3. CASE STUDY

FRAMEWORK FOR TRAFFIC INCIDENT MANAGEMENT FOR COLOMBO MUNICIPAL AREA

3.1 Introduction

The objective of this study is to propose a framework for traffic incident management within the Colombo Municipal Limits.

As previously said, funding is the major constrain for introducing new methods and systems. By keeping it in mind, a cost effective proposal is required to be proposed using the available infrastructures and institutional setups. On the other hand, when introducing new methods or systems, acceptance or support of the users would be very important for its success and further improvement. So introducing an efficient system with clear and doubtless benefits to the users is essential. Also it should not be an additional burden for the ordinary public.

3.2 Justification of the Selection of the Area

1. The area considered for the proposal is around 37.31 sq. km in extent but affected by various incidents frequently. Accidents, road repairs, people protests, VIP movements, temple processions are the frequent incidents for this area.

2. Since this is the capital city, vehicles from all directions are visiting and they are wasting their time and energy without knowing the occurrence of incident and any alternatives, when an incident occurred.

3. This area is having some infrastructure already to start with a new proposal with minimum investment.

Within the Colombo Municipal limits, only the traffic police is involved with the Traffic Incident Management at present. With the coordination of the other stake holders such as Colombo Municipal Council, Road Development Authority, Ministry of Health and others, this could be done more efficient than present.
For the Expressways, currently a separate traffic police unit and the following facilities have been provided.

1. Separate rescue team
2. Variable message signs
3. CCTV cameras at main locations
4. Traffic Operations (Control) Centre- TOC
5. Roadside Assistance
6. Dedicated telephone number

From this it is clear that to provide a better incident management, coordination with several other stakeholders is necessary.

### 3.3 Identifying Stakeholders

Establishing a successful Traffic Incident Management Team made up of members from all critical stakeholders is the first step towards establishing good coordination.

For this framework context, services of the agencies related with Law enforcement, Emergency medical treatment, Fire and Rescuing, Towing and recovery, Coroner’s service etc. could be taken as very urgent needs. Media, Repairs, Planning are also should be in the team.

**Members of a typical TIM Team may include representatives from:**

**A. Law Enforcement Authorities** - which are responsible for

1. Securing the incident area.
2. Safeguarding personal properties.
3. Conducting Accident investigations.
5. Directing traffic and serving as incident commander.

From the literature review, it is the traffic police who are carrying out the above said responsibilities. So, traffic police is identified as a stakeholder.
B. Transportation Agencies- Responsible for
1. Overall planning and implementation of incident management
3. Assist in incident detection and verification
4. Provide motorist information
5. Provide traffic control
6. Serve as incident commander for clearance and repair functions
7. Assist motorists with disabled vehicles
8. Establish and operate alternate routes
9. Determine incident clearance and roadway repair needs.

From the literature review it is clear that the traffic police is the currently responsible agency.

C. Highway Plan, Design, Construction & Maintenance Authorities – which is responsible for plan, improvement and maintenance of roads.

Within the Municipal area, Colombo Municipal Council is the responsible authority for design, construction and maintenance, with the advices of the Urban Development Authority. Outside the municipal limits, Road Development Authority is the responsible authority.

So, Colombo Municipal Council, Urban Development Authority and Road Development Authority are identified as stakeholders.

D. Fire and Rescue Authorities - Responsible for
1. Protecting the incident scene.
2. Suppressing fire.
3. Rescuing injured from wrecked vehicles.
4. Providing emergency medical care
5. Serving as incident commander.
6. Assisting in incident clearing, traffic control, transportation of injured.

Fire occurs very rarely on road incidents. But maintenance of fire brigade and crew should be kept standby throughout. As this is costly, this may create some negative impacts on the proposal. But since the Municipal Council is having this facility, it could
be devolved with it. As they have four bases spreading the entire area, easy access to any direction is ensured.

E. Emergency Medical Service providers – Responsible for
   1. Providing emergency medical care.
   2. Determining of destination and transportation for the injured.
   3. Serving as a commander for medical emergencies.

Department of Health Services is identified as another stakeholder.

F. Towing and Recovery Services - Responsible for
   1. Recover and remove vehicles from the scene.
   2. Protect victim’s property and vehicles
   3. Remove debris from roadway.

Clearing wreckage of vehicles and other items after an incident also an important task. Damaged vehicles and other properties are to be cleared quickly, after the necessary law enforcement formalities. It is required to store these items and vehicles in a suitable, safe way for the owner or his representatives/successors to identify their items and do necessary action as their wish.

The following important points are to be considered in this regard:
Clearing should be done carefully without further damaging the items.
Charges should be reasonable.
Service should be available at any time.
Safety of the wrecked vehicles and other items should be ensured.
Based on these requirements, involvement of a private party would be unlikely and costly. The Colombo municipal Council is identified as the most suitable authority to carryout these tasks. Availability of depots with yards facilities will strengthen the selection.

