (AADT) of the particular road and peak hour traffic volumes are required.

- Vehicle Dimension

Commercial vehicles in traffic stream also influence the lane width. Normal steering deviations as well as the tracking errors and pavement imperfections reduce the clearance between passing vehicles.

- Speed environment

Drivers have less control over the lateral position of a vehicle at high speed. Therefore: at higher Design Speeds, high width of traffic lane is required.

- Combination of speed and traffic volume

When both the speed and traffic volume are high, narrow lane width should be avoided.

#### 2.1.2.3 General Lane Width

The width of carriageway is determined in terms of the number of traffic lanes and width of a traffic lane. A traffic lane is defined as the width used for single line of

traffic operation. The desirable lane width is taken as 3.7m. The absolute minimum lane width is 3.1m.

Table 2.2 shows the minimum width of sealed pavements of undivided roads

Table 2.2 : Minimum Width of Sealed Pavements of Undivided Roads

| **Design Speed km/h** | **Minimum carriageway width(m) for design traffic volumes (AADT)** | | | | |
|---|---|---|---|---|---|
| | **1-140** | **141-300** | **301-1100** | **1101-2200** | **Over 2200** |
| 40 | 3.7 | 5.6 | 6.2 | - | - |
| 50 | 3.7 | 5.6 | 6.2 | 6.8 | 7.4 |
| 60 | 3.7 | 6.2 | 6.8 | 6.8 | 7.4 |
| 70 | 3.7 | 6.2 | 6.8 | 6.8 | 7.4 |
| 80 | 3.7 | 6.2 | 6.8 | 7.4 | 7.4 |
| 90 | 3.7 | 6.2 | 6.8 | 7.4 | 7.4 |
| 100 | 3.7 | 6.8 | 6.8 | 7.4 | 7.4 |
| 110 | 3.7 | 6.8 | 7.4 | 7.4 | 7.4 |
| 120 | 3.7 | 6.8 | 7.4 | 7.4 | 7.4 |

### 2.1.3 Sight Distance

#### 2.1.3.1 General

The necessity for a driver to see sufficiently far ahead to enable him assess developing situations and take appropriate action is obvious. The most common occasions that arises while driving are the following;

- To stop when approaching an obstacle
- Requiring a decision regarding overtaking
- Requiring an assessment of the course of action to be taken at an intersection

Sight distance is the unobstructed distance of roadway ahead visible to the driver. There are multiple types of sight distances that include stopping sight distance, passing sight distance, decision sight distance, overtaking sight distance, intersection sight distance etc. It is critical that sight distance issues be properly developed and applied to projects. In this design, following sight distances was considered in detail;

- Stopping Sight Distance
- Overtaking Sight Distance
- Continuation Sight Distance

#### 2.1.3.2 Constants Used for Design of Sight Distance

The following values are used to calculating Sight Distances according to RDA standard;

- Total reaction time = 2.5 Seconds.

i.e. the time between the instant the hazard comes into view and the instant the vehicle begins to slow down after the breaks have been applied. Otherwise it is known as PIEV value.

P - Perception I - Intellect E - Emotion V - Volition

Driver eye height

- Passenger Car =1.05m
- Commercial Vehicle =1.80m

Object cut off height above road surface

- Approaching vehicle = 1.15m
- Stationary object = 0.2m
- Vehicle tail height/Stop light = 0.6m
- Height of Head Light = 0.75m
- Upward Divergence Angle = 1.00 deg
- Vertical Clearance = 5.2m

### 2.1.4 Vertical Profile

The longitudinal profile of a road consists of straight gradients and vertical curves. Vertical curves should be simple in application and should result in a design that is safe, comfortable in operation, pleasing in appearance and adequate enough for drainage. The function of a vertical curve not only limits smoothing the passage of a vehicle from one gradient to another but also increases the sight distance over crests at the junction of the gradients.

Vertical curves can be broadly categorized into two categories namely;

- Crest Vertical Curves
- Sag Vertical Curves

The following considerations are of prime importance in designing the vertical alignment of the road.

- Good correlation with the horizontal alignment.
- Provision of adequate sight distance.

Further, following general controls should also be kept in view in designing the vertical profile of a highway.

- The selected grade line shall be smooth with gradual changes, consistent to class of the road and terrain type.
- A broken-back grade line (two vertical curves in the same direction separated by short section of tangent grade) generally should be avoided.
- Hidden type of profile should be avoided as it is hazardous and aesthetically unpleasant.
- On long grades it may be preferable to place the steepest grade at the bottom and flatter the grade at shorter intervals of lighter grade instead of uniformly sustained grade.

### 2.1.5 Grades

Generally, grades should be as flat as possible consistent with economy and longitudinal drainage requirements. Flat grades permit all vehicles to operate at the same speed. Steeper grades produce variation in speeds between lighter vehicles and the heavier vehicles both in the uphill and downhill directions. This speed variation leads to higher relative speeds of vehicles producing the potential for higher rear-end and head-on vehicle accident rates. This speed variation also results in increased queuing and overtaking requirements which give rise to further safety problems particularly at higher traffic volumes. In addition, freight costs are increased due to the slow speed of heavy vehicles.

The gradient of a line is its longitudinal slope and is expressed as the ratio of the difference in height of its two ends to the length between them. In other words, it can be described as a percentage of one vertical divided by the horizontal component.

### 2.1.5.1 General Maximum Gradients

Maximum gradients vary with the class of road, speed and topography. On high speed roads, grades close to 3% provide a very satisfactory level of service. On roads with high design speeds, gradients up to 6% cause no real problems. Gradients over 10% bring problems of very slow climbing speeds and high downhill speeds for heavy vehicles. In such places climbing lanes should be provided.

When adopting maximum grades, side drains need to be considered in respect to the maximum velocity of flow for scour protection. Special lining of the drains may be required to limit damage to the drain and the environment.
Table 2.3 specifies the maximum gradient based on type of terrain and road class.

Table 2.3 : Maximum Gradient Based on Type of Terrain and Road Class

| **Class of Road** | **A** | **B** | **C** | **D** | **E** |
|---|---|---|---|---|---|
| Terrain Type | F R M | F R M | F R M | F R M | F R M |
| Maximum Gradient | 4 6 8 | 5 7 9 | 7 9 10 | 9 10 10 | 9 10 10 |

*Source: Geometric Design Standards of Roads. Road Development Authority, 1998*

### 2.1.5.2 Minimum Gradients

Very flat grades may make it difficult to provide longitudinal drainage. Therefore, some longitudinal gradient is desirable for satisfactory drainage rather than flat gradient. As far as possible, these drainage requirements should not dictate the road grade; rather the drainage facility should be designed to accommodate the road grade. This may require greater recourse to sub-surface drains with closely spaced inlets, or other solutions to suit the circumstances.

In urban areas where pavements are kerbed, minimum gradient should not be flatter than 0.3%. In rural areas a minimum gradient of 0.5% should be maintained. If the

road gradient is flatter than 0.5%, then the drains must be graded separately from the road center line to obtain a minimum of 0.5% slope.

#### 2.1.5.3 Critical Length of Grades

The length of steep gradient should be limited in order to provide a satisfactory level of service of the road and it is known as Critical Length of gradients. Wherever possible it is necessary to avoid gradients that cause heavy vehicles to slow down to significantly low speed. On this basis, the critical lengths of upgrades when approached by level or nearly level section of roads are as given in Table 2.4.

Table 2.4 : Critical Length of Grades

| Grade (%) | Critical Length (m) |
|---|---|
| 3.0 | 480 |
| 4.0 | 330 |
| 5.0 | 250 |
| 6.0 | 200 |
| 7.0 | 170 |
| 8.0 | 150 |
| 9.0 | 140 |
| 10.0 | 135 |
| 12.0 | 120 |

*Source: Geometric Design Standard of Roads – Road Development Authority-1998*

## 2.2 Method of Analysis

The Analytic Hierarchy Process (AHP) is used in this study. It is popular and widely used, in decision making and in a wide range of applications. (Saaty, 2014) describes case applications ranging from the choice of a school for his son, through to the planning of transportation systems for the Sudan.

The AHP calculations but its essence is to construct a matrix expressing the relative values of a set of attributes. For example, what is the relative importance to the management of this firm of the cost of equipment as opposed to its ease of operation? They are asked to choose whether cost is very much more important, rather more

important, and as important, and so on down to the very much less important, than operability. Each of these judgments is assigned a number on a scale. (Saaty & Wong, 1983) adopted one common scale as shown in Table 2.5

Table 2.5 : Preference Index - Relative Importance of Categories

| **Intensity of importance** | **Definition** | **Explanation** |
|---|---|---|
| **1** | Equal importance | Two factors contribute equally to the objective |
| **3** | Somewhat more importance | Experience and judgment slightly favor one over the other |
| **5** | Much more importance | Experience and judgment strongly favor one over the other |
| **7** | Very much important | Experience and judgment strongly favor one over the other. Its importance is demonstrated in practice. |
| **9** | Absolutely more important | The evidence favoring one over the other is of the highest possible validity. |
| **2,4,6,8** | Intermediate values | When compromise is needed |

A basic, but a very reasonable assumption is that if attribute A is absolutely more important than attribute B and is rated at 9, then B must be absolutely less important than A and is valued at 1/9. These par wise comparisons are carried out for all factors to be considered, usually not more than 7, and the matrix is completed. The matrix is of a very particular form which neatly supports the calculations which then ensue.

The next step is the calculation of a list of the relative weights, importance or value of the factors which are relevant to the problem in question (technically, this list is called eigenvector). The final stage is to calculate a consistency ratio (CR) to measure how consistent the judgments have been relative to large samples of purely random judgments are untrustworthy because they are too close for comfort to randomness and the exercise is valueless or must be repeated. It is easy to make a minimum number of judgments after which the rest can be calculated to enforce a perhaps unrealistically perfect consistency.

# 3 STUDY AREA

## 3.1 General

The Colombo – Galle – Hambantota - Wellawaya Road (A002) is one of the major arterials roads of the Colombo city. It stretches westward to Wellawaya and act as a prime transport corridor, which links between half of the country to the capital. There is a constant heavy flow of traffic on this corridor throughout the year. It also generates quite a large number of pedestrian traffic due to the mixed land use pattern alongside the arterial road, besides congestion, travel delay and other operational problems. Traffic accidents have become a recurring event on this arterial.

A total of fifty-seven un-signalized intersections with varying geometric characteristics were selected for this study purpose. These all; fall between William junction to Maliban junction as shown in figure 3.1 below.


Figure 3.1 : Map of the Study Area

# 4 METHODOLOGY AND DATA COLLECTION

## 4.1 Overview

Several researchers used different method to analyze the T-intersections as per the literature review. In this study, accident data collected from Traffic Police was converted as Excel file and it is filtered to get relevant information. Then accident keys and X-Y coordinates were extracted and converted to shape file. This is used to locate the accident locations by using GIS software as shown in Appendix - 01. Numbers of accidents for each year were counted by using GIS maps against the particular locations and then geometrical data of each location were collected through field study as shown in Appendix - 02.

Next step, the lane width was classified as single lane, two lanes, multi-lane and approach road profile was divided into flat, medium and adverse. The turning movement types were classified into four types: M1, M2, M3 and M4 based on centre median configuration for traffic movement at the junction. After that the relative contribution of the elements to the accident prone T – intersections were determined by using Analytical Hierarchy Process (AHP) with a rating system.
The ratings of each element were scored by experts of highways and traffic engineering. Experts' ratings were subjected to consistency testing and AHP determines the weightage of each element.

Finally, each location was categorized according to the combination and compared with expert weightage and average of accidents (Numbers of accidents divided by number of locations in a same scenario). Verifications were conducted from the field study and remedial measures were found.

## 4.2 Data Collection

The data required for this study were traffic accident data and road geometry data. Traffic accident data was collected from Sri Lanka Traffic Police through University of Moratuwa. The road geometry data was collected by field study as well as from relevant authority.

### 4.2.1 Traffic Accident Data

Road traffic accident data for the period from 2009 to 2014 was collected from Traffic Police. This contains the following: types of accidents; accident locations with coordinates, time of accidents, weather condition, and road condition etc. Traffic Police accident collection data sheet is annexed in Appendix - 03. Filtered T – intersection accidents were located on the map by using GIS software.

### 4.2.2 Geometry Data

The intersection geometry data was collected through field study and from relevant authority. This consists of road width, vertical profile, movement type, and road condition etc.

The concern of the road safety, road width, vertical profile and movement type are more critical parameters than others in road geometry. The visibility is not considered as critical factor in this study because all intersections consist of enough visibility except three intersections. The limited time, availability of the data and to reduce complexity in analysis and interpretation the critical parameter was considered as main influence factor to this study. In addition, road width, vertical profile of by road, movement type and traffic accident data have also been taken in to account.

