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URBAN TRAFFIC SPEED MANAGEMENT: THE USE OF GPS/GIS.

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1.0 INTRODUCTION

- Speed management is simply a way of adopting various methods such as
- Legislation,
- Road layout measures,
- Enforcement,
- Campaigns or
- *An advanced technology to help in regulating the speed of vehicles.*

2.0 THE FIELD OBSERVATIONS :
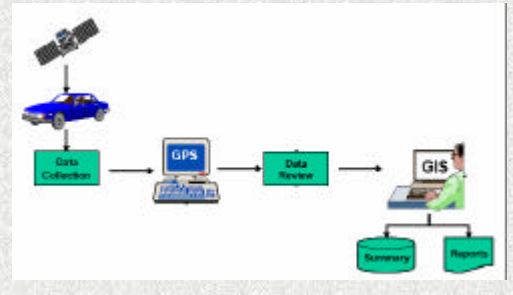
The GPS receiver gives information on the ff :

❑ Mapping the overall road network for the study area.

❑ Vehicle locations (Latitude & Longitude pairs).

❑ Travel Times.

❑ Vehicle Speeds.

All these were recorded automatically at regular sampling periods.

3.0 DATA PROCESSING AND REDUCTION

1. Background map preparation:

- One of the key successful components for real-time GPS mapping is a background map.

4.0 GIS APPLICATION:

-It is obvious that a map with spatial data will allow the user to accomplish different tasks including:

§   Selection of features based on their

     proximity to other features.

§   To carry out a network analysis.

§   To track any vehicles position on the

     network.

§   To layout a map and print it.

- A database was finally created for the road network.

5.0 RESULTS:

1.0 Speed profiles:

The average speeds of the moving test vehicle in traffic at any given location along the designated routes for given periods of time of the day have been presented as the speed profiles.
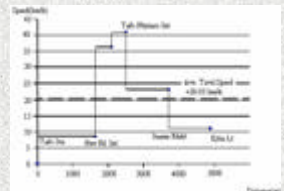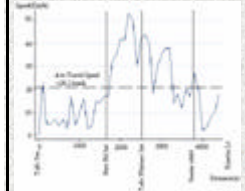


Speed-Distance Profile for Mampong road from a GPS File.

Speed-Distance Profile for Mampong road by manual method.

- **The peaks depict sections of the route with high speeds**
- **The troughs indicate sections with low speeds**
- **Speeds below 20 km/hr, the level of service (LOS) is unacceptable**
- **Speeds greater than 30 km/hr, the level of service (LOS) is acceptable**
- **Therefore sections of the route where traffic speeds are below 20 km/hr presented traffic congestion and bottlenecks in the road network**

2.0 Distribution of congested route sections

Route Name	Length (km)	Carriage-way Status	<20km/hr LOS=E, F	20-30km/hr LOS=C, D	>30km/hr LOS=A, B
Harper Road	2.5	Single	52%	25%	23%
Accra Road	3.4	Dual	6%	16%	78%
Bekwai Road	5.2	Single	15%	65%	20%
Lake Road	3.2	Single	33%	43%	24%
Antoa Road	5.7	Single	17%	52%	31%
Western By-Pass	3.6	Dual	8%	12%	80%
Okomfo Anokye Road	5.9	Dual	4%	9%	87%

3.0 Percentage Distribution of Congestion on typical routes.
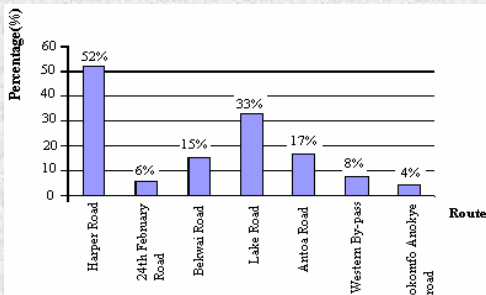
4.0 Mapping of speeds in GIS:

a. Different colour codes have been used to represent different categories of:

➢ Speed classes on the various routes and at a glance.

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  Legend
  1. Red=speed<20km/hr.
- 2. Yellow=speed: 20-30km/hr
- 3. Green=speed>30km/hr

- **Sections where traffic speeds are unacceptably low and present bottlenecks in the road network can be readily seen after querying the system.**

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Conclusion:

Vehicular traffic speeds in the urban environment can effectively be managed by the application of the GPS and GIS because:

➢ Mapping of the situational road traffic speed at any given time brings out the desired geographic patterns and relationships which are fundamental decision making tools for the management of the urban traffic system by the Urban Planner.

➢ guesswork as to which routes require attention is eliminated.

➢ The speed profiles for the various routes become handy in establishing sections along the routes where there are bottlenecks

➢ In general, the dual carriageway routes presented higher traffic performance than the single carriageway roads. The later depict roads under stress which require immediate attention.

THANK YOU!!!!!!!