G. Coroner / Medical Examiner By law coroners or medical examiners are responsible for investigating deaths that result from anything other than natural causes. As such, they play an important role in investigating fatal accidents that occur on roadways. So, Ministry of Justice is also identified as a stakeholder.
H. Media

The typical roles and responsibilities of the media as they relate to incident management activities include:

1. Report traffic incidents
2. Broadcast information on delays
3. Provide alternate route information
4. Update incident status frequently
5. Provide video or photography services

Accordingly, the following institutions have been identified as stakeholders:

1. Traffic Police
2. Colombo Municipal Council
3. Health Services Department
4. Urban Development Authority
5. Road Development Authority
6. Ministry of Justice
7. All Media

3.4 Other Supporting Infrastructure Required

Main stakeholders have been identified under the chapter Nos:3.2 and 3.3. Now it is necessary to propose a method, for information to the road user, using an ITS method, for the completeness of the framework.

Here CCTV cameras are used to detect the incidents in some cases. In addition, at the junctions, they are used to observe the level of congestion. This ensures real-time updates of traffic information are displayed.

For displaying, Variable Message Signs are proposed at required locations.

a. CCTV cameras

CCTV cameras should be established along the main corridors, based on a criteria of selecting only main junctions of A and B class Roads, which provide another alternative route for the main corridor considered. As majority of the main junctions have already been equipped with CCTV cameras installed, only a few remaining junctions are to be
fixed with cameras to cover the entire area. Junctions located in the vicinity of outside of the city limits are also taken into consideration, to cover the incidents near to city limits.

Purpose of Fixing CCTV Cameras

1. To monitor the traffic level on the road.
2. To monitor any incident and its severance, within its range.

b. Variable Message Signs

Variable message signs should be fixed at required locations, identified for fixing CCTV cameras, just before and after the junctions along the main corridors, to display various information about the incidents, time required for clearance, alternative routes and traffic condition to the drivers. The boards should be big enough to display letters in big sizes but the message should be short. In addition to the text message, a display of colour indicator lights fitted against the leg showing an alternative route. This indicator lights would give more information for the drivers to decide their alternative route of travel. The text information should be given in all 3 languages. The colour lights represent the level of congestion of the alternative route. Also the colour lights should be in a different shape or style to avoid any confusion with the traffic signal lights.

c. Traffic Controlling/ Monitoring Unit

Already existing control room needs to be modified to suit current requirements.

d. Dedicated Radio Channel

A continuous broadcasting of the traffic condition and incident information may be more useful for the drivers for selecting their routes. The drivers those who are interested in going to the destination in time or earliest possible time can tune to this radio and get the updates and advices broadcasted from the controlling unit.

e. Dedicated Telephone number

As ‘1969’ has been allocated to for the Expressways, an easy number has to be allocated for reporting of incidents. It should be preferably toll free.
3.5 Methodology

The methodology proposed here is for the context of Colombo municipal area on the basis of utilizing the available resources to its maximum and cost effective, practical solutions.

3.5.1 Incident Notification

1. From a traffic policeman on duty.
2. Using the CCTV camera image.
3. From a resident of the area of incident.
4. From the media
5. From a road user.

3.5.2 Confirmation of Incidents

Whatever the message received, it should be confirmed by an authorized person before displaying. Some officers should be authorized for this purpose. Traffic police officers are the most suitable persons.

A preliminary notification could be displayed when an incident is seen by CCTV camera. If the incident is near to a camera, even the severity of the incident could be confirmed. For the other cases, an authorized person should confirm the incident.

3.5.3 Severity and Incident Clearance Time

The authorized person must be able to describe the incident, its severity and the possible time required for clearance to the control room. Whether the incident is fatal, what type of incident, direction affected, no of lanes affected are also to be informed.

3.5.4 Traffic Operations Centre (TOC)

It is proposed to upgrade the Police CCTV Division for this purpose and it will function as the Traffic Control Center. From this centre only various details of incidents and other related data are collected, confirmed and suitable details are displayed on sign boards.
Functions of Traffic Operations Center

a. Receiving of Messages:
   1. Information provided by public
   2. Information provided by traffic police
   3. Information obtained from CCTV camera images

b. Confirmation of Messages and other details by authorized personnel
   1. Type of incident
   2. No of lanes affected, direction and no. of lanes functioning
   3. Approximate time required to clear the incident- To give this details, the person who confirms, must have clear idea on:
      a. what type of incident
      b. severity of the incident
      c. what are the formalities to be completed before clearing the scene
      d. locations of the rescue personnel and time needed for them to reach the scene etc.

As this details are to be given with high accuracy, these personnel must be provided with extensive training. The Control Centre also should contact the other related sections before giving the incident clearance time.

3.5.5 Variable Message Signs

It is proposed to convert the direction boards as variable sign boards along the main corridor, wherever required, before and after the junctions at which CCTV cameras are installed. Proposed sign board should consist of 3 main portions.

1. Space to display variable messages operated by Traffic Operations Centre.
2. Space to show permanent direction markings.
The details given by the Traffic Operation Centers should be displayed from 2-3 junctions ahead of the incident. This is very important because our other roads are not capable enough to take many vehicles. So vehicles should spread to every possible roads to minimize congestion on the other roads.