# 5 DATA ANALYSIS AND DISCUSSION

The data was analyzed based on expert judgment, field study and Traffic Police data. The road geometry of by roads was classified as road width (RW), vertical profile (VP) and turning movement (M1, M2, and M 3 & M4).

## 5.1 Road Width

The road width of by roads were classified as single lane (0 to < 6.0 m), two lanes (6.0m ≤ to < 9.0m) and multi-lane (≥ 9.0 m) as per Geometric Design Standards of Roads published by RDA on 1998.

## 5.2 Vertical Profile

Vertical profile of approach road is calculated as a ratio of "rise over run" in which rise is the vertical distance and run is the horizontal distance. Vertical profile mainly dominates climbing to main road whilst maintaining the gear of the vehicle. Too steep vertical profile usually makes difficulties for heavy trucks and low power cars to ascend in top gear. Vertical profile of approach road is classified as flat, median and adverse.

## 5.3 Centre Median

The centre median is classified as M1, M2, M3, & M4 per main road profile where a by road merges with main road. The M1 is closed raised centre median, M2 is open raised centre median, M3 is closed marked centre median and M4 is open marked centre median.

## 5.4 Graphical Illustration of Police Data

The collected data from Traffic Police were filtered and tabulated according to considered parameters of this study, as follows.

### 5.4.1 Road Width

The accident data collected from Traffic Police, Sri Lanka is filtered to get the number of accidents as shown in Table 5.1 and these data illustrated in Figure 5.1. Figure shows that single lane has more chances for accidents compared with two lanes and multi-lane. We have observed very limited number of two lane and multi-lane roads in the study area.

Table 5.1 : Number of Accidents with Road Width

| Road Width Range(m) | No.of Lanes | Total | % Of Accidents |
|---|---|---|---|
| Single Lane | 48 | 231 | 88 |
| Two Lane | 7 | 25 | 9 |
| Multi-Lane | 2 | 8 | 3 |
| | 57 | 264 | |

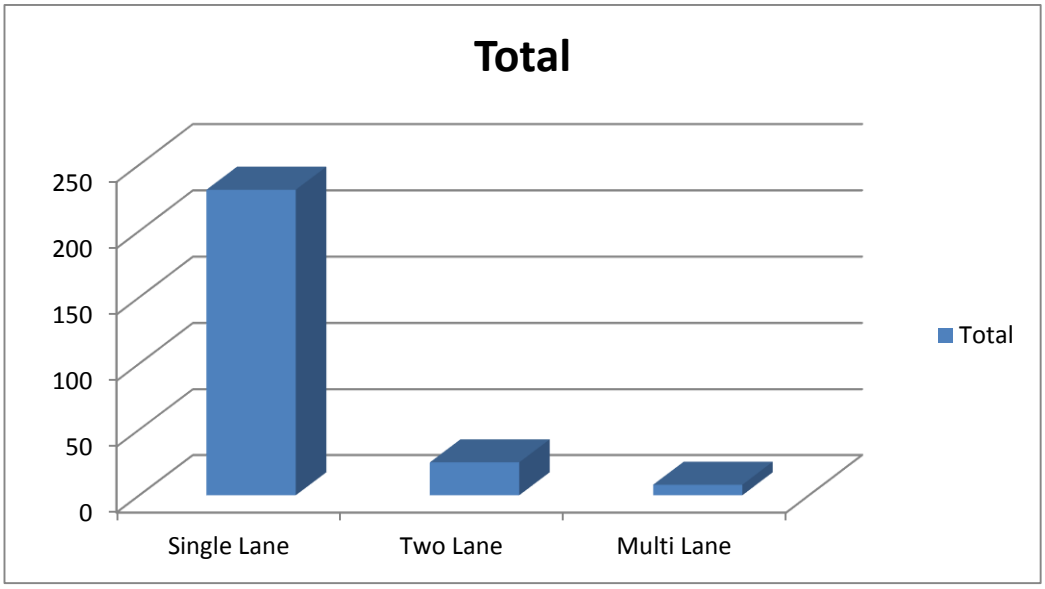


Figure 5.1 : Number of Accidents with Road Width

### 5.4.2 Vertical Profile

As per the accident data collected from traffic police, Sri Lanka and filtered to get the accidents as shown in Table 5.2 and these data illustrated in Figure 5.2. It indicated Flat profile of by road has more chances for accidents compared to adverse profile and medium profile.

Table 5.2 : Number of Accidents with Profile

| Type of Profile | Total | % of Accidents |
|---|---|---|
| Adverse | 50 | 19 |
| Medium | 28 | 11 |
| Flat | 186 | 70 |
| | 264 | |

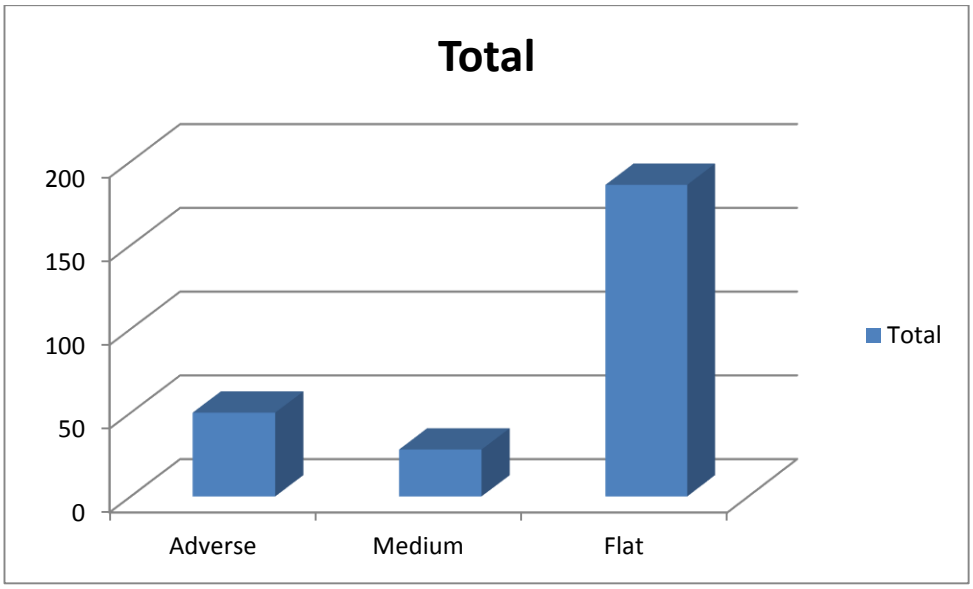


Figure 5.2 : Number of Accidents with Profile

### 5.4.3 Type of Movements

As per the accident data collected from Traffic Police, Sri Lanka and filtered to get the accidents as shown in Table 5.3 and these data illustrated in Figure 5.3. It indicated that M4 type movement has more chances for accidents when compared to M1, M2 & M3.

Table 5.3 : Number of Accidents with Movement Type

| Type Of Movements | Total | % Of Accidents |
|---|---|---|
| M1 | 39 | 15 |
| M2 | 26 | 10 |
| M3 | 75 | 28 |
| M4 | 124 | 47 |
| | 264 | |

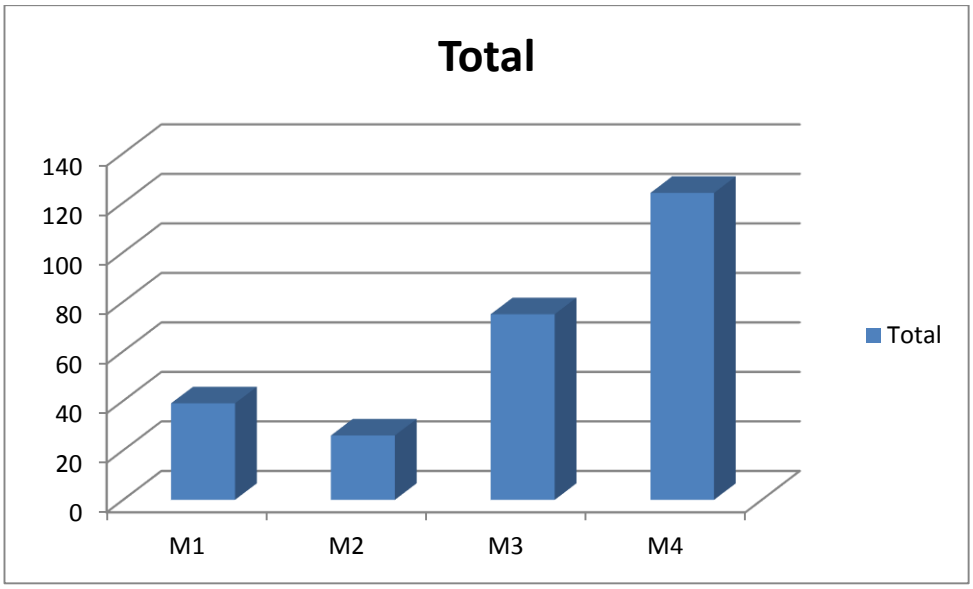


Figure 5.3 :Number of Accidents with Movement Type

### 5.4.4 Pedestrians involved accidents

In T-intersections, about 21% of the accidents are occurred involving with pedestrians. This is a considerably high. Therefore, it has to be taken into account in order to prevent or reduce it. The number of accidents and pedestrians' accidents is shown in Table 5.4 and are illustrated in Figure 5.4.

Table 5.4 : Total number of accidents and pedestrian accidents

| Year | Total No of Accidents | Number of Accidents with Pedestrians | % of Accidents with Pedestrians |
|---|---|---|---|
| 2010 | 56 | 21 | 38 |
| 2011 | 44 | 21 | 48 |
| 2012 | 100 | 7 | 7 |
| 2013 | 64 | 7 | 11 |
| Total | 264 | 56 | 21 |

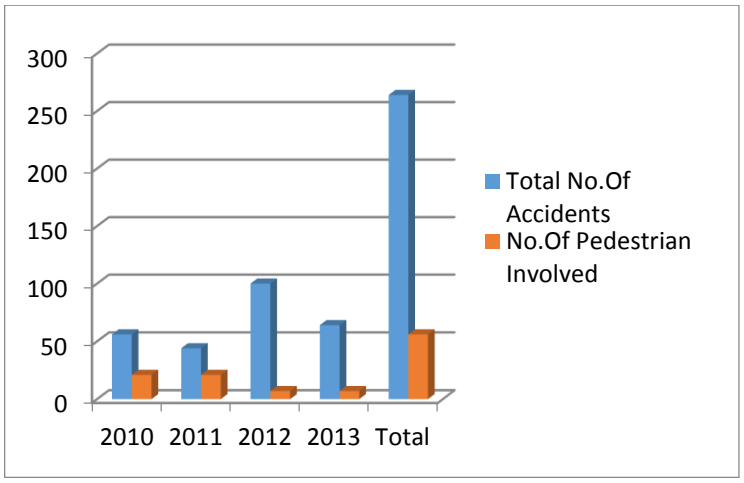


Figure 5.4 : Total Number of Accidents inclusive of Pedestrian accidents

### 5.4.5 Graphical Illustration of Expert Weightage

The combination of road width, vertical profile of by road and type of movement is tabulated with expert weightage and the average number of accidents as shown in Table 5.5. The expert weightage and average number of accidents are correlated as shown in Figure 5.5. All the locations are correlated with expert weightage except three locations.

Table5.5: Average Number of Accidents with Expert Weightage

| Combination | Expert Weightage | Number of Accidents |
|---|---|---|
| R1V1M4 | 39.37 | 17 |
| R1V3M4 | 18.35 | 10 |
| R1V1M3 | 14.67 | 7 |
| R2V1M4 | 13.83 | 6 |
| R1V1M2 | 7.64 | **11** |
| R1V3M3 | 6.84 | 5 |
| R1V2M4 | 6.54 | 0 |
| R2V3M4 | 6.45 | NO LOCATION |
| R3V1M4 | 5.83 | 5 |
| R2V1M3 | 5.16 | NO LOCATION |
| R1V1M1 | 3.58 | **6** |
| R1V3M2 | 3.56 | NO LOCATION |
| R1V2M3 | 2.44 | **10** |
| R2V2M4 | 2.3 | 5 |
| R1V3M1 | 1.67 | 3 |
| R3V2M2 | 0.19 | 3 |

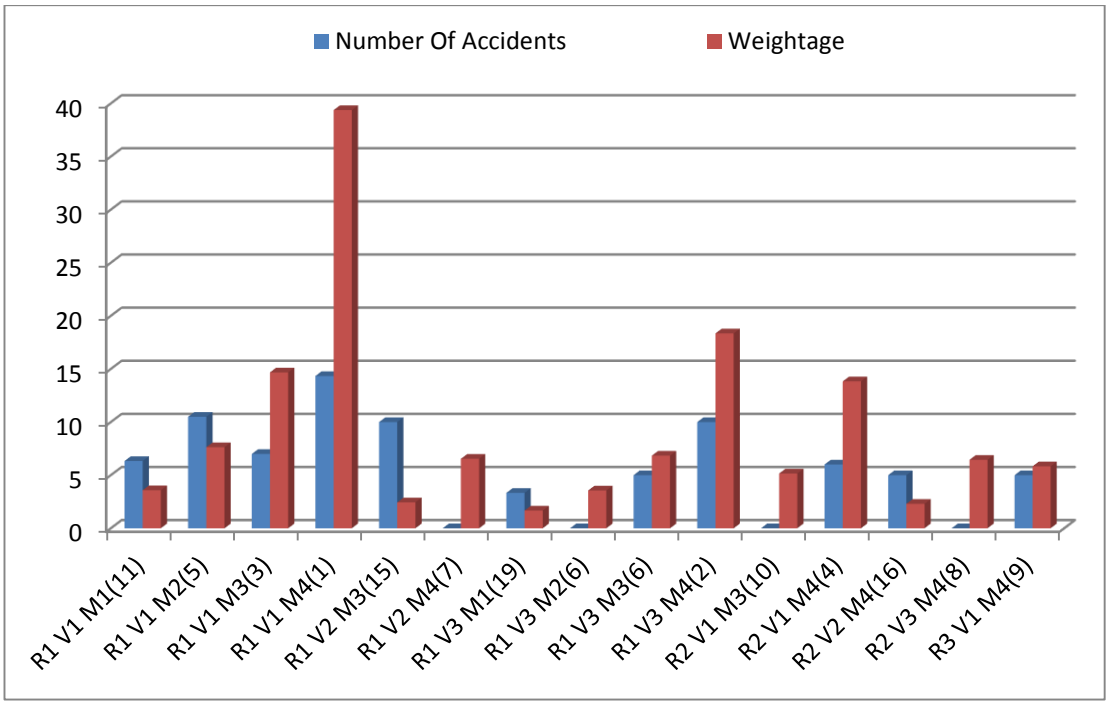


Figure 5.5: Average Number of Accidents with Expert Weightage

From the above Fig 5.5., most accidents prone locations were identified and those locations are mentioned in the Tables 5.6 – 5.9 chronologically.

Table 5.6: Combination of R1V1M4

| **Road Name** | **LHS/RHS** | **Lane Width** | **Vertical Profile** | **Type of Movement** | **Number of Accidents** |
|---|---|---|---|---|---|
| SRI GUNARATHNA ROAD | LHS | 3.1 | FLAT | M4 | 16 |
| DAKSHINARAMA ROAD | LHS | 3.5 | FLAT | M4 | 17 |
| PIRIVENA ROAD | LHS | 5.8 | FLAT | M4 | 15 |
| PARK ROAD | LHS | 3.8 | FLAT | M4 | 25 |
| CHAKKINDHARAMA ROAD | LHS | 3.8 | FLAT | M4 | 13 |

Table 5.7: Combination of R1V1M4

| Road Name | LHS/RHS | Lane Width | Vertical Profile | Type of Movement | Number of Accidents |
|---|---|---|---|---|---|
| COLLEGE AVENUE | RHS | 5.3 | ADVERSE | M4 | 10 |

Table 5.8: Combination of R1V1M3

| Road Name | LHS/RHS | Lane Width | Vertical Profile | Type of Movement | Number of Accidents |
|---|---|---|---|---|---|
| SRI SUMANARAMA ROAD | LHS | 4.8 | FLAT | M3 | 5 |
| WIJAYA ROAD | LHS | 4.2 | FLAT | M3 | 4 |
| D J WIJESIRIWARDANA MAWATHA | LHS | 3.7 | FLAT | M3 | 15 |
| SRI DHARMABALA MAWATHA | RHS | 5.6 | FLAT | M3 | 6 |
| OLD QUARRY ROAD | RHS | 5.2 | FLAT | M3 | 5 |

Table 5.9: Combination of R2V1M4

| Road Name | LHS/RHS | Lane Width | Vertical Profile | Type of Movement | Number of Accidents |
|---|---|---|---|---|---|
| WATARAPPALA ROAD | LHS | 6.0 | FLAT | M4 | 3 |
| HENA ROAD | LHS | 7.5 | FLAT | M4 | 10 |
| SRI DHARMARAMA ROAD | LHS | 7.2 | FLAT | M4 | 3 |
| ST RITA'S ROAD | RHS | 6.4 | FLAT | M4 | 4 |

From the Table 5.5, there are three locations identified as exceptional and are verified and analyzed at site.


Figure 5.6: T Intersection at Waidya Road [R1V1M2]


Figure 5.7: T Intersection at Attapattu Mawatha [R1V1M2]

As shown in Figures 5.5 – 5.6 utility posts obstruct the right of way, pedestrians crossing at the entry of the by- road, obstruction in walkway; leading to pedestrians walking on the road and unauthorized roadside parking all obstruct the right of way.

Because of above reasons accidents are on the increase. These additional issues contravene expert opinion.


Figure 5.8: T Intersection at Dudley Senanayake Mawatha [R1V2M3]


Figure 5.9: T Intersection at Dudley Senanayake Mawatha [R1V2M3]

As shown in above Figures 5.7 -5.8, petrol station beside the by road, trees planted in the by- road and the presence of utility posts obstruct the by-road. These might cause an increase in the number of accidents at this intersection.


Figure 5.10: T Intersection at Sri Mahabodhi Road [R1V1M1]


Figure 5.11:T Intersection at Malwatha Road [R1V1M1]

As shown in above figure 5.10 – 5.11, parking near the entry to the by - road, petrol station besides the by- road, utility posts and pedestrians crossing at the entry to the by road cause more accidents.

### 5.4.6 Calculations

The Figure 5.11 illustrates about this research. Six criteria were analyses with the concern of three main elements of road width, vertical profile and movement type.

Each element consists of different factors that influence the characteristics of the element. Road width consists of different factors as single lane, two lanes and multi-lane; vertical profile consists of different factors as flat, medium and adverse; and Movement type consists of different factors as M1, M2, M3 & M4.

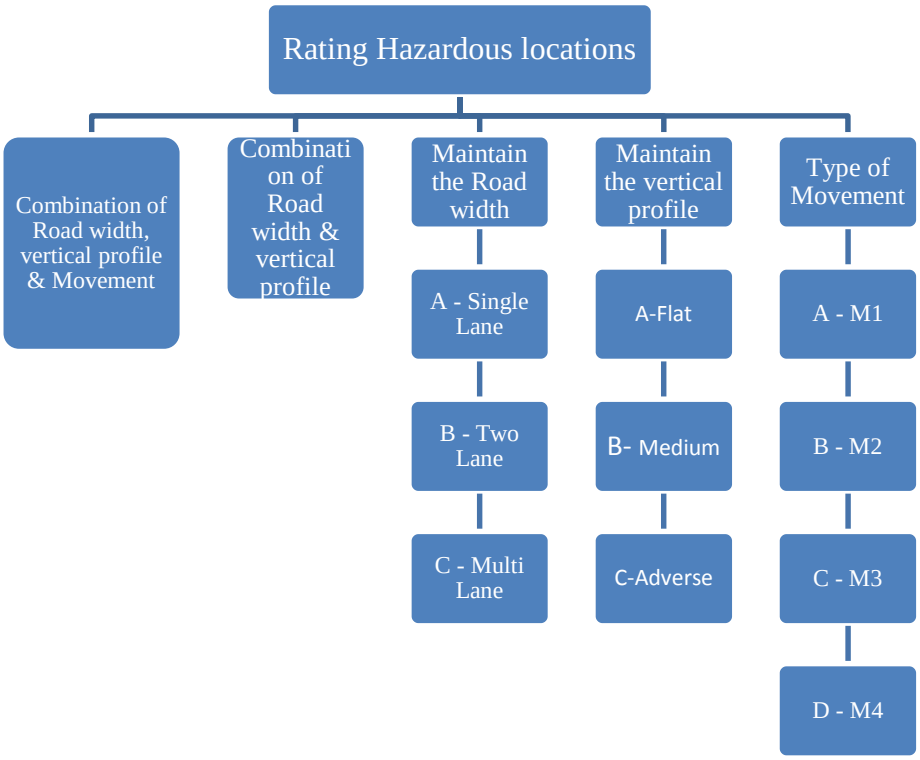


Figure 5.12: Hierarchy Structure

As per scores given by experts through the survey sheet were used for developing par wise comparison of matrix for each criterion.

Table 5.10: The Relative Weight Matrix- Expert 1

| | RW,TOM & V | RW & V | RW & TOM | TOM & V | Road Width | Vertical Profile | Type of Movement |
|---|---|---|---|---|---|---|---|
| ` | 1 | 5 | 6 | 7 | 9 | 7 | 9 |
| RW & V | 1/5 | 1 | 3 | 4 | 3 | 7 | 5 |
| RW & TOM | 1/6 | 1/3 | 1 | 3 | 2 | 8 | 3 |
| TOM & V | 1/7 | 1/4 | 1/3 | 1 | 5 | 2 | 3 |
| Road Width | 1/9 | 1/3 | 1/2 | 1/5 | 1 | 3 | 7 |
| Vertical Profile | 1/7 | 1/7 | 1/8 | 1/2 | 1/3 | 1 | 5 |
| Type Of Movement | 1/9 | 1/5 | 1/3 | 1/3 | 1/7 | 1/5 | 1 |

Table 5.11: The Relative Weight Matrix- Expert 2

| | RW,TOM & V | RW & V | RW & TOM | TOM & V | Road Width | Vertical Profile | Type Of Movement |
|---|---|---|---|---|---|---|---|
| RW,TOM & V | 1 | 3 | 5 | 4 | 7 | 9 | 6 |
| RW & V | 1/3 | 1 | 5 | 4 | 6 | 7 | 6 |
| RW & TOM | 1/5 | 1/5 | 1 | 4 | 4 | 3 | 2 |
| TOM & V | 1/4 | 1/4 | 1/4 | 1 | 5 | 4 | 6 |
| Road Width | 1/7 | 1/9 | 1/4 | 1/5 | 1 | 3 | 5 |
| Vertical Profile | 1/9 | 1/7 | 1/3 | 1/4 | 1/3 | 1 | 4 |
| Type Of Movement | 1/6 | 1/6 | 1/2 | 1/6 | 1/5 | 1/4 | 1 |

Table 5.12: The Relative Weight Matrix- Expert 3

| | RW,TOM & V | RW & V | RW & TOM | TOM & V | Road Width | Vertical Profile | Type Of Movement |
|---|---|---|---|---|---|---|---|
| RW,TOM & V | 1 | 3 | 4 | 5 | 9 | 8 | 7 |
| RW & V | 1/3 | 1 | 3 | 5 | 6 | 7 | 8 |
| RW & TOM | 1/4 | 1/3 | 1 | 3 | 4 | 7 | 9 |
| TOM & V | 1/5 | 1/5 | 1/3 | 1 | 3 | 5 | 7 |
| Road Width | 1/9 | 1/6 | 1/4 | 1/3 | 1 | 5 | 7 |
| Vertical Profile | 1/8 | 1/7 | 1/7 | 1/5 | 1/5 | 1 | 5 |
| Type Of Movement | 1/7 | 1/8 | 1/9 | 1/7 | 1/7 | 1/5 | 1 |

Table 5.13: The Relative Weight Matrix- Expert 4

| | RW,TOM & V | RW & V | RW & TOM | TOM & V | Road Width | Vertical Profile | Type Of Movement |
|---|---|---|---|---|---|---|---|
| RW,TOM & V | 1 | 3 | 4 | 6 | 9 | 7 | 8 |
| RW & V | 1/3 | 1 | 5 | 4 | 5 | 7 | 9 |
| RW & TOM | 1/4 | 1/5 | 1 | 4 | 5 | 6 | 4 |
| TOM & V | 1/6 | 1/4 | 0.25 | 1 | 6 | 5 | 3 |
| Road Width | 1/9 | 1/5 | 0.2 | 1/6 | 1 | 4 | 2 |
| Vertical Profile | 1/7 | 1/7 | 1/6 | 1/5 | 1/4 | 1 | 3 |
| Type Of Movement | 1/8 | 1/9 | 1/4 | 1/3 | 1/2 | 1/3 | 1 |

Table 5.14 : The Relative Weight Matrix- Expert 5

| | RW,TOM & V | RW & V | RW & TOM | TOM & V | Road Width | Vertical Profile | Type Of Movement |
|---|---|---|---|---|---|---|---|
| RW,TOM & V | 1 | 5 | 3 | 4 | 6 | 8 | 7 |
| RW & V | 1/5 | 1 | 4 | 2 | 5 | 4 | 6 |
| RW & TOM | 1/3 | 1/4 | 1 | 5 | 3 | 4 | 3 |
| TOM & V | 1/4 | 1/2 | 1/5 | 1 | 4 | 6 | 3 |
| Road Width | 1/6 | 1/5 | 1/3 | 1/4 | 1 | 3 | 2 |
| Vertical Profile | 1/8 | 1/4 | 1/4 | 1/6 | 1/3 | 1 | 5 |
| Type Of Movement | 1/7 | 1/6 | 1/3 | 1/3 | 1/2 | 1/5 | 1 |

Then the resulting matrices of each expert were normalized and average values in each row were utilized to get the corresponding rate as shown in Tables 5.14 – 5.18.