Traffic level along alternative road will be monitored by Traffic Operation Centers using CCTV camera and display colour will be adjusted accordingly. This can give a more accurate real time updates. This update could be further improved by fixing intermediate cameras at required locations.

This type of colour indicator light system is proposed to reduce the amount of text in the display panel. As the messages are to be displayed in all three languages, due to space limitation, light indictors have been included. This can be seen by the driver from a reasonable distance and take a decision suit to him.
Showing Details of Possible Alternative Routes, Variable Message Signs Locations and CCTV Camera Locations for a Section

Figure No:3-2 Proposed Arrangement for A 2 Road Wellawatte South Area
Table No: 3-1 Parameters For VMS Locations for the Area Considered

Traffic Flow Direction: Moratuwa to Colombo.

Incident Location : Near Delmon Hospital, Wellawatte.

<table>
<thead>
<tr>
<th>Alternative Route No:</th>
<th>Location of VMS</th>
<th>Parameters Considered</th>
<th>Points taken into consideration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>50m from Hill Street Junction Moratuwa Side</td>
<td>Vehicles can go along Attidiya Road, Horana Road</td>
<td>Long distance; Possible traffic in Horana Road</td>
</tr>
<tr>
<td>2</td>
<td>Infront of Dehiwela Mt.Lavinia MC</td>
<td>Can go to Saranangara Road or Horana Road</td>
<td>Horana Road traffic.</td>
</tr>
<tr>
<td>3</td>
<td>Wellawatte Bridge</td>
<td>Can turn to Marine Drive/ Ramakrishna Road</td>
<td>Better selection</td>
</tr>
<tr>
<td>4</td>
<td>50m Moratuwa side of Vihara Lane</td>
<td>Vihara Lane; Sri Subuthi Road, Hampton Lane, WA SilvaMw</td>
<td>Possible Congestion in Sri Subuthi Road and Hampton Road</td>
</tr>
</tbody>
</table>

3.6 Findings/ Results

Some form of traffic incident management is being carried out now by mainly the traffic police. This could be improved by coordinating with other stakeholders.

A basic incident management for the Colombo city limits could be done successfully by traffic police, Colombo municipal council, Department of Health Services, Urban Development of Authority, Road Development Authority, media and Ministry of Justice jointly. All these organizations are capable of take up the task.

The available CCTV cameras and the Operations Centre could be upgraded suitably and utilized to display messages on newly modified variable message boards.
3.7 Discussion

An efficient traffic incident management could reduce the congestion considerably in the following ways:

1. Quick clearance.
2. Prevent accumulation of vehicles at the scene.
3. Well organized traffic control at scene.

Under the proposal, currently under utilized CCTV cameras will be used to monitor traffic level, incidents and its severity within its range. These real time updates would be more beneficial in user information systems. Similarly, the present monitoring center, will become a traffic operations centre with required modifications to alert the required authorities and analyze incidents.

Advantages of the proposed system:

1. Under normal circumstances, these variable message boards could be used to guide the drivers by updating the congestion level. So over congestion in a particular road could be avoided.
2. Display lights could be seen easily during nights also.
3. Can use to display other related information. Eg. Temple festivals, processions (political and religious), flooding on road etc.
4. Integrating Parking Management

Parking is another main reason for congestion in the city. Parking Management is another ITS application. Parking causes following effects on the congestion:

1. In search of parking lots, vehicles moving at reduced speeds causing congestion.
2. In the case of non availability of parking lots, the tendency of parking along roadside increases, which causes congestion.
3. Moving of vehicles in search of parking lots, causes congestion.

Based on a criteria, by integrating the details of availability of parking lots with the Traffic Operations Centre, real time updated detail could be made displayed on the boards at the required locations. This may be extended to large, private customer parking also to attract their customers.
4. Useful when carrying out investigations about an incident or any other event, if it is within its range.

![CCTV Image](image.jpg)

Fig 3-3 A recent accident in which CCTV image used to identify the culprit.

**Funding for Maintenance:**

Even though the available infrastructure and organizational setups are considered for this proposal, basic funding for establishing the facilities is required. Until the public realizes the benefits of this incident management, no levies charged from the public. Some other proposals for income through this system are given here:

1. Other side of the display board could be given for advertisements and maintenance of board can be arranged with them.
2. Information displayed for private parties could be charged (e.g., parking).
3. During non-peak times selected advertisements could be displayed.
4. The CCTV cameras could be used for various other purposes and earnings could be used for maintenance.
   
   Eg: High speed vehicles, Law breaking vehicles at intersections etc could be identified with the aid of cameras and fined.

It is very important to show clearly the effectiveness and advantages of the Traffic Incident Management to the road users doubtlessly, in order to convince them, attract them and to get their support for further improvements. Comparing with the loss to economy due to delay, fuel wastage and environmental damage, the investment required will be a small portion only.