Table 5.15:Weight of Each Element - Expert 1

| | RW,TOM & V | RW & V | RW & TOM | TOM & V | Road Width | Vertical Profile | Type of Movement | Total | w |
|---|---|---|---|---|---|---|---|---|---|
| RW,TOM & V | 0.533 | 0.689 | 0.531 | 0.437 | 0.440 | 0.248 | 0.273 | 3.151 | 0.450 |
| RW & V | 0.107 | 0.138 | 0.266 | 0.249 | 0.147 | 0.248 | 0.152 | 1.306 | 0.187 |
| RW & TOM | 0.089 | 0.046 | 0.089 | 0.187 | 0.098 | 0.284 | 0.091 | 0.883 | 0.126 |
| TOM & V | 0.076 | 0.034 | 0.030 | 0.062 | 0.244 | 0.071 | 0.091 | 0.609 | 0.087 |
| Road Width | 0.059 | 0.046 | 0.044 | 0.012 | 0.049 | 0.106 | 0.212 | 0.529 | 0.076 |
| Vertical Profile | 0.076 | 0.020 | 0.011 | 0.031 | 0.016 | 0.035 | 0.152 | 0.341 | 0.049 |
| Type of Movement | 0.059 | 0.028 | 0.030 | 0.021 | 0.007 | 0.007 | 0.030 | 0.182 | 0.026 |

$\lambda_{max}$ = 7.5

CI = $(\lambda_{max} - n)/(n-1)$

= (7.5 - 7)/(7-1)

= 0.083

CR = CI/RI

= 0.083/1.32

= 0.062879

< 10%

Table 5.16:Weight of Each Element - Expert 2

| | RW,TOM & V | RW & V | RW & TOM | TOM & V | Road Width | Vertical Profile | Type Of Movement | Total | w |
|---|---|---|---|---|---|---|---|---|---|
| RW,TOM & V | 0.454 | 0.616 | 0.405 | 0.294 | 0.297 | 0.330 | 0.200 | 2.597 | 0.371 |
| RW & V | 0.151 | 0.205 | 0.405 | 0.294 | 0.255 | 0.257 | 0.200 | 1.768 | 0.253 |
| RW & TOM | 0.091 | 0.041 | 0.081 | 0.294 | 0.170 | 0.110 | 0.067 | 0.853 | 0.122 |
| TOM & V | 0.113 | 0.051 | 0.020 | 0.073 | 0.212 | 0.147 | 0.200 | 0.818 | 0.117 |
| Road Width | 0.065 | 0.023 | 0.020 | 0.015 | 0.042 | 0.110 | 0.167 | 0.442 | 0.063 |
| Vertical Profile | 0.050 | 0.029 | 0.027 | 0.018 | 0.014 | 0.037 | 0.133 | 0.309 | 0.044 |
| Type Of Movement | 0.076 | 0.034 | 0.041 | 0.012 | 0.008 | 0.009 | 0.033 | 0.214 | 0.031 |

$\lambda_{max}$ = 7.2

CI = $(\lambda_{max} - n)/(n-1)$

= (7.2 - 7)/(7-1)

= 0.12

CR = CI/RI

= 0.12/1.32

= 0.090909

< 10%

Table 5.17 : Weight of Each Element - Expert 3

| | RW,TOM & V | RW & V | RW & TOM | TOM & V | Road Width | Vertical Profile | Type of Movement | Total | w |
|---|---|---|---|---|---|---|---|---|---|
| RW,TOM & V | 0.462 | 0.604 | 0.453 | 0.341 | 0.386 | 0.241 | 0.159 | 2.645 | 0.378 |
| RW & V | 0.154 | 0.201 | 0.339 | 0.341 | 0.257 | 0.211 | 0.182 | 1.685 | 0.241 |
| RW & TOM | 0.116 | 0.067 | 0.113 | 0.204 | 0.171 | 0.211 | 0.205 | 1.087 | 0.155 |
| TOM & V | 0.092 | 0.040 | 0.038 | 0.068 | 0.129 | 0.151 | 0.159 | 0.677 | 0.097 |
| Road Width | 0.051 | 0.034 | 0.028 | 0.023 | 0.043 | 0.151 | 0.159 | 0.488 | 0.07 |
| Vertical Profile | 0.058 | 0.029 | 0.016 | 0.014 | 0.009 | 0.030 | 0.114 | 0.269 | 0.038 |
| Type Of Movement | 0.066 | 0.025 | 0.013 | 0.010 | 0.006 | 0.006 | 0.023 | 0.148 | 0.021 |

$\lambda_{max} = 7.392$

$CI = (\lambda_{max} - n)/(n-1)$

$= (7.392 - 7)/(7-1)$

$= 0.065$

$CR = CI/RI$

$= 0.065/1.32$

$= 0.049242$

$< 10\%$

Table 5.18 : Weight of Each Element - Expert 4

| | RW,TOM & V | RW & V | RW & TOM | TOM & V | Road Width | Vertical Profile | Type of Movement | Total | w |
|---|---|---|---|---|---|---|---|---|---|
| RW,TOM & V | 0.470 | 0.612 | 0.368 | 0.382 | 0.336 | 0.231 | 0.267 | 2.666 | 0.381 |
| RW & V | 0.157 | 0.204 | 0.460 | 0.255 | 0.187 | 0.231 | 0.300 | 1.793 | 0.256 |
| RW & TOM | 0.117 | 0.041 | 0.092 | 0.255 | 0.187 | 0.198 | 0.133 | 1.023 | 0.146 |
| TOM & V | 0.078 | 0.051 | 0.023 | 0.064 | 0.224 | 0.165 | 0.100 | 0.705 | 0.101 |
| Road Width | 0.052 | 0.041 | 0.018 | 0.011 | 0.037 | 0.132 | 0.067 | 0.358 | 0.051 |
| Vertical Profile | 0.067 | 0.029 | 0.015 | 0.013 | 0.009 | 0.033 | 0.100 | 0.267 | 0.038 |
| Type Of Movement | 0.059 | 0.023 | 0.023 | 0.021 | 0.019 | 0.011 | 0.033 | 0.189 | 0.027 |

$\lambda_{max}$ = 7.466

CI = $(\lambda_{max} - n)/(n-1)$

= (7.466 - 7)/(7-1)

= 0.078

CR = CI/RI

= 0.078/1.32

= 0.059091

< 10%

Table 5.19 : Weight of Each Element - Expert 5

| | RW,TOM & V | RW & V | RW & TOM | TOM & V | Road Width | Vertical Profile | Type Of Movement | Total | w |
|---|---|---|---|---|---|---|---|---|---|
| RW,TOM & V | 0.451 | 0.679 | 0.329 | 0.314 | 0.303 | 0.305 | 0.259 | 2.640 | 0.377 |
| RW & V | 0.090 | 0.136 | 0.439 | 0.157 | 0.252 | 0.153 | 0.222 | 1.449 | 0.207 |
| RW & TOM | 0.150 | 0.034 | 0.110 | 0.392 | 0.151 | 0.153 | 0.111 | 1.101 | 0.157 |
| TOM & V | 0.113 | 0.068 | 0.022 | 0.078 | 0.202 | 0.229 | 0.111 | 0.823 | 0.118 |
| Road Width | 0.075 | 0.027 | 0.037 | 0.020 | 0.050 | 0.115 | 0.074 | 0.397 | 0.057 |
| Vertical Profile | 0.056 | 0.034 | 0.027 | 0.013 | 0.017 | 0.038 | 0.185 | 0.371 | 0.053 |
| Type Of Movement | 0.064 | 0.023 | 0.037 | 0.026 | 0.025 | 0.008 | 0.037 | 0.220 | 0.031 |

$\lambda_{max} = 7.016$

$CI = (\lambda_{max} - n)/(n-1)$

$= (7.016 - 7)/(7-1)$

$= 0.002$

$CR = CI/RI$

$= 0.002/1.32$

$= 0.001515$

$< 10\%$

While checking Consistency Ratio (CR) all five CR values were less than 10%. Since these CR values were in an acceptable range; the average weights for each element were considered. Similarly, the average weights were calculated for each factors as shown in Table 5.19.

Table 5.20 : Average Expert's Weights for Each Element

| Element | Combination of Road width, Movement Type & Vertical | Combination of Road width, & Movement Type | Combination of Road width & Vertical | Combination of Movement Type & Vertical | Road width | Movement Type | Vertical Profile |
|---|---|---|---|---|---|---|---|
| **Weight** | **0.39** | **0.23** | **0.14** | **0.104** | **0.063** | **0.044** | **0.027** |

Finally, the global weights were calculated according to the results, the hazardous T – Intersection were ranked along the A 002 road. Figure 5.12 illustrates the global priority of the research. Refer to Figure 5.11 for A, B, C & D.

Table 5.21 : Average Expert's Weights for Each Factor

| Element / Factor | Road Width | Vertical Profile | Movement Type |
|---|---|---|---|
| A (Refer Figure 5.11) | 4.26 | 3.27 | 0.16 |
| B (Refer Figure 5.11) | 1.46 | 0.8 | 0.34 |
| C (Refer Figure 5.11) | 0.61 | 0.37 | 0.53 |
| D (Refer Figure 5.11) | | | 1.57 |

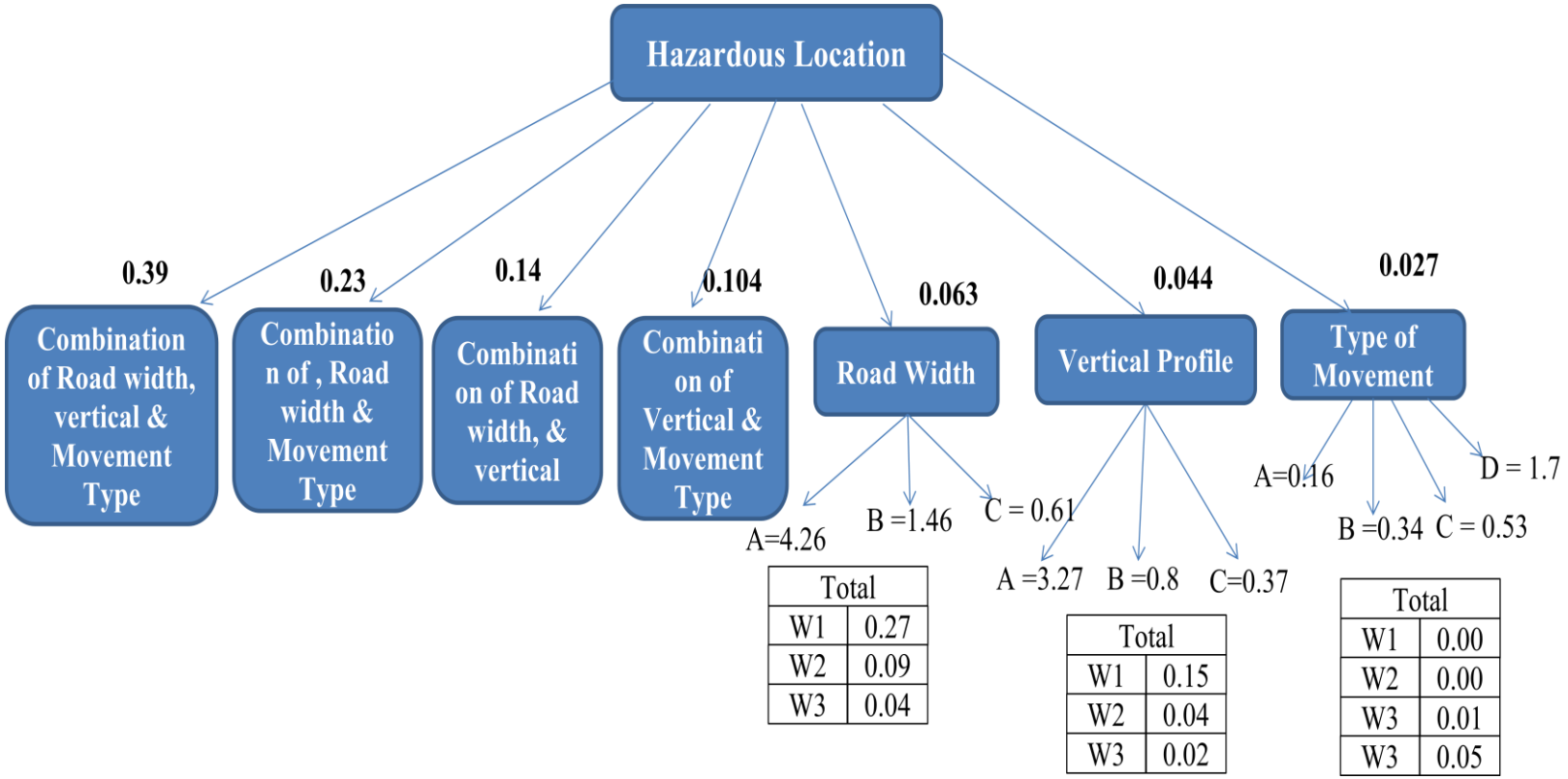


Figure 5.13:Global Priority

# 6 CONCLUSION AND RECOMMENDATION

Most vulnerable accident prone T-intersections had the combination of flat gradient of approach road, single lane width and open centre median on the major road of the intersection.

Following recommendations are made to reduce the accidents in T intersections.

- Avoid combination of single lane, Flat profile (By- road merging to main road) and open centre medians (Marked by paint) in T intersection roads.
- Maintain at least two lanes at the approach road to T- intersection.
- Provide raised centre median at the main road in front of T-intersection or if it is unavoidable circumstances, allow for raised center median with openings at the main road.
- Stop unauthorized parking at the approach road to T-Intersection.
- Avoid placing utility post and tree plantings at the approach road to T – intersections.
- Provide raised pedestrian crossings at the approach road to T-intersections.
- Provide proper signs and markings at T- intersections.

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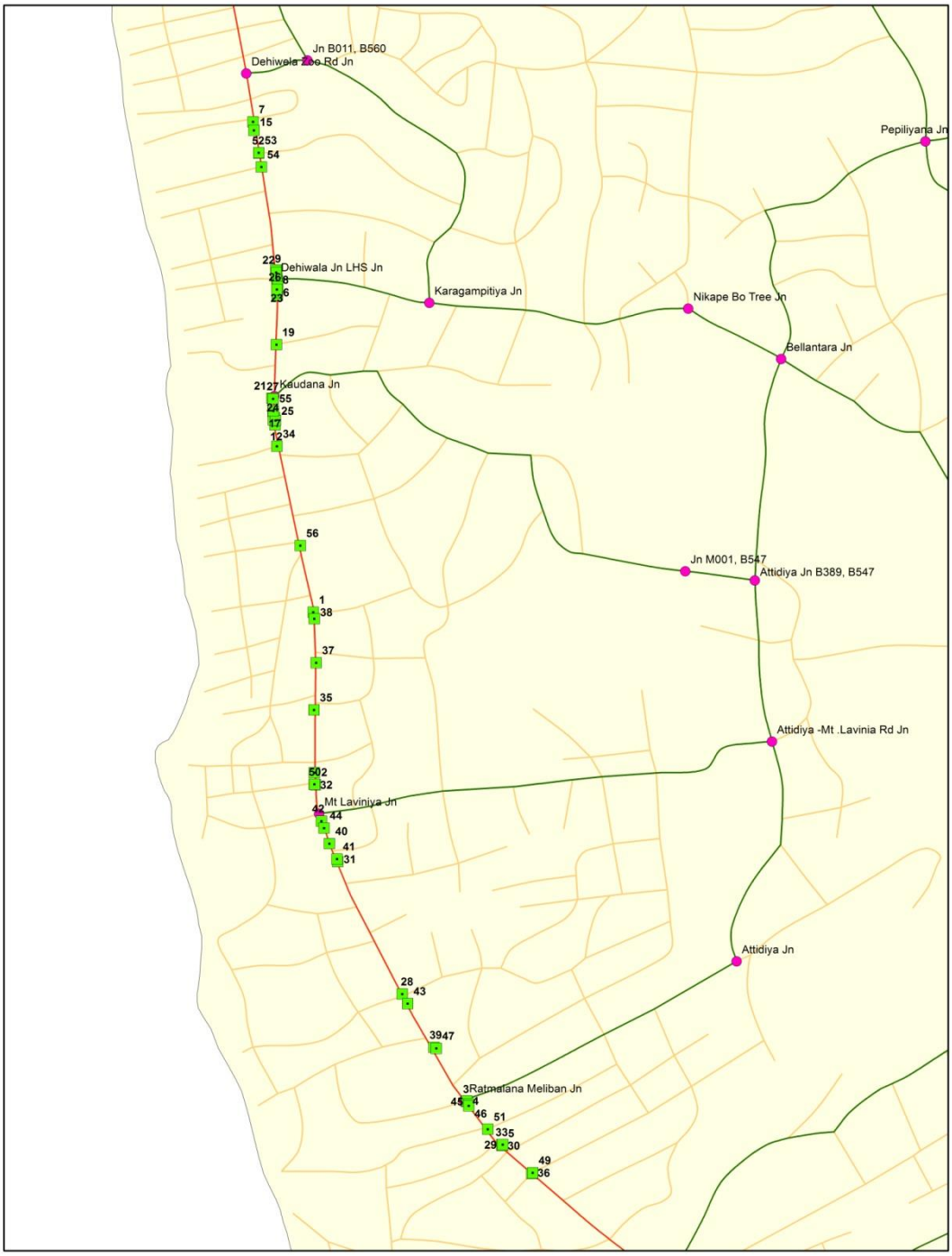
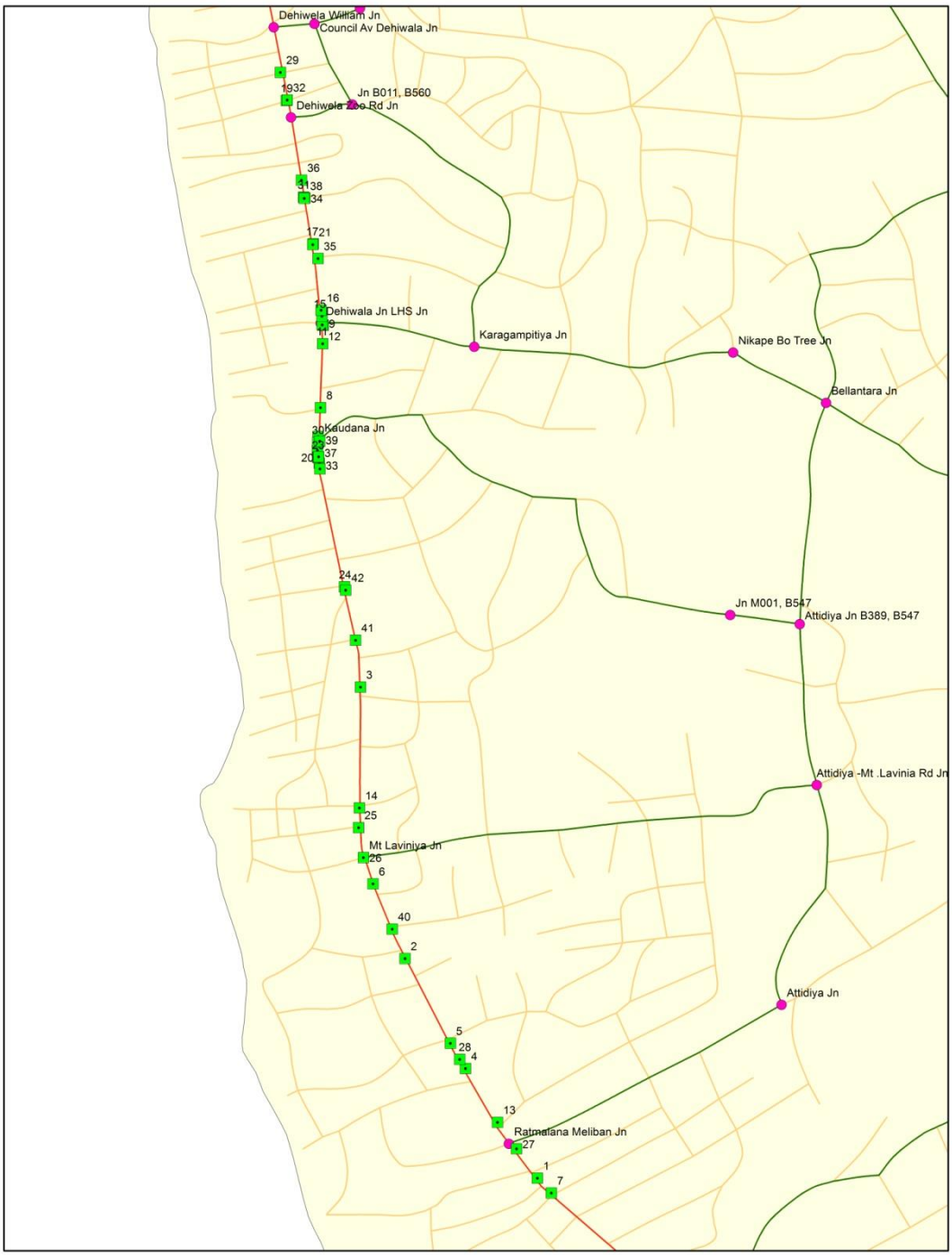
# APPENDICES

## Appendix 1 : GIS Maps

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Council Av Dehiwala Jn
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1932
Jn B011, B560
Dehiwala Zoo Rd Jn
36
3138
34
1721
35
16
Dehiwala Jn LHS Jn
9
11
12
Karagampitiya Jn
Nikape Bo Tree Jn
Bellantara Jn
8
Kaudana Jn
39
37
20
33
24
42
Jn M001, B547
Attidiya Jn B389, B547
41
3
Attidiya -Mt .Lavinia Rd Jn
14
25
Mt Laviniya Jn
26
6
40
2
Attidiya Jn
5
28
4
13
Ratmalana Meliban Jn
27
1
7

## Appendix 2 : Geometrical data of by roads and Number of accidents

| Item No | By Road Name | LHS/ RHS | Number of Accidents | Road Width | No.of Lanes | Vertical Gradient | Visibility | Type of Control | Type of Movements | Road Pavement Type | Pavement Condition | Road Marking |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Anagarika Dharmapala Mawatha | LHS | 2 | 8 | 2 | FLAT | OK | NO | M2 | Asphalt | GOOD | NO |
| 2 | Millenium Mawatha | LHS | 0 | 4.2 | | FLAT | OK | NO | M1 | Asphalt | GOOD | NO |
| 3 | Attapattu Mawatha | LHS | 4 | 5.5 | | FLAT | OK | NO | M2 | Asphalt | GOOD | NO |
| 4 | Sri Maha Bodhi Mawatha | LHS | 7 | 3.8 | | FLAT | OK | NO | M1 | Asphalt | GOOD | NO |
| 5 | Waidya Road | LHS | 17 | 4 | | FLAT | OK | NO | M2 | Asphalt | GOOD | NO |
| 6 | Malwatha Road | LHS | 5 | 4.6 | | FLAT | OK | NO | M1 | Asphalt | GOOD | NO |
| 7 | Sri Subodarma Rajamaha Mawatha | LHS | 7 | 3.4 | | FLAT | OK | NO | M1 | Asphalt | GOOD | NO |
| 8 | Kawdana Road | LHS | 0 | 7.4 | | FLAT | OK | NO | M2 | Asphalt | GOOD | NO |
| 9 | Mihindu Mawatha | LHS | 0 | 4.2 | | ADVERSE | OK | NO | M3 | Asphalt | GOOD | NO |
| 10 | Terrance Avenue | LHS | 0 | 4.2 | | ADVERSE | OK | NO | M3 | Asphalt | GOOD | NO |
| 11 | St Anthony's Mawatha | LHS | 0 | 3.4 | | ADVERSE | OK | NO | M3 | Asphalt | GOOD | NO |

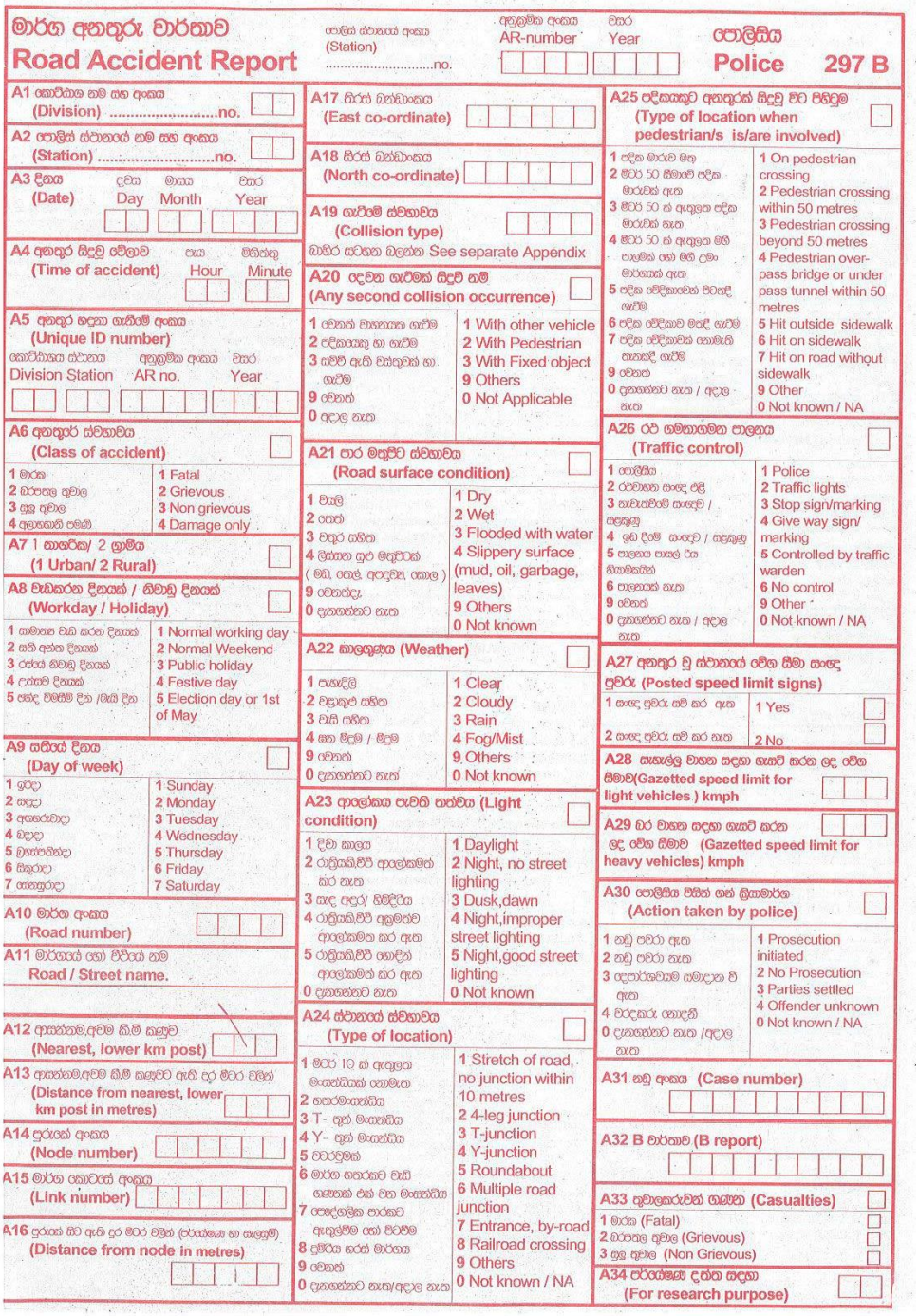
| Item No | By Road Name | LHS/ RHS | Number of Accidents | Road Width | No.of Lanes | Vertical Gradient | Visibility | Type of Control | Type of Movements | Road Pavement Type | Pavement Condition | Road Marking |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 | St Sylvester Road | LHS | 2 | 3.4 | | ADVERSE | OK | NO | M3 | Asphalt | GOOD | NO |
| 13 | Pieris Road | LHS | 0 | 5.2 | | ADVERSE | OK | NO | M3 | Asphalt | GOOD | NO |
| 14 | Sri Sumanarama Road | LHS | 5 | 4.8 | | FLAT | OK | NO | M3 | Asphalt | GOOD | NO |
| 15 | Wijaya Road | LHS | 4 | 4.2 | | FLAT | OK | NO | M3 | Asphalt | GOOD | NO |
| 16 | Watarappola Road | LHS | 3 | 6 | | FLAT | OK | NO | M4 | Asphalt | GOOD | NO |
| 17 | Sri Gunarathna Road | LHS | 16 | 3.1 | | FLAT | OK | NO | M4 | Asphalt | GOOD | NO |
| 18 | Dakshinarama Road | LHS | 17 | 3.5 | | FLAT | OK | NO | M4 | Asphalt | GOOD | NO |
| 19 | D J Wijesiriwardana Mawatha | LHS | 15 | 3.7 | | FLAT | OK | NO | M3 | Asphalt | GOOD | NO |
| 20 | Hena Road | LHS | 10 | 7.5 | | FLAT | OK | NO | M4 | Asphalt | GOOD | NO |
| 21 | Pirivena Road | LHS | 15 | 5.8 | | FLAT | OK | NO | M4 | Asphalt | GOOD | NO |
| 22 | Park Road | LHS | 25 | 3.8 | | FLAT | OK | NO | M4 | Asphalt | GOOD | NO |
| 23 | Chakkindharama Road | LHS | 13 | 3.8 | | FLAT | OK | NO | M4 | Asphalt | GOOD | NO |

| Item No | By Road Name | LHS/ RHS | Number of Accidents | Road Width | No.of Lanes | Vertical Gradient | Visibility | Type of Control | Type of Movements | Road Pavement Type | Pavement Condition | Road Marking |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 24 | Sri Dharmarama Road | LHS | 3 | 7.2 | | FLAT | OK | NO | M4 | Asphalt | GOOD | NO |
| 25 | Frazer Avenue | RHS | 3 | 10 | 2 | MEDIUM | OK | NO | M2 | Asphalt | GOOD | NO |
| 26 | Rathnakara Place | RHS | 0 | 5.2 | | MEDIUM | OK | NO | M1 | Asphalt | GOOD | NO |
| 27 | Initium Road | RHS | 0 | 5 | | ADVERSE | OK | NO | M1 | Asphalt | GOOD | NO |
| 28 | Albert Place | RHS | 0 | 4.4 | | ADVERSE | OK | NO | M1 | Asphalt | GOOD | NO |
| 29 | Campell Places | RHS | 0 | 3.4 | | ADVERSE | OK | NO | M1 | Asphalt | GOOD | NO |
| 30 | 2nd Lane | RHS | 0 | 4.7 | | ADVERSE | OK | NO | M2 | Asphalt | GOOD | NO |
| 31 | Peters Lane | RHS | 0 | 4.2 | | ADVERSE | OK | NO | M1 | Asphalt | GOOD | NO |
| 32 | Muhandiram Lane | RHS | 0 | 2.7 | | MEDIUM | OK | NO | M1 | Asphalt | GOOD | NO |
| 33 | Vanderwart Place | RHS | 0 | 4 | | ADVERSE | OK | NO | M1 | Asphalt | GOOD | NO |
| 34 | De Alwis Place | RHS | 0 | 5 | | ADVERSE | OK | NO | M1 | Asphalt | GOOD | NO |
| 35 | Annie Mawatha | RHS | 2 | 4.1 | | ADVERSE | OK | NO | M1 | Asphalt | GOOD | NO |

| Item No | By Road Name | LHS/ RHS | Number of Accidents | Road Width | No.of Lanes | Vertical Gradient | Visibility | Type of Control | Type of Movements | Road Pavement Type | Pavement Condition | Road Marking |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | Fairline Road | RHS | 4 | 4.4 | | ADVERSE | OK | NO | M1 | Asphalt | GOOD | NO |
| 37 | Rodrigo Lane | RHS | 3 | 2.3 | | ADVERSE | POOR | NO | M1 | Asphalt | GOOD | NO |
| 38 | Gregory Road | RHS | 3 | 3.8 | | ADVERSE | POOR | NO | M1 | Asphalt | GOOD | NO |
| 39 | Ediriweera Avenue | RHS | 4 | 3.2 | | ADVERSE | OK | NO | M1 | Asphalt | GOOD | NO |
| 40 | Aponsu Mawatha | RHS | 4 | 5 | | ADVERSE | OK | NO | M1 | Asphalt | GOOD | NO |
| 41 | Auburn Side | RHS | 9 | 5.2 | | ADVERSE | OK | NO | M3 | Asphalt | GOOD | NO |
| 42 | Dudley Senanayake Mawatha | RHS | 17 | 5.2 | | MEDIUM | OK | NO | M3 | Asphalt | GOOD | NO |
| 43 | Sri Dharmapala Mawatha | RHS | 6 | 5.6 | | FLAT | OK | NO | M3 | Asphalt | GOOD | NO |
| 44 | Sri Pala Road | RHS | 0 | 4.4 | | FLAT | OK | NO | M3 | Asphalt | GOOD | NO |
| 45 | Beach Road | RHS | 0 | 3.5 | | FLAT | OK | NO | M3 | Asphalt | GOOD | NO |
| 46 | Solomon Peiris Mawatha | RHS | 1 | 4.4 | | ADVERSE | OK | NO | M3 | Asphalt | GOOD | NO |
| 47 | College Avenue | RHS | 10 | 5.3 | | ADVERSE | POOR | NO | M4 | Asphalt | GOOD | NO |

| Item No | By Road Name | LHS/ RHS | Number of Accidents | Road Width | No.of Lanes | Vertical Gradient | Visibility | Type of Control | Type of Movements | Road Pavement Type | Pavement Condition | Road Marking |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 48 | Cross Road | RHS | 0 | 4.2 | | ADVERSE | OK | NO | M4 | Asphalt | GOOD | NO |
| 49 | Station Road | RHS | 5 | 9 | 2 | FLAT | OK | NO | M4 | Asphalt | GOOD | NO |
| 50 | Old Quarry Road | RHS | 5 | 5.2 | | FLAT | OK | NO | M3 | Asphalt | GOOD | NO |
| 51 | Samudrasanna Road | RHS | 8 | 5 | | ADVERSE | OK | NO | M3 | Asphalt | GOOD | NO |
| 52 | Fernando Mawatha | RHS | 3 | 3.9 | | MEDIUM | OK | NO | M3 | Asphalt | GOOD | NO |
| 53 | St Mary's Road | RHS | 0 | 5.2 | | FLAT | OK | NO | M3 | Asphalt | GOOD | NO |
| 54 | St Rita's Road | RHS | 2 | 6.4 | | FLAT | OK | NO | M4 | Asphalt | GOOD | NO |
| 55 | William Place | RHS | 0 | 5 | | ADVERSE | OK | NO | M3 | Asphalt | GOOD | NO |
| 56 | De Silva Place | RHS | 0 | 3.8 | | MEDIUM | OK | NO | M4 | Asphalt | GOOD | NO |
| 57 | Sri Dharmarama Road | RHS | 5 | 6.4 | | MEDIUM | OK | NO | M4 | Asphalt | GOOD | NO |

## Appendix 3 : Traffic Police Accident Reporting Form



මාර්ග අනතුරු වාර්තාව
Road Accident Report

පොලිස් ස්ථානයේ අංකය (Station) ..... no.
අනුක්‍රමික අංකය AR-number
වසර Year
පොලිසිය Police 297 B

A1 කොට්ඨාස නම සහ අංකය (Division) ..... no.

A2 පොලිස් ස්ථානයේ නම සහ අංකය (Station) ..... no.

A3 දිනය (Date) දවස Day මාසය Month වසර Year

A4 අනතුර සිදුවූ වේලාව (Time of accident) පැය Hour මිනිත්තු Minute

A5 අනතුර හඳුනා ගැනීමේ අංකය (Unique ID number)
කොට්ඨාසය Division ස්ථානය Station අනුක්‍රමික අංකය AR no. වසර Year

A6 අනතුරේ ස්වභාවය (Class of accident)
1 මාරක
2 බරපතල තුවාල
3 සුළු තුවාල
4 දේපළහානි පමණි
1 Fatal
2 Grievous
3 Non grievous
4 Damage only

A7 1 නාගරික/ 2 ග්‍රාමීය (1 Urban/ 2 Rural)

A8 වැඩකරන දිනයක් / නිවාඩු දිනයක් (Workday / Holiday)
1 සාමාන්‍ය වැඩ කරන දිනයක්
2 සති අන්ත දිනයක්
3 රජයේ නිවාඩු දිනයක්
4 උත්සව දිනයක්
5 ඡන්ද විමසීම දින /මැයි දින
1 Normal working day
2 Normal Weekend
3 Public holiday
4 Festive day
5 Election day or 1st of May

A9 සතියේ දිනය (Day of week)
1 ඉරිදා
2 සඳුදා
3 අඟහරුවාදා
4 බදාදා
5 බ්‍රහස්පතින්දා
6 සිකුරාදා
7 සෙනසුරාදා
1 Sunday
2 Monday
3 Tuesday
4 Wednesday
5 Thursday
6 Friday
7 Saturday

A10 මාර්ග අංකය (Road number)

A11 මාර්ගයේ හෝ වීථියේ නම Road / Street name.

A12 ආසන්නම,අඩම කිලී කණුව (Nearest, lower km post)

A13 ආසන්නම,අඩම කිලී කණුවට ඇති දුර මීටර වලින් (Distance from nearest, lower km post in metres)

A14 පුරුක් අංකය (Node number)

A15 මාර්ග ලොට්ස් අංකය (Link number)

A16 පුරුකේ සිට ඇති දුර මීටර වලින් (ප්‍රත්‍යයෙහි හා සැලසුම්) (Distance from node in metres)

A17 නිරස් බද්ධාංකය (East co-ordinate)

A18 නිරස් බද්ධාංකය (North co-ordinate)

A19 ගැටීමේ ස්වභාවය (Collision type)
බාහිර සටහන බලන්න See separate Appendix

A20 දෙවන ගැටීමක් සිදුවී නම් (Any second collision occurrence)
1 වෙනත් වාහනයක ගැටීම
2 පදිකයෙකු හා ගැටීම
3 ස්ථිර ඇති වස්තුවක් හා ගැටීම
9 වෙනත්
0 අදාල නැත
1 With other vehicle
2 With Pedestrian
3 With Fixed object
9 Others
0 Not Applicable

A21 පාර මතුපිට ස්වභාවය (Road surface condition)
1 වියලි
2 තෙත්
3 වතුර සහිත
4 ලිහිනෙ සුළු ඔලුවක්
( මඩ, තෙල්, අපද්‍රව්‍ය, කොළ )
9 වෙනත්ද.
0 දැනගන්නට නැත
1 Dry
2 Wet
3 Flooded with water
4 Slippery surface (mud, oil, garbage, leaves)
9 Others
0 Not known

A22 කාලගුණය (Weather)
1 පැහැදිලි
2 වළාකුළු සහිත
3 වැසි සහිත
4 සහ මීදුම / මීදුම
9 වෙනත්
0 දැනගන්නට නැත
1 Clear
2 Cloudy
3 Rain
4 Fog/Mist
9 Others
0 Not known

A23 ආලෝකය පැවති තත්වය (Light condition)
1 දිවා කාලය
2 රාත්‍රියකිවිටි ආලෝකමත් කර නැත
3 සැඳ අඳුර/ හිමිදිරිය
4 රාත්‍රියකිවිටි අනුගමන ආලෝකමය කර ඇත
5 රාත්‍රියකිවිටි හොඳින් ආලෝකමත් කර ඇත
0 දැනගන්නට නැත
1 Daylight
2 Night, no street lighting
3 Dusk,dawn
4 Night,improper street lighting
5 Night,good street lighting
0 Not known

A24 ස්ථානයේ ස්වභාවය (Type of location)
1 මීටර 10 ක ඇතුලත මංසන්ධියක් නොමැත
2 හතරමංසන්ධිය
3 T- හෝ මංසන්ධිය
4 Y- හෝ මංසන්ධිය
5 වටරවුමක
6 මාර්ග හතරකට වැඩි ගණනක එක් වන මංසන්ධිය
7 පසඳගල්ක පාරකට ඇතුල්වීම් හෝ පිටවීම
8 දුම්රිය හරස් මාර්ගය
9 වෙනත්
0 දැනගන්නට නැත/අදාල නැත
1 Stretch of road, no junction within 10 metres
2 4-leg junction
3 T-junction
4 Y-junction
5 Roundabout
6 Multiple road junction
7 Entrance, by-road
8 Railroad crossing
9 Others
0 Not known / NA

A25 පදිකයකුට අනතුරක් සිදුවූ විට පිහිටුම (Type of location when pedestrian/s is/are involved)
1 පදික මාරුව මත
2 මීටර 50 සීමාවේ පදික මාරුවක් ඇත
3 මීටර 50 ක් ඇතුලත පදික මාරුවක් නැත
4 මීටර 50 ක් ඇතුලත මහ පාලමක් හෝ මහ උමං මාර්ගයක් ඇත
5 පදික මාදිලියෙන් පිටත් ගැටීම
6 පදික මාදිලිය මතදී ගැටීම
7 පදික මාදිලියක් නොමැති තැනකදී ගැටීම
9 වෙනත්
0 දැනගන්නට නැත / අදාල නැත
1 On pedestrian crossing
2 Pedestrian crossing within 50 metres
3 Pedestrian crossing beyond 50 metres
4 Pedestrian over-pass bridge or under pass tunnel within 50 metres
5 Hit outside sidewalk
6 Hit on sidewalk
7 Hit on road without sidewalk
9 Other
0 Not known / NA

A26 රථ ගමනාගමන පාලනය (Traffic control)
1 පොලිසිය
2 රථවාහන සංඥා එළි
3 නැවැත්වීම සංඥා / ඉඟුනු
4 ඉඩ දීම් සංඥා / ඉඟුනු
5 පාලනය පසුම් පිය නිලධාරියින්
6 පාලනයක් නැත
9 වෙනත්
0 දැනගන්නට නැත / අදාල නැත
1 Police
2 Traffic lights
3 Stop sign/marking
4 Give way sign/ marking
5 Controlled by traffic warden
6 No control
9 Other
0 Not known / NA

A27 අනතුර වූ ස්ථානයේ වේග සීමා සංඥා පුවරු (Posted speed limit signs)
1 සංඥා පුවරු ඇති කර ඇත
2 සංඥා පුවරු ඇති කර නැත
1 Yes
2 No

A28 සැහැල්ලු වාහන සඳහා සැකසී කරන ලද වේග සීමාව(Gazetted speed limit for light vehicles ) kmph

A29 බර වාහන සඳහා සැකසී කරන ලද වේග සීමාව (Gazetted speed limit for heavy vehicles) kmph

A30 පොලිසිය විසින් ගන්න ලද ක්‍රියාමාර්ග (Action taken by police)
1 නඩු පවරා ඇත
2 නඩු පවරා නැත
3 පැහැදිලිකරගැනීම් සම්මාදාන වී ඇත
4 වරදකරු නොදනී
0 දැනගන්නට නැත /අදාල නැත
1 Prosecution initiated
2 No Prosecution
3 Parties settled
4 Offender unknown
0 Not known / NA

A31 නඩු අංකය (Case number)

A32 B වාර්තාව (B report)

A33 අවාලකරුවන් ගණන (Casualties)
1 මරණ (Fatal)
2 බරපතල අවාල (Grievous)
3 සුළු අවාල (Non Grievous)

A34 පර්යේෂණ දත්ත සඳහා (For research purpose)

## E1 අනතුරට හාජනය වූ දෑ (Element type)

| | |
|---|---|
| 01 කාරය | 01 Car |
| 02 ද්විත්ව කාර්ය වාහනය | 02 Dual purpose vehicle |
| 03 ලොරිය | 03 Lorry |
| 04 පාපැදිය | 04 Cycle |
| 05 ගතුරුපැදිය, මෝපෙඩ් | 05 Motor cycle, Moped |
| 06 ත්‍රිරෝද රථය | 06 Three wheeler |
| 07 අඳ රථය, අර්ධෝ අදින්නෙ ගන වාහනය | 07 Articulated vehicle, prime mover |
| 08 ලංගම මහ ප්‍රවාහන බස්රථය | 08 SLTB bus |
| 09 රජයේලෙක මහ ප්‍රවාහන බස්රථය | 09 Private bus |
| 10 ඉන්ටර්සිටිකාරී මහ ප්‍රවාහන බස්රථය | 10 Intercity bus |
| 11 ඉඩම් වාහනය /ට්‍රැක්ටරය | 11 Land vehicle/ Tractor |
| 12 සතෙකු අදින්නෙ ගන වාහනයක් හෝ සතෙකු පිටනැති පුද්ගලයෙක් | 12 Animal drawn vehicle or rider on animal |
| 13 පදික‍යා | 13 Pedestrian |
| 19 වෙනත් | 19 Others |
| 00 දැනගන්නට නැත | 00 Not known |

## E5 වාහනයේ අයිතිය (Vehicle ownership)

| | |
|---|---|
| 1 පෞද්ගලික වාහනයක් | 1 Private vehicle |
| 2 පෞද්ගලික ආයතනයක වාහනයක් | 2 Private company own vehicle |
| 3 රජයේ වාහනයක් | 3 Government vehicle |
| 4 අර්ධරාජ්‍ය, ආයතනයක වාහනයක් | 4 Semi Government vehicle |
| 5 සමුදා වාහනයක් | 5 Service vehicle |
| 6 පොලිස් වාහනයක් | 6 Police vehicle |
| 0 දැනගන්නට නැත | 0 Not Known |

## E7 රියදුරාගේ/ පැදිකරුගේ/ පදික‍යාගේ ස්ත්‍රී පුරුෂ භාවය (Driver / Rider / Pedestrian Sex)

| | |
|---|---|
| 1 පුරුෂ | 1 Male |
| 2 ස්ත්‍රී | 2 Female |
| 0 දැනගන්නට නැත | 0 Not known |

## E10 රියදුරු බලපත්‍රයේ වලංගුභාවය (Validity of driving license)

| | |
|---|---|
| 1 වාහනය සඳහා වලංගු බලපත්‍රයක් ඇත | 1 Valid license for the vehicle |
| 2 වාහනය සඳහා වලංගු බලපත්‍රයක් නැත | 2 Without valid license for the vehicle |
| 3 පුහුණුවීම් බලපත්‍රයක් ඇත | 3 Learner permit |
| 4 පාක්ෂික බලපත්‍රය | 4 Probation license |
| 5 ජාත්‍යන්තර බලපත්‍රය | 5 International license |
| 0 දැනගන්නට නැත / අදාල නැත | 0 Not known / NA |

## E13,E14 අනතුර සිදුවීමට රියදුරාගෙන් බලපෑ මූලික හේතු (Human pre crash factors contributing to accident)

| | |
|---|---|
| 01 අධික වේගය | 01 Speeding |
| 02 අවධානම් / නොසැලකිලිමත් ලෙ පැදවීම | 02 Aggressive / negligent driving |
| 03 වැරදි විනිශ්චය | 03 Error of judgment |
| 04 මධ්‍යසාර / මත්ද්‍රව්‍ය වල බලපෑම් | 04 Influenced by alcohol / drugs |
| 05 විඩාව / නිවැරදි ගෑම | 05 Fatigue / fall asleep |
| 06 අවධානයෙන් බැහැරවීම (ගුවන් විදුලිය ක්‍රියා කරවීම, ජංගම දුරකථන, මානසික ආතතිය ආදී) | 06 Distracted/ inattentiveness (handling radio, mobile phone, mental stress etc.) |
| 07 අක් පෙනීමේ දුර්වලතා | 07 Poor eye sight |
| 08 හදිසි රෝගී තත්වයක් | 08 Sudden illness |
| 09 වෙනත් වාහන වල එළි / හිරුරැස් | 09 Blinded by another vehicle / sun |
| 19 වෙනත් | 19 Others |
| 00 දැනගන්නට නැත / අදාල නැත | 00 Not known / NA |

## E15 අනතුර සිදුවීමට පදික‍යාගෙන් බලපෑ හේතුව (Pedestrian pre crash factor contributing to accident)

| | |
|---|---|
| 1 බලාපොරොත්තු නොවූ පදික‍යෙකුගේ හැසිරීමක් | 1 Unexpected pedestrian movement |
| 2 සජා ඇති පදිකමාර්ග නොසලකා හැරීම | 2 Disobey designated crossing |
| 3 මධ්‍යසාර / මත්ද්‍රව්‍ය වල බලපෑම් | 3 Influenced by alcohol / drugs |
| 4 පහසුදීම නොපැහැදීම | 4 Poor visibility (clothing) |
| 9 වෙනත් | 9 Other |
| 0 දැනගන්නට නැත / අදාල නැත | 0 Not known / NA |

## E16 අනතුර සිදුවීමට මාර්ගයෙන් බලපෑ හේතුව (Road pre crash factor contributing to accident)

| | |
|---|---|
| 1 මතුපිට සහ තොල සහිත මාර්ග, මිනිසතුරු මාර්ග, වතුර බලවල, මහ කැබලි, විශාල පැලෑලි, උස් හෝ පහත් කසළ කාණු ආවරණ ආදිය | 1 Defective road surface, slippery road, pot holes, water puddles, large cracks, high or low sewer covers etc. |
| 2 කැඩුණු, නිසිපරිදි නඩත්තු නොකරන ලද මාර්ග සලකුණු හෝ සංඥා හෝ මාර්ග සලකුණු හෝ සංඥා කිසිවක් දක්නට නොමැතිවීම | 2 Defective, absent or badly maintained road markings or signs |
| 3 කිසිමත රථ වාහන නතුන සංඥා නොමැතිව මාර්ගයේ වැඩ කරන අවස්ථා | 3 Road works without adequate traffic control devices |
| 4 කාලගුණ තත්වයක් | 4 Weather conditions |
| 5 ප්‍රමාණවත් ආලෝකමය නිවී | 5 Poor street lighting |
| 9 වෙනත් | 9 Other |
| 0 දැනගන්නට නැත / අදාල නැත | |

## E17 අනතුර සිදුවීමට වාහනයෙන් බලපෑ හේතුව (Vehicle pre crash factor defects contributing to accident)

| | |
|---|---|
| 1 තිරිංග | 1 Brakes |
| 2 ටයර් / රෝද | 2 Tyres, wheels |
| 3 හැසිරවුම් | 3 Steering |
| 4 විදුලි එළි, ලාම්පු | 4 Lights, lamps |
| 5 ප්‍රමාණවත් තත්වයක් | 5 Poor mechanical condition |
| 6 වැඩියෙන් බර පැටවූ හෝ වැරදි ලෙස බර පැටවූ වාහනයක් | 6 Overloaded or wrongly loaded vehicle |
| 9 වෙනත් | 9 Other |
| 0 දැනගන්නට නැත/අදාල නැත | 0 Not known / NA |

## E18 අනතුර බරපතලකමට හේතුවූ කරුණු (Crash factor contributing to accident severity)

| | |
|---|---|
| 1 ගහක ගැටීම | 1 Hitting tree |
| 2 කණුවක ගැටීම | 2 Hitting pole / post |
| 3 විශාල ගලක ගැටීම | 3 Hitting stone or boulder |
| 4 මාර්ග ගැටියක් සමග ගැටීම | 4 Hitting road island, curb etc. |
| 5 බාධකයක හෝ ආරක්ෂක වැටක ගැටීම | 5 Hitting barrier or guard rail |
| 6 සවිවී ඇති වෙනත් වස්තුවක් සමග ගැටීම | 6 Hitting other fixed object |
| 7 පෙරළීම | 7 Rolled over |
| 0 දැනගන්නට නැත/අදාල නැත | 0 Not known / NA |

## E19 වෙනත් හේතු (Other factors)

| | |
|---|---|
| 1 අනතුරක් වැළැක්වීමට ගාවමා | 1 Avoiding maneuver |
| 2 නොනවත්වා පලාගිය | 2 Hit and run |
| 3 පාර වැඩ කරමින් සිටීම | 3 Road works |
| 4 අනතුරෙන් පසු සිදුවන කලබල | 4 Post crash violence |
| 5 හොරකම්කරන ලද වාහනයක් | 5 Stolen vehicle |
| 0 දැනගන්නට නැත/අදාල නැත | 0 Not known / NA |

## E20 මධ්‍යසාර පරීක්ෂාව (Alcohol test)

| | |
|---|---|
| 1 මධ්‍යසාර භාවිතා කර නැත හෝ සම්මත ප්‍රමාණයට අඩුවෙන් | 1 No alcohol or below legal limit |
| 2 සම්මත ප්‍රමාණය ඉක්මවා ඇත | 2 Over legal limit |
| 3 පරීක්ෂා කර නැත | 3 Not tested |

## E21 රියදුරු/පැදිකරු/පදික‍යා අනතුරට වගකිව යුතුද? (Driver/ Rider/ Pedestrian at fault)

| | |
|---|---|
| 1 ඔව් | 1 Yes |
| 2 නැත | 2 No |
| 0 දැනගන්නට නැත/අදාල නැත | 0 Not known / NA |

## තුවාලකරු පිළිබඳ විස්තර (CASUALTY DETAILS )

## C1 අනතුරට හාජනය වූ දෑහි අංකය (Traffic element number)

| | |
|---|---|
| රියදුරෙක් හෝ මගියෙක් තුවාල වී නම් තුවාලකරු ගමන්කරන වාහනයෙහි දැහි අංකය දක්වන්න | If a driver or passenger casualty indicate the vehicle's element number in which the casualty traveled. |
| පදික‍යෙක් තුවාල වී නම් පදික‍යාගේ දැහි අංකය දක්වන්න | If a pedestrian casualty indicate the element number for the pedestrian |

## C2 දණ්ඩ නීති සංග්‍රහයට අනුව තුවාලකරුගේ බරිහාවය (Severity according to penal code)

| | |
|---|---|
| 1 මාරක | 1 Fatal |
| 2 බරපතල තුවාල | 2 Grievous |
| 3 සුලු තුවාල | 3 Non grievous |

## C3 වර්ගය (Category)

| | |
|---|---|
| 1 රියදුරු /පැදිකරු | 1 Driver / Rider |
| 2 පදික‍යා | 2 Pedestrian |
| 3 මගියා / ගතුරු පැදියක හෝ පාපැදියක පිටුපස ගමනා | 3 Passenger / pillion rider |
| 4 මගියා / ගතුරු පැදියක හෝ පාපැදියක පිටුපස ගමනා වාහනයෙන් වැටීම | 4 Passenger/pillion rider falling off vehicle |
| 5 මගියා බසයකට නැගීම හෝ බසයෙන් බැසීම | 5 Passenger entering or leaving bus |
| 0 දැනගන්නට නැත | 0 Not known |

## C4 ස්ත්‍රී පුරුෂ භාවය (Sex)

| | |
|---|---|
| 1 පුරුෂ | 1 Male |
| 2 ස්ත්‍රී | 2 Female |
| 0 දැනගන්නට නැත | 0 Not known |

## C6 ආරක්ෂාව (Protection)

| | |
|---|---|
| 1 ආරක්ෂක බදාව පළඳා ඇත | 1 Safety belt, worn |
| 2 ආරක්ෂක බදාව පළඳා නැත | 2 Safety belt, not worn |
| 3 ආරක්ෂක හිස්වැසුම් පළඳා ඇත | 3 Helmet, worn |
| 4 ආරක්ෂක හිස්වැසුම් පළඳා නැත | 4 Helmet, not worn |
| 5 ළමා ආරක්ෂක ආසනය භාවිතකර ඇත | 5 Child restrain seat used |
| 0 දැනගන්නට නැත/අදාල නැත | 0 Not known / NA |

## C7 රෝහල් ගත කිරීම (Hospitalized)

| | |
|---|---|
| 1 තුවාල සිදුවීම හා අවම වශයෙන් එක් දිනක් හෝ රෝහල් ගත කිරීම | 1 Injured and admitted to hospital at least 1 day |
| 2 තුවාල සිදුවී, නමුත් රෝහලට ඇතුල් නොකිරීම හෝ එක් දිනකට අඩු කාලයක් සඳහා රෝහල් ගත කිරීම | 2 Injured but not admitted to hospital or admitted less than 1 day |

| අනතුරට හේතුවූ වාහනයේ අංකය (TRAFFIC ELEMENT) | අංක Traffic Element No. | අංක Traffic Element No. | අංක Traffic Element No. |
|---|---|---|---|
| E1 අනතුරට හේතුවූ දෑ (Element type) | | | |
| E2 වාහනයේ ලියාපදිංචි අංකය (Vehicle Registration number) | | | |
| E3 වාහනය නිපදවූ වර්ෂය (Vehicle year of manufacture) | | | |
| E4 වාහනය කොපමණ පැරණිද යන වග (Age of vehicle) | | | |
| E5 වාහනයේ අයිතිය (Vehicle ownership) | | | |
| E6 ගමන් කරන දිශාව (Direction of movement) | | | |
| E7 රියදුරුගේ / පැදිකරුගේ / පදිකයාගේ ස්ත්‍රී පුරුෂ භාවය (Driver / Rider / Pedestrian sex) | | | |
| E8 රියදුරුගේ / පැදිකරුගේ / පදිකයාගේ වයස (Driver / Rider / Pedestrian age) | | | |
| E9 රියදුරු බලපත්‍රයේ අංකය (Driving License number) | | | |
| E10 රියදුරු බලපත්‍රයේ වලංගු භාවය (Validity of Driving License) | | | |
| E11 රියදුරු බලපත්‍රය නිකුත් කළ වර්ෂය (Year of issue of Driving License) | | | |
| E12 රියදුරු බලපත්‍රය නිකුත් කළ අවස්ථාවේ සිට කාලය ( අවුරුදු ) (Number of years since first issue of driving license) | | | |
| E13 අනතුර සිදුවීමට රියදුරාගෙන් බලපෑ පළමු හේතුව (Human pre crash factor 1 contributing to accident) | | | |
| E14 අනතුර සිදුවීමට රියදුරාගෙන් බලපෑ දෙවන හේතුව (Human pre crash factor 2 contributing to accident) | | | |
| E15 අනතුර සිදුවීමට පදිකයාගෙන් බලපෑ හේතුව (Pedestrian pre crash factor contributing to accident) | | | |
| E16 අනතුර සිදුවීමට මාර්ගයෙන් බලපෑ හේතුව (Road pre crash factor contributing to accident) | | | |
| E17 අනතුර සිදුවීමට වාහනයෙන් බලපෑ හේතුව (Vehicle pre crash factor contributing to accident) | | | |
| E18 අනතුර බරපතලකමට හේතුවූ කරුණ (Crash factor contributing to accident severity) | | | |
| E19 වෙනත් හේතු (Other factors) | | | |
| E20 මධ්‍යසාර පරීක්ෂාව (Alcohol test) | | | |
| E21 රියදුරු / පැදිකරු /පදිකයා අනතුරට වගකිව්වාද ? (Driver / Rider / Pedestrian at fault ?) | | | |
| E22 පර්යේෂණ දත්ත සඳහා (For research purpose) | | | |

| හානිකරු (CASUALTIES) | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| C1 අනතුරට හේතුවූ වාහනයේ අංකය (Traffic element number) | | | | | | | |
| C2 දණ්ඩ නීති සංග්‍රහයට අනුව හානිකරුගේ ස්වභාවය (Severity according to penal code) | | | | | | | |
| C3 වර්ගය (Category) | | | | | | | |
| C4 ස්ත්‍රී පුරුෂ භාවය (Sex) | | | | | | | |
| C5 වයස (Age) | | | | | | | |
| C6 ආරක්ෂණය (Protection) | | | | | | | |
| C7 රෝහල් ගත කිරීම (Hospitalized) | | | | | | | |

ගැටීමේ සටහන
(Collision Sketch)


අතිරේක තොරතුරු හෝ අනතුර සිදුවූ ආකාරය පිළිබඳ ලුහුඬු සටහනක්
( Discription of accident & additional information)

.....

.....

.....

.....

විභාග කරන නිලධාරියා විසින් මෙම වාර්තාව සකස් කරන ලදී. නම / අත්සන:
This Report has been prepared by the investigating Officer. Name / Signature: .....

ස්ථානාධිපති (රථ වාහන) විසින් මෙම වාර්තාව නිවැරදි බව සහතික කරන ලදී. නම / අත්සන:
This Report is certified to be correct by OIC (traffic). Name / Signature: .....

සංකේත ලිපිකරු විසින් සටහන් හා සංකේත යෙදීම පරීක්ෂා කරන ලදී
Entring and Coding checked by coding clerk Name / Signature: .....

ස්ථානාධිපති (සංඛ්‍යාලේඛන කොට්ඨාශය) විසින් සටහන් හා සංකේත යෙදීම පරීක්ෂා කරන ලදී
Entring and Coding checked by OIC (Statistics Division) Name / Signature: .....

H 036008 – 30,000 (2010/11) ශ්‍රී ලංකා රජයේ මුද්‍රණ දෙපාර්තමේන්තුව

Swc/28.05.2